A CONTINUING EDUCATION PROGRAMME FOR REGISTERED NURSES WORKING AT MINE MEDICAL STATIONS

Jan Johannes Keogh, M.Soc.Sc.

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Promoter : Prof. F. M. J. de Villiers
Co-promoter : Dr. C. P. Kahl

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ABSTRACT

A CONTINUING EDUCATION PROGRAMME FOR REGISTERED NURSES WORKING AT MINE MEDICAL STATIONS

Continuing education is necessary if the registered nurse wants to remain professionally competent, and up-to-date regarding theory and clinical skills development. This fact is ably demonstrated in the available literature.

The need for a specific continuing education programme for registered nurses working in the mine medical stations of the gold mining industry, was identified at a meeting of senior medical station superintendents of the Freegold Mines, a subsidiary of the Anglo American Corporation of South Africa. The fact that no such programme existed was identified as the main problem, and this served as the motivation for this study.

Continuing education can be very costly. The development of such a programme therefore warrants careful planning in order to ensure that the end product (the curriculum) will be of such a nature that the student, the health care service and the health care consumer will benefit from it. The researcher therefore conducted a situational analysis at the mine medical stations of the Freegold mines in Welkom, and the Gold Fields of South Africa Limited mines in Carletonville. This was done to determine

- the exact learning needs of the registered nurses in the mine medical stations;
- the types of services offered at the medical stations;
- the needs of the health care consumers (mine workers), based on the monthly reports of the conditions that treatment was provided for; and
- the ability of the Gold Fields Nursing College and Ernest Oppenheimer Nursing College to present and maintain the continuing education programme.

From the analysis of the collected data, it became clear that the

need expressed by the senior medical station superintendents was indeed a need experienced by all the registered nurses in the mine medical stations. Problems encountered in the health care services in the mine medical stations were identified, and the exact learning needs of the registered nurses were established. Based on these findings, a curriculum for continuing education was developed, including the main nursing disciplines as identified during the situational analysis. In the mine medical stations, a unique health care service is rendered, with occupational health nursing as the main focus. Primary health care and primary health nursing science (including the physical assessment and relevant pharmacology), traumatology and ethos and professional practice of nursing also form important components of the curriculum.

The analysis of the nursing colleges revealed that the Gold Fields Nursing College would experience difficulties in trying to offer such a continuing education programme at the present time, due to the staffing position, diversity of subjects presented by the teaching staff and possible staffing shortages. The Ernest Oppenheimer Nursing College is in the process of discontinuing their nursing education programme, and would therefore not be in a position to present the programme. The curriculum will now be handed to the Department of Nursing at the PU for CHE, who will make it available to teaching institutions that will be in a position to present the programme.

OPSOMMING

'n VOORTGESETTE ONDERWYSPROGRAM VIR GEREGISTREERDE VERPLEEGKUNDIGES WERKSAAM IN MYN MEDIESE STASIES

Voortgesette onderwys is belangrik vir die geregistreerde verpleegkundige wat professioneel paraat en op hoogte wil wees met moderne teoretiese en kliniese ontwikkeling. Hierdie feit is omvattend geboekstaaf in die literatuur.

Die behoefte aan 'n spesifieke voortgesette onderwysprogram vir die geregistreerde verpleegkundige in die myn-mediese stasies van die goudmynbedryf is tydens 'n vergadering van senior mediese stasiesuperintendente van die Freegold-myne, 'n onderafdeling van die Anglo American Corporation of South Africa, geïdentifiseer. Die gebrek aan so 'n kursus is as die hoofprobleem geïdentifiseer en het as motivering vir hierdie studie gedien.

In die lig van die hoë kostekomponent van voortgesette onderwys moet die ontwikkeling van sodanige onderwysprogram baie noukeurig gedoen word ten einde te verseker dat die eindproduk (die kurrikulum) aan die behoeftes van die student, die gesondheidsdiens en die gesondheidsdiensverbruiker (die mynwerker) sal voldoen. Die navorser het daarom 'n situasieanalise by die myn-mediese stasies van die Freegold-myne te Welkom en die Gold Fields of South Africa Limited-myne te Carletonville gedoen. Dit is uitgevoer ten einde:

- die presiese leerbehoeftes van die geregistreerde verpleegkundiges in mediese stasies te bepaal;
- die tipe dienste gelewer te identifiseer;
- die behoeftes van die gesondheidsdiensverbruikers, gegrond op maandelikse statistiese verslae, te bepaal;
- die vermoë van die Gold Fields Nursing College en Ernest Oppenheimer Nursing College om 'n voortgesette onderwysprogram aan te bied, te bepaal.

Die analisering van die data het blootgelê dat die behoefte, soos

geïdentifiseer deur die senior mediese stasiesuperintendente, ook deur die ander geregistreerde verpleegkundiges werksaam in myn-mediese stasies, ervaar word. Die probleme in die gesondheidsdienste van die mediese stasies, asook die presiese leerbehoeftes van die geregistreerde verpleegkundiges, is geïdentifiseer. Gegrond op hierdie bevindinge is 'n kurrikulum met bedryfsgesondheidsverpleegkunde as hoofkomponent ontwikkel. Ander belangrike komponente binne die unieke gesondheidsdienste van die goudmynbedryf is primêre gesondheidsorg en primêre verpleegsorg (insluitende die fisieke ondersoek en relevante farmakologie), traumatologie, die etos en professionele praktyk van verpleging.

'n Ontleding van die data betreffende die verplegingskolleges het bewys dat die Gold Fields Nursing College huidiglik nie so 'n kursus sal kan aanbied nie, vanweë die kombinasies van vakke aangebied deur die personeel, die personeelkwota en 'n moontlike personeeltekort. Die Ernest Oppenheimer Nursing College is besig om hul verplegingsonderwysprogram uit te faseer en sal gevolglik nie die kursus kan aanbied nie. Die kurrikulum sal dus deur die Departement Verpleegkunde van die PU vir CHO aan onderriginstansies wat wel die kursus kan aanbied, beskikbaar gestel word.

PROEM

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Dedicated to Jan-Pieter, whom I love very much.

PART 1

THEORETICAL PERSPECTIVE

CHAPTER 1

INTRODUCTION, ORIENTATION AND STATEMENT OF THE PROBLEM

OVERVIEW OF THE CHAPTER

The aim of this chapter, is to provide a broad overview of the course of the research.

This aim is achieved through:

- giving an overview of the reasons that originated the study;
- stating the ensuing problem;
- stating the objectives of the study;
- explaining certain key concepts;
- demarcating the research terrain, and
- stating the course of the study.

1.1 INTRODUCTION

The need for continuing education for mine medical station personnel, was identified in the minutes of a meeting of senior medical station superintendents and medical station superintendents of the Freegold mines, held on 13 February 1989 in the Board Room of the Ernest Oppenheimer Hospital. It reads as follows:
"It was agreed that continuing medical education was an urgent requirement for mine medical station staff, and that the support of both medical management and mine management was necessary" (AACSA, 1989:1).

1.2 FORMULATION OF THE PROBLEM

Searle (1986:117) states that the nurse has a duty towards his employer to remain professionally competent. This can be achieved through continuing education. Continuing education is also very important in services where nurses are responsible for large groups of clients on a daily basis. During the situational analysis it was established that of the nurses employed in mine medical stations, 71,2% of those employed at the Freegold mines, and 63,6% of those employed at the Gold Fields of South Africa mines, were registered nurses holding one registration only. These nurses were not educated to render comprehensive health care. The need for a continuing education programme for nurses working in mine medical stations, had already been identified (AACSA, 1988(d); AACSA, 1989).

1.3 STATEMENT OF THE PROBLEM

No specific continuing education programme exists for registered nurses working in the mine medical stations of the gold mining industry. This fact served as the motivation for this research.

1.4 ORIGIN OF THE STUDY

The education policy of the South African Nursing Council supports the principle of a comprehensive health care system (preventive, promotive, curative and rehabilitative services), as laid down by the Health Act, No 63 of 1977.

To this effect, the South African Nursing Council has developed a new comprehensive education programme for all basic nursing students. This leads to registration as a nurse (general, psychiatric and community) and midwife, and ensures that the registered nurse is able to provide for all the health needs of the community, whether these be institutional- or non-institutional health care (South African Nursing Council, 1983:2). Because these modifications in nursing education are relatively new, most practising registered nurses were not educated under these regulations, and therefore did not receive a comprehensive basic education.

Mine medical station personnel identified the need for continuing education which will enable them to render a comprehensive health care service. At a meeting held by medical station superintendents on 8 September 1988, it was decided that a community nursing science programme would be more convenient, as it led to registration with the South African Nursing Council, and successful candidates were eligible to wear a yellow bar (AACSA, 1988(d):1). As recommendation, the occupational health nursing science programme under consideration by the South African Nursing Council was looked upon as the programme of choice (AACSA, 1988(d):2). At a further meeting held on 13 February 1989, and attended by representatives from the Potchefstroom University for Christian Higher Education, the Mine Medical Officer's Association, Ernest Oppenheimer Hospital and Ernest Oppenheimer Nursing College, as well as the Mine Medical Stations Superintendent's Association, it was decided to develop a programme giving attention to primary health care, occupational health nursing, and an in-service education programme (AACSA,

1988(d):1).

The job description of the registered nurses employed at the mine medical stations includes the conducting of physical assessments as a major component of their professional practice. The physical assessments also form part of the pre-employment examination of new recruits in the gold mining industry, and could lead to the rejection of a recruit. Nurses also deal with the casualties and all the patients reporting to the medical station during duty hours (AACSA, 1988(a, b, c)). Until 1986, student nurses in the Republic of South Africa were not necessarily trained to conduct physical assessments on patients.

The accepted ratio of nurse:population is 1:500 for third world countries. In 1985 the ratio of registered or professional health service unit:population in South Africa was 1:199. For 1985/1986 the registered nurse:population ratio was 1:423 (Kotzé, 1987:4-5). During the period January - November 1990, the Freegold Mines in Welkom employed a total average of 84 752 workers in all their mines, as well as a total of 60 registered nurses in the mine medical stations. This gives a registered nurse:population ratio of 1:1 413.[1]

Empirical observation during June 1989 established that an average of 143 000 patients were seen on a monthly basis at the mine medical stations.

Gold Fields South Africa Limited employed a daily average of 44 379 people, during 1989 in the four mines included in the study (Petschel, 1990:17). During March 1990, the researcher interviewed 11 registered nurses employed in the mine medical stations of Gold Fields South Africa Limited in Carletonville, and was assured that these 11 nurses were the total registered nurse complement. This gives a registered nurses:patient ratio of 1:4 034. During February - April 1990, the registered nurses

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[1]: figures obtained from Dr P Allin, Senior Medical Officer : Free State Geduld Mine, on 11 December 1990.

at the Gold Fields South Africa Limited mines in Carletonville, treated a total average of 5 446 patients per month.[2]

1.5 OBJECTIVES OF THE STUDY

The aim of this study is the development of a continuing education programme that will enable the registered nurse working in a mine medical station in the gold mining industry to render a comprehensive health care service to mine workers. To date no such programme exists, and a unique programme must be developed within the parameters of the South African Nursing Council regulations and directives, the needs of the gold mining industry, and the educational needs of the registered nurses working in the mine medical stations of the gold mining industry. This proposed programme will make a contribution to the professional practice of nurses employed in mine medical stations.

The aims of the study can be realized through the following objectives:

1. undertake a situational analysis in order to

1.1. establish the nature of the services rendered in the mine medical stations:

1.2. establish the education, knowledge and skills of the registered nurses rendering these services; and

1.3. establish the exact educational needs and professional skills of the registered nurses employed in mine medical stations, which will enable the researcher to establish a continuing education programme for a comprehensive health care service in mine medical stations.

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[2]: figures obtained from monthly reports submitted to Dr E G Petschel.

2. Establish this course within the parameters of the South African Nursing Council's regulations and directives for nursing education, and the regulations of the gold mining industry.
3. Implement and evaluate this programme for continuing education in order to ensure that the programme will meet the needs of the registered nurses and the health care service of the gold mining industry.

1.6 EXPLANATION OF KEY CONCEPTS

CONTINUING EDUCATION

Shamian and Lemieux (1984:86) state:

"Continuing education has become an accepted way of life for all professionals. The only possible way to maintain high quality services is by the ongoing acquisition of new knowledge."

Simultaneous references to in-service education are made, which creates the impression that Shamian *et al*. view the concepts of "in-service education" and "continuing education" synonymously.

Sutcliffe, (1989:73) states that:

". . . inservice programming is necessary to assist staff nurses to maintain and update their clinical knowledge and skills".

For the purpose of this study, the concept "continuing education" will be used, and will include "in-service education".

PRIMARY HEALTH CARE

The South African Nursing Council (1992(a):1) subscribes to the definition of primary health care as provided by the World Health Organisation, but adapted article VI of the Alma Ata declaration, resulting in the following definition of primary health care:

"Primary health care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made accessible to all individuals and families in the

community at every stage of their development through their full participation and at a cost that the community and country can afford to maintain, in the spirit of self-reliance and self-responsibility. It reflects and evolves from the economic conditions and socio-cultural and political characteristics of the country and its communities and is based on the application of the relevant results of social, bio-medical and health services research and public health experience. It forms an integral part of the country's health systems, of which it is the nucleus and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and communities with the formal and informal health systems, bringing health care as close as possible to where people live and work. Primary health care constitutes the first element of a continuing health care process in a comprehensive health system."

In this study, the quoted definition will be used.

PRIMARY NURSING

According to Macdonald (1988:798) primary nursing was originally defined by Manthey as being a ". . . system for delivering nursing care in an in-patient facility".

Currently, primary nursing implies the 24 hour responsibility for each patient's care to the primary nurse, as confirmed by various authors (Binnie, 1987:36; Bowers, 1987:36; Rinke, 1984:1227).

A combination of the above mentioned definitions will be used in this study.

PRIMARY CARE

MacDonald (1988:798) defines primary care as ". . . usually involving community-based health workers, providing distributive care to an ambulatory population".

Brown (1981:113-114) states that nurses provide primary care for

injured workers or workers who became ill at work. It constitute the first care provided to the worker, as well as the continued care for the ambulatory patient.

A combination of these definitions will be accepted for this study.

MINE MEDICAL STATION

Duminy, Lowe and Munro (1990:218-219) state that:
"Medical stations are usually associated with the hostels which are the living areas of the workers".

The authors further list the physical requirements of such a facility, as well as:

1. the category of nurses employed in the mine medical station, and
2. the type of services rendered to the worker at the medical station (Duminy *et al.*, 1990:218).

MEDICAL STATION SUPERINTENDENT

According to the job description of the senior medical station superintendent and the medical station superintendent, these titles are used to describe a specific nursing position of authority within a mine medical station. The person must be a registered nurse, and the post encompasses both administrative and clinical components (AACSA, 1988(b):1-4). These titles also apply at the Gold Fields of South Africa Limited mines in Carletonville. The Freegold mines in Welkom is in the process of phasing these titles out , and replacing them with new titles in accordance with public service titles, but at the time of completion of this study, the old titles still apply.

AMBULANCE OFFICER

According to the job description of the ambulance officer, this title refers to a specific nursing position within a mine medical station. The person must be a registered nurse, and the post encompasses both administrative and clinical components. The

employee in this post will be supervised by the medical station superintendent (AACSA, 1988(c):1-3). These titles only apply to the Freegold mines, as the Gold Fields of South Africa Limited mines uses title descriptions similar to those in the public service. This title is also in the process of being changed at the Freegold mines, but at the time of completion of this study, it still applies.

STUDENT

According to the Oxford Reference Dictionary, (Hawkins, 1986:820) a student is

". . . a person who is studying, especially at a university or other place of higher education . . .".

For the purpose of this study, a student will be a registered nurse employed in a mine medical station and following the continuing education course developed in this study in order to achieve the set objectives.

PATIENT

"The patient is a person, sick or well, who needs help to supplement his specific ability to accept optimal responsibility for his own health in the various health service and treatment areas . . ." (The South African Nursing Council, 1985(a):4).

LEARNING

For the purpose of this study, learning is defined as that activity which leads to change at the level of cognitive, affective and psycho-motor domains, through active involvement of the student (The South African Nursing Council, 1985(a):2).

SKILLS

Skills include cognitive, affective, psychomotor and interpersonal aspects (Fourie & Laubser, 1989:1)

LEARNING OPPORTUNITY

"A learning opportunity is the possibility for learning created by the educator in classroom and clinical teaching situations and used by the student to reach learning objectives" (The South African Nursing Council, 1985(a):4).

LEARNING EXPERIENCE

"A learning experience is a learning opportunity used by the student" (The South African Nursing Council, 1985(a):4).

CLINICAL TEACHING

"Clinical teaching is the practice-oriented teaching given to students in laboratory situations" (The South African Nursing Council, 1985(a):4).

AN OBJECTIVE

"An objective is a specific description of measurable behavior required from somebody at a given stage. Stage objectives are objectives which should be achieved at various levels during a programme" (The South African Nursing Council, 1985(a):4)

1.7 RESEARCH METHODOLOGY

A literature survey was undertaken as follows:

- A computer search was done at the Ferdinand Postma Library of the Potchefstroom University for Christian Higher Education, using key words such as nurse, nursing, in-service education, occupational health nursing, primary nursing, and traumatology. The ERIC and MEDLINE data revealing systems were used.

- Relevant primary and secondary sources were studied. Current literature in occupational health nursing science is not readily available, and books such as the book by Schilling (1981) is still one of the best available sources. All the sources were then assimilated into a

coherent structure for the purposes of this study.

- A situational analysis was done at the 11 mine medical stations of the Freegold South mines, the 11 mine medical stations of the Freegold North mines, and four of the Gold Fields of South Africa Limited mines in Carletonville, as well as the Ernest Oppenheimer College of Nursing and the Gold Fields Nursing College, where the continuing education programmes could be offered. The situational analysis included interviews with the following people:
  * all registered nurses employed at the mine medical stations;
  * the Medical Superintendent of the Ernest Oppenheimer Hospital and Leslie Williams Memorial Hospital; and
  * the principals of the Ernest Oppenheimer College of Nursing the Gold Fields Nursing College.

These interviews were necessary to address the variables involved in the areas where the individuals interviewed are working.

- Census sampling was used as the total population of registered nurses employed at the mine medical stations of Freegold and the four mines of Gold Fields of South Africa Limited will be included in the study.
- Checklists were used to guide the interviews during the situational analyses.

1.8 COURSE OF THE STUDY

The study is divided into two parts.

PART 1. THE THEORETICAL PERSPECTIVE

Chapter 1 gives an overview of the course of the research.

Chapter 2 illustrates the need for continuing education for professional nurses even in the mine medical station set up.

Chapter 3 illustrates the infrastructure and function of mine medical stations, as well as the origin, role and function of the registered nurse within the mine medical station.

Chapter 4 places the role and functions of the registered nurse in the mine medical station within the parameters of the discipline of occupational health nursing science, primary health nursing science (including primary health care), ethos and professional practice of nursing, and trauma nursing science.

Chapter 5 deals with the theory of curriculum development.

PART 2. THE EMPIRICAL PERSPECTIVE

Chapter 6 deals with the research methodology of the study.

Chapter 7 discusses the data analysis and discussion of the results of the situational analysis, the pilot implementation of the programme and the evaluation of this presentation.

Chapter 8 contains the conclusions, recommendations and a conclusive remark for this research.

CHAPTER 2

CONTINUING EDUCATION FOR NURSES IN THE MINING INDUSTRY

OVERVIEW OF THE CHAPTER

The aim of this chapter is to provide an overview of continuing education for registered nurses with special reference to the registered nurse employed within the gold mining industry.

This aim is achieved through:

- explaining the need for continuing education;
- explaining the previous training as offered by the SOUTH AFRICAN NURSING COUNCIL;
- exploring the cost factor of continuing education;
- explaining the different types of continuing education;
- exploring certain topics for continuing education;

2.1 INTRODUCTION

On 8 September 1988, a group of medical station superintendents met at the Canteen of the Western Holdings mine in Welkom. At this meeting the need for a continuing education programme for registered nurses working in the mine medical stations of the gold mining industry was discussed. The minutes of this meeting contained the following statement:

> "It was strongly felt by all medical station staff approached in this survey that there is a overdue and urgent need to upgrade the standards and staff of medical stations" (AACSA, 1988(d):2).

This statement was upheld at a subsequent meeting held on 13 February 1989 at the Ernest Oppenheimer Hospital Board room (AACSA, 1989:1), and served as a motivation for this research.

2.2 THE NEED FOR CONTINUING EDUCATION

What is continuing education, and how do people perceive it? Binger and Huntsman (1988:229) illustrate the general negative perception of continuing education as follows:

> "When managers or educators hear the terms, they may envision repeating the basics of some procedure or skill, such as an aseptic technique or preoperative nursing assessment."

Puetz, Dejanovich, Strauss and Tobin (1988:227) approach continuing education differently by stating

> "Inherent in the definition of a profession and its societal responsibility are the dimensions of maintaining currency of its practitioners and contributing to its ongoing growth and enhancement. One way of achieving these goals is through continuing education".

Djupe (1987:154) confirms this necessity for continuing education

as a means of keeping abreast with new developments in nursing, and mentions that principles of adult learning must be kept in mind.

Pickard and Burns (1979:416) developed a continuing education programme for nurses in rural areas, aiming at updating their knowledge and introducing them to new ways of thinking.

The programme developed by Pickard *et al.* (1979:416) would lead to growth and enhancement, as spelled out by Puetz *et al.* (1988:227). This would have a very positive outcome on the professional growth and development of the registered nurse, yet, at the same time, Binger *et al.* (1988:229) identified a very negative perception of continuing education amongst the nursing fraternity.

Another very negative aspect of continuing education is highlighted by O'Connor (1982:19), namely the tendency to attend continuing education programmes that might be interesting but unsuitable for the current situation of a particular nurse. Recent adverse events at a hospital or health care service often lead to a better attendance of a particular programme, but the rest of the programmes have to be mandatory at times before people attend them.

It is therefore clear that continuing education can be viewed positively or negatively, depending on the registered nurses or their setting. However, it is also equally clear that continuing education can lead to growth and development in the professional life of the registered nurse. The registered nurse must therefore be motivated, internally or externally, to perceive continuing education more positively. One can actually state that continuing education forms an integral part of the professional life of the registered nurse. Although in-service education is viewed as a type of continuing education, Durham (1988:76) views it as a separate entity. The author is, however, more concerned with the documenting and evaluation of continuing

education programmes, which is essential in a country where there is mandatory re-licensure in certain disciplines.

Thompson, Pitotti, Beard, Sanger and Arnott (1987:67-68) describe a particular continuing education programme, and list the following primary goals for this programme:

- To make continuing education programmes available to nurses in a specific area;
- to keep costs low;
- to reduce staff shortages by offering the programme in this area, therefore students did not have to go away in order to attend a continuing education programme;
- to reduce duplication;
- to offer the programme to as many nurses from the area as possible;
- to keep nurses up to date regarding new developments in nursing; and
- to maintain or improve the standard of nursing care in that area.

These goals can become the drive for continuing education programmes for registered nurses in the gold mining industry.

It becomes therefore important to assess the necessity for continuing education, including continuing education for registered nurses employed in the gold mining industry, and its influence on practising nurses. In order to do this, the viewpoint of some nursing councils and associations should be examined.

The United Kingdom Central Council (UKCC), states that:

> "Every nurse, midwife or health visitor should be accountable for her practice, and take every reasonable opportunity to sustain and improve her knowledge and professional competencies" (Allan & Mossman, 1988:452).

The UKCC also indicated that there is a move towards regular

updating for nurses and health visitors, and 1990 was set aside as the deadline for setting this system into operation (Balcombe, 1988:696). However, this did not materialise, for a variety of reasons, such as the implementation of the new education programme for British nurses, called "PROJECT 2000" (Balcombe, 1988:696).

The American Nurses' Association states that:

> ". . . leadership for the quality of all nursing education programs, including continuing education, has been a commitment of the professional association since its founding in 1896" (American Nurses' Association, 1984 as quoted by Puetz *et al.*, 1988:227)

The South African Nursing Council's viewpoint is contained in regulation R 879 of 2 May 1975, as amended, which states in its guide that:

> "The importance, and the possible methods, of keeping abreast of developments in nursing and within the profession after registration, should be emphasized throughout the course" (South African Nursing Council, 1975:4).

The South African Nursing Association was established under the auspices of Section 38 of the Nursing Act, Act 50 of 1978. The duties of the Branches of this Association, as spelled out in the Constitution of the South African Nursing Association, is to

> ". . . assist with the development of an adequate and effective nursing and midwifery service in the area through professional development of members" (The South African Nursing Association:22).

It is therefore clear that the South African Nursing Association views professional development as so important that this section is included in its constitution. One way of bringing about professional development would be through continuing education, which can be formal or informal, as in the case of the South

African Nursing Association.

Searle (1987:118) concurs with this, and states that nurses must remain professionally competent and current as far as the latest development in nursing is concerned. She emphasizes that professional nurses are held accountable for their actions by the law and the controlling peer group, as embodied in the South African Nursing Council (Searle, 1987:2).

From these viewpoints it becomes clear that the professional controlling bodies of at least three countries view professional competence for registered nurses as an integral part of being a professional. Continuing education programmes can be seen as a means of remaining professionally competent.

2.3 BASIC NURSING EDUCATION

Prior to 1986, nurses in the Republic of South Africa could follow, *inter alia*, a basic nursing education programme, leading to registration as a general nurse. This course was offered under the auspices of the South African Nursing Council.

The purpose of the course is spelled out in Regulation R 879 of 2 May 1975, as amended. The purpose includes, *inter alia*:

- the development of an appreciation for the importance of preventive, curative and rehabilitative health services in the community, and
- teaching students to recognize signs and symptoms, as well as teaching them to master diagnostic, therapeutic and technical skills in nursing (South African Nursing Council, 1975:3).

By analyzing these two statements, it becomes clear that the student completing this course was not trained to render a comprehensive health care service. In fact, the course aimed very much at curative hospital health care, with an appreciation for preventive, curative and rehabilitative health care.

Analysis of the curriculum reveals that:

- a course in preventive and promotive health care and family planning was included in the curriculum, offering a lecture complement of 120 lectures, and a practical complement of 160 hours;
- the content of this course dealt with basic concepts from the discipline "community nursing science";
- it contained three levels of the subject "Nursing science and art", which concentrated on nursing the sick patient in the hospital (South African Nursing Council, 1975:11-13).

It is not clear whether ". . . special pathological, diagnostic, therapeutic and nursing skills . . . " (South African Nursing Council, 1975:12) includes instruction about the physical assessment of a patient.

Searle (1987:196) indicated that nursing research highlighted the fact that nursing education programmes were lacking in certain aspects, which could be the result of nurse educators that were not current. The government has also stated that the nurse will become the the central figure in the development of the health services of South Africa, and nursing education will have to prepare the nurse for this role (Searle, 1987:194). This necessitated the development of new comprehensive education programmes for nursing colleges and universities, as implemented since, or just prior to, 1986. Registered nurses who did not receive this comprehensive education, could update their knowledge by either enroling for a registrable post-registration course, or a planned continuing education programme serving specific service needs.

No specific reference to the teaching of the caring component, or affective domain of nursing, is made. However, the nurse in the gold mining industry works with large groups of patients on a daily basis, and this calls for a great awareness of the caring component. Rinne (1987:40) refers to the three parts of caring, namely:

- the nurse's ability to recognize the needs of others;
- the nurse's ability to respond to the recognized need in a meaningful way, leading to a positive solution of the need, and
- the nurse's ability to provide emotional support to the patient.

Although the above mentioned parts of caring may not intentionally be left out of the specific curriculum being discussed, continuing education will make this material available to the registered nurses of the gold mining industry. Rinne (1987:41) continues by stating that nursing care must be rendered on a interpersonal basis, where ". . . two people are involved: the nurse, who is educated to recognize, evaluate and respond appropriately; and the patient, who is sick or in need of health services".

It becomes clear that the nurse holding a registration as a general nurse, with or without additional qualifications in midwifery, psychiatric and community nursing science, will find it difficult to render comprehensive health care to patients. The mining industry employs many of these nurses. The services needed by the mine employees (patients) warrants much more than mere hospital nursing, and continuing education is the only way to upgrade the expertise and skills of the registered nurse.

2.4 THE COST FACTOR IN CONTINUING EDUCATION

Continuing education can be very expensive, as it involves registered nurses employed in a specific capacity. These nurses must render patient care while simultaneously follow a continuing education programme. The need for continuing education has been adequately dealt with, but finding the time to offer such a programme offers specific problems. Sutcliffe (1989:73) identified a growing workload for nurses. Continuing education is also often offered before, during or after a work shift.

Nurses find it difficult to attend these sessions, as it leaves them with less time with their patients and families.

Drew (1985:49) and Djupe (1987:154) both discuss the possibility of offering continuing education to nurses on night duty. However, this presents specific problems, such as the fact of medical emergencies that can arise as soon as the staff go off to the class. Because of the already smaller staff complement, this offers a problem for the staff remaining in the ward, with the result that the programmes are usually poorly attended. Both authors, however, viewed a night time education programme for personnel on night duty as an acceptable approach with benefits for both staff and patients.

Drew (1985:49) feels that the problems could be solved by:

- instructing staff in shifts, thereby repeating the lessons, but offering all the nurses the opportunity to attend;
- encouraging participation in the class by those attending, or
- recording the day-time programme, and playing this back during the night-time programme, especially if there are problems in finding staff to offer the course at night.

Djupe (1987:154) states that nurses prefer to attend continuing education programmes during the normal shift. She identified 02:00 - 04:00 as being the best time to offer continuing education programmes for night staff.

Continuing education can either be offered as an in-service education programme (while on duty), or students must be released from their normal duties to attend a formal continuing education programme. In the gold mining industry, nurses must be constantly alert for emergency situations, which makes both options very difficult to implement. Both will have a built-in cost factor in the form of the salaries of the staff attending the programme, as well as the cost of providing temporary staff to release staff for a full-time continuing education programme.

Sanger (1988:731) emphasizes that the costs of continuing education are justifiable if patient care improves. This might be the most important drive behind any continuing education programme, and surely forms part of the basis for this research.

Exactly how much money is involved in continuing education? Boyer (1981:12) indicates that depending on the size of the nursing service, the cost of continuing education could well be into several hundred thousand dollars per year in the United States of America. Sanger (1988:731) describes a specific programme for cardio-pulmonary resuscitation recertification at the St Josephs Hospital in Milwaukee. This programme brought about a saving of $8000 per year in educator costs alone. This obviously leaves out other costs such as the salaries of students or replacement personnel. Regarding the situation in the two mining companies included in the study, the budget for continuing programmes at the Freegold mines, specifically for the mine medical stations personnel, amounts to R110 500, which does not include travelling, accommodation and allowances (Allin, 1992:1). The Gold Fields of South Africa Limited mining company did not want to stipulate an exact figure, but indicated that:

1) All nurses are encouraged to further their qualifications.
2) Three nurses at the Leslie Williams Memorial Hospital undertake long term studies during each year. All expenses regarding course fees, accommodation, salaries and books are covered by the company. Part time studies are also funded to the same extent (Lowe, 1992:1).

This gives an indication of the immense costs involved in continuing education programmes.

In the United Kingdom, midwives must undergo mandatory continuing education programmes every five years. Those midwives employed by the National Health Service receive their courses free of charge, but those who are employed elsewhere, must pay for their own education. This amounts to about £180 per week (Allan *et al.*, 1988:453)

Lyon (1988:248) indicates that the cost of continuing education will increase in the remainder of this decade, because of possible cuts in money made available for nursing staff development. It is therefore feasible to look at alternative ways of offering continuing education in order to limit costs and to maximize existing resources. This concurs with the findings of Stetler, McGarth, Everson, Foster and Holloran (1983:23).

The mining industry can effect continuing education programmes offered in innovative ways that will curtail costs. For example both Gold Fields of South Africa Ltd. and the Anglo American Corporation of South Africa Ltd. have developed their own nursing colleges, where continuing education can be offered without major additional financial outlays, although the Ernest Oppenheimer Nursing College is currently in the process of phasing out their nursing education programmes.

Boyer (1981:12) specifically draws attention to deficiencies between the education system and the practical situation. Continuing education can breach the gap, but this must be as cost effective as possible.

There is an impression that fees attached to continuing education programmes are generally paid by the employer (Woolfork, 1988:94; Pickard *et al.*, 1979:417). This could lead to problems if the employing body is not willing to spend money on continuing education. The solution may lie in charging the student a small fee. Pickard *et al.* (1979:417) also state that students might be even better motivated to register for the course if a fee was charged. Woolfork (1988:94) however, states that educational leave should be granted to employees to attend reasonably priced programmes that will lead to an improvement in knowledge and skills.

In conclusion, costs can negatively influence continuing education programmes. If money is unavailable, continuing education programmes can neither be offered nor attended.

If the employing body forms part of the private industry operating according to a profit motive, there might be even less money available for continuing education programmes. Registered nurses must therefore be able to identify the necessity for continuing education themselves, and motivate that the financial expense will lead to an improvement in patient care, thereby justifying the expense.

Nurses should also realize that continuing education is in their own interest, as well as in the interest of the patient, Therefore, taking the present financial constraints in South Africa into account, nurses must realize that they will have to contribute towards their own continuing education, as each nurse is ultimately responsible for his own professional development and professional competency.

2.5 APPROACHES IN CONTINUING EDUCATION

Continuing education can be offered using a variety of approaches. Some of these approaches will be briefly discussed.

2.5.1 The formal teaching model

According to Shamian *et al.* (1984:86), this approach is based on the idea of a centralized education department, where staff development programmes are offered in a class room situation. The learner has very little input as to the content as well as the time when the programme will be offered, and the educator is usually a more senior person, such as an instructor or member of the nursing management team.

Shamian *et al.* (1984:86) view this approach as an example of the "dependant method" of education. Administrative and teaching decisions will determine what will be taught. This can be to the detriment of the student.

There may be several advantages and disadvantages in this approach. An advantage may be that the environment can be manipulated in a class room situation, which cannot be done in the nursing unit, as live patients are involved. Simultaneously this is the cause of a major disadvantage, namely the fact that the programme is offered in a classroom situation. Practical facilities are not at hand, or must be simulated, which raises costs. A further cost factor is the fact that the student must leave the work environment, decreasing the number of nursing staff on duty. Shamian *et al.* (1984:86), however, state that this approach is one of the cheaper methods of providing continuing education programmes.

2.5.2 The preceptor teaching model

This approach is also described by Shamian *et al.* (1984:86). It involves decentralization of instruction, and the continuing education programme can be offered in the nursing unit by any member of the nursing staff. The student can select a time suitable for education, after consultation with the educator, who is called a preceptor.

Shamian *et al.* (1984:86) view this approach as an "independent method" of education, where the communication flow and transfer of information is controlled by both the educator and the student.

There may again be advantages and disadvantages. An advantage is that teaching takes place in the nursing unit, and problems can be dealt with as they occur in the real situation. Simultaneously, this can be a disadvantage also, as the teaching environment cannot be manipulated, because of the live patients involved. There is an even bigger disadvantage, namely, the fact that it may be difficult to co-ordinate the programme, as there is no pre-selected time for education. Because the student can select a time suitable for himself, the preceptor may have to repeat the programme until all the staff members have attended

the programme. This can be costly and time consuming.

The preceptor teaching model is seen as the ideal approach for orienting new staff members.

2.5.3 Coaching

Coaching is described by Binger *et al.* (1988:232-233) as a process where one person (the coach) identifies a problem and then helps other colleagues (the students) to develop methods to solve the problem. The coach must be able to help individuals to identify gaps in their performance, and how to improve their performance in order to fill these gaps. The coach and learner will then decide on outcome behaviour that will indicate that the learner has mastered the problem.

Binger *et al.* (1988:233) identifies advantages and disadvantages, which can be summarized as follows:

"* The process starts at the learner's present level of development . . ..
* The only constraints on a learner's development are his or her drive and ability.
* The process maximizes the performance of highly motivated capable individuals.
* Because behavioral outcomes of the desired performance are identified in coaching, the learner may check his or her progress anytime; feedback does not totally depend on the coach".

However, there are major disadvantages that can be summarized as follows:

* If individuals do not take the responsibility for their own learning, they will not identify any need for improvement, and the approach will not succeed, and
* if the learner has poor insight and observation skills, then he will not succeed as either the coach or the learner.

This approach has a lot of potential, provided that the learners are motivated, and will take responsibility for their own learning.

Sovie (1982:7) states that educators who do staff development (continuing education) can be utilized as coaches in order to help nursing personnel to prepare presentations for hospital and departmental committee meetings.

In conclusion, Binger *et al.* (1988:235) state that the coaches ". . . must be able to observe the learner's performance objectively and identify increasingly sophisticated levels of performance for the learner".

2.5.4 Performance-based staff development

Performance-based staff development is based on the identification of a desired outcome in nursing care. This is achieved by establishing standards of performance (Boyer, 1981:12). It would appear that this approach can also be called the "competency-based programme", as described by O'Neal (1986:32).

The approach concentrates on performance, and is not only interested in the acquisition of knowledge, but rather in the performance of the student, which is seen as the application of acquired knowledge (Boyer, 1981:12, O'Neal, 1986:32). Performance-based staff development is a self-directed method of instruction, where self-learning packages can be used successfully. Students can also arrange a time suitable for themselves, the teacher and the nursing unit, for attending the continuing education programme.

There are advantages and disadvantages, with an important advantage being the fact that performance is seen as the application of knowledge. The focus is not on the mere acquisition of knowledge, but the application thereof, which will

lead to an improvement in the standard of patient care.

A disadvantage that may occur, is the issue of self-learning packages. Although this should not be seen as a disadvantage, it may develop into one, if student motivation is lacking. This disadvantage seems to be the most important disadvantage for all continuing education programmes. Lack of motivation and or insight into learner needs can severely hinder any educational programme.

2.5.5 Process consultant

This is not a definite continuing education approach as discussed previously, but it does warrant discussion.

The process consultant is a person, and not an approach. Scully (1983:39) describes the process consultant as the person that will help ". . . the client to perceive, understand, and act upon interpersonal events that occur in the client's environment". Unfortunately the concept "client" is neither defined nor described. The assumption must therefore be made that this "client" is either the nurse in the practical situation, or the nurse following a continuing education programme.

The process consultancy develops from a specific situation. When the staff educator is faced with a situation where there are conflicting ideas concerning perceived problems, this educator can become a process consultant. The process consultant will address the issue by attempting to effect changes in different group members, until the group reaches consensus about a particular problem. This will prevent the further emergence of unresolved issues in subsequent discussions.

The success of the process consultant will depend on the success of the process, which depends on the group's awareness of communication patterns, and their problem solving approaches. It further depends on the realization that nurses must diagnose,

intervene and evaluate their own processes. The process is an "independent learning method" (Scully, 1983:39).

There may be advantages and disadvantages in this approach. An advantage would be the development of problem solving skills, which became vital in modern day nursing. The disadvantage is that it appears as if there must be a group of learners. In a nursing unit it would be easy to gather together a group of learners, but in the gold mining industry this could pose certain problems. Some mine medical stations are manned by one registered nurse only, and sending this registered nurse for a continuing education programme, will leave the medical station unmanned.

2.5.6 Orientation programmes

Orientation programmes can be lengthy, costly and complex (O'Neal, 1986:32), and can run for six weeks (Boyer, 1981:13), although there is a proposal that newly qualified staff be oriented for a period of at least six months before they take any responsibility (Anon, 1987:96).

Orientation, as a means of continuing education is vital for newly appointed staff. Newly appointed nurses must have a thorough orientation, which will indicate to the nurse what is expected of him, as the employer and patient expects a competent nurse (O'Neal, 1986:32)

Boyer (1981:13) discussed orientation programmes along the lines of the performer-based staff development approach. A performance based contract is described, which holds numerous advantages for both the service and the nurse. Examples of these advantages include the elimination of waste in the training process, basic performance areas are excluded, thereby limiting the time lost in "retraining" the candidates, and the fact that the programme can be fitted into any time frame, because of the self-learning approach (Boyer, 1981:15). These advantages are also applicable

in the gold mining industry.

The performance contract, as described by Boyer (1981:13), identifies the major competencies expected of the new appointee. This enables the nurse and the staff educator to identify areas which needs evaluation, which is also one of the advantages of the programme. The most important advantage lies in the fact that the nurse will know exactly what is expected of him.

Schofield (1986:13) states that nurse executives should also undergo orientation, as these executives often have to initiate self-directed orientation programmes. This must be done in order to articulate the goals for nursing throughout the nursing community, as well as the community at large.

The value of executive orientation is situated in the fact that it will enable the nurse executive to identify his role expectations, as well as providing the basis for future growth and development. It will also influence the nurse executive's effectiveness in future management and decision making, because the oriented person acquires the ability to gather appropriate information and to establish a healthy organizational power base (Schofield, 1986:14). The nurse executives within the mine medical stations are the senior medical station superintendents and medical stations superintendents. These executives also need orientation to ensure that they are current regarding the organizational aspects of their practice. At the time of the situational analyses, none of the nurse executives held any administrative qualifications, and this orientation can therefore only be of benefit to them.

2.6 TOPICS FOR CONTINUING EDUCATION

Several authors have identified topics for continuing education programmes. As this study will deal with the development of a continuing education programme, it is relevant to investigate

topics identified by other authors as possible topics for these programmes.

Djupe (1987:154) identifies the following topics as being of the highest priority:

* physical assessment,
* legal aspects,
* pharmacology,
* laboratory and diagnostic testing.

O'Neal (1986:33-35) identifies a different set of topics, but if analyzed, they may also fit in with those identified by Djupe. The topics can be classified as follow:

i) A general overview dealing with the philosophy, standards, and guidelines for continuing education.
ii) Individualised care.
iii) Independence and involvement, dealing with differences between ambulatory and hospitalized patients, and its effect on nursing care.
iv) continuity of care, dealing with the importance of good record keeping.
v) Privacy and confidentiality.
vi) Financial integrity, dealing with cost effective techniques.
vii) Health maintenance, addressing most aspects of assessment.
viii) Safety, dealing with infection control, injection techniques, etc.

These topics are also contained in those provided by Djupe, who addressed the matter in a different way. Topics iv) and v) as given by O'Neal, is contained in the topic "legal aspects" as given by Djupe, and topic vii) is contained in Djupe's topic "physical assessment". It would appear that these topics can be generalized, and that they can possibly serve as guidelines for a continuing education programme in the gold mining industry.

Geary (1988:21) identifies a completely different set of topics. When analyzing them, it would appear as if they can be used for

administrative personnel, and therefore the medical station superintendents and senior medical station superintendents can specifically benefit from them. These topics are:

"- Role transition from staff nurse to charge nurse.
- Differences between leadership and management.
- Different styles of leadership and the effect of these on staff motivation.
- Organizational structure of the hospital and the multi-hospital system.
- Finance and budgeting.
- Communication, . . . Assertive communication.
- Communication, . . . Interviewing and non-verbal communication.
- Communication, . . . Conflict resolution.
- Teaching and the evaluation process.
- Problem solving.
- Implementing planned change.
- Time management.
- Managing the marginal employee.
- Career planning and development."

The above mentioned topics for continuing education are clearly meant for the more senior staff, and the mentioned categories of nurse in the gold mining industry could definitely benefit from all of these.

It is necessary to include the principles of the ethos and professional practice of nursing, with special reference to the influence of the legal guidelines as contained in the Nursing Act, Act 50 of 1978 with all its amendments, in any continuing education programme for South African nurses. The current atmosphere in health care delivery, with all the negative publicity contained in the media, such as television and newspaper coverage, as well as the influence of pressure groups such as trade unions, on nursing, may lead to situations which may be harmful to either the nurses themselves, or the public as health care consumers. This has already been illustrated in

strike actions of nurses in various centres in South Africa during the past two to three years. In a recent press release, the President of the South African Nursing Council indicated that it was recommended that Section 40(2) of the Nursing Act, Act 50 of 1978, be scrapped, as the profession of nursing does not need legal constraints in preventing strike action. However, the impression must not be given that the South African Nursing Council condones strike action, and a warning is issued that nurses participating in strike action will still be disciplined by this Council (Kotzé, 1991:1).

In the same newspaper, the President of the South African Nursing Association states the viewpoint of this Association regarding strike action. It is very clearly stated that because of the relationship of trust established between the nursing profession and members of the public, strike action cannot be allowed, and recommendation has already been made to the Department of Manpower that nursing be declared an essential service (Bruwer, 1991:1). This type of information is essential to the nurse practitioner in any South African nursing service, and including this as an up-date on the ethics of the professional practice of the registered nurse into the continuing education programme proposed in this study can only be of benefit to the registered nurse working in the mine medical station of the gold mining industry.

2.7 CONCLUSION

In conclusion, the necessity for continuing education has been debated and although positive and negative perceptions of continuing education exist, its necessity in keeping practising nurses up to date cannot be denied. If registered nurses have themselves identified the need for continuing education, as is the case with the mine medical station personnel, the importance of continuing education becomes even more apparent.

The basic nursing education programmes offered prior to 1986,

could be a contributing factor towards the fact that not all registered nurses can provide comprehensive health care, but continuing education programmes can eradicate this gap.

Continuing education is costly, but an improvement in patient care justifies the financial expense.

The different approaches in continuing education will be considered when finally planning and implementing the proposed continuing education programme, as will be the different topics for discussion as identified.

In the next chapter the infrastructure of the mine medical stations will be discussed, as well as the role and function of the registered nurse within the mine medical station.

CHAPTER 3

THE REGISTERED NURSE IN MINE MEDICAL STATIONS

OVERVIEW OF THE CHAPTER

The aim of this chapter is to provide an overview of the development of occupational health services in South Africa, and the specific contribution of the gold mining industry in this regard. Special attention will be given to the role and function of the registered nurse within the mine medical station of the gold mining industry.

This aim is achieved through:

- explaining the historical background of registered nurses in the gold mining industry,
- providing a profile of the current health problems encountered in the mine medical stations
- comparing the infra-structure of two gold mining companies in the Republic of South Africa, and
- explaining the role and function of the registered nurse in the mine medical station.

3.1 INTRODUCTION

The mining industry played a leading role in establishing occupational health services in Southern Africa. Legislation was introduced as early as 1905, as a result of the outcome of an enquiry into phthisis which was held in 1902 (Nzama, 1990:13).

It is therefore necessary to review briefly the historical development of occupational health services in Southern Africa, with specific reference to the contribution of the gold mining industry.

3.2 HISTORICAL PERSPECTIVE

3.2.1 The founding of the Cape of Good Hope

One of the reasons that the Cape of Good Hope was settled was a need for occupational health services.

Searle (1965:14-19) refers to the poor conditions that existed on the ships of the Dutch East India Company, leading to the development of diseases such as scurvy and typhus. The main contributing factors to this situation can be summarized as follow:

i) Poor health and nutrition prior to being employed as sailors;
ii) poor hygienic conditions aboard ship with crowded living space;
iii) lack of fresh food and water;
iv) hard work aboard ship with very strict discipline for people who already suffered from poor nutrition and a variety of diseases;
v) communicable diseases such as typhus were rife, and no knowledge existed as to the reasons for the spread of these diseases, and
vi) there was inadequate care for the sick, as the surgeons on board ship were the only care providers.

when Joris van Spilbergen established a hospital at the "watering place of Saldanha". Sick sailors were transferred to this hospital, and the result was a much reduced death rate (Searle, 1965:20).

During 1627, 100 sick sailors were brought ashore of whom only 44 died. This was a very low mortality rate for those years, and that specific situation. During 1647 the ship "Nieuwe Haerlem" was wrecked in Table Bay, and the crew managed to establish a little temporary settlement at the Cape, while waiting to be rescued. As a result of their recommendations, the Council of Seventeen finally decided to establish a settlement at the Cape of Good Hope. During 1651 Johann van Riebeeck was appointed as commander of the Cape of Good Hope, and he set sail for Southern Africa (Searle, 1965:20-21).

The arrival of Johann van Riebeeck, and the subsequent establishment of the settlement at the Cape of Good Hope can be seen as the establishment of occupational health services for the sailors of the Dutch East India Company in Southern Africa.

3.2.2 Industrial development in Southern Africa

Stock farming and agriculture were the two most important industries that developed in Southern Africa (Baker and Coetzee, 1983:10)

It was approximately 1870 when diamonds were discovered in Southern Africa, and almost overnight thousands of miners flocked together at the diamond mines, and a little later at the newly discovered gold mines (Baker *et al.*, 1983:10-11). From 1872 onwards, gold and diamond mining became the leading Southern African industries. Diseases such as malaria and pneumonia were rife in the areas where the mining activities took place, and virtually no nursing care existed. The nursing was done by the wives and daughters of the miners. At Pilgrims Rest, two American women provided nursing care for the sick miners,

although they were not trained nurses (Searle, 1965:80). This "home nursing" laid the foundation for nursing care for mine workers in the gold mining industry.

Kimberley was the biggest diamond mining area, and Bishop Wells realized that trained nurses were necessary in Kimberley. Sister Henrietta Stockdale was therefore asked to accompany him to Kimberley in 1876 to investigate the conditions in the hospital there (Loots & Vermaak, 1975:30). As a result of this visit, she was sent back to Kimberley towards the end of that year to establish a new hospital in the diamond fields (Loots *et al.*, 1975:37).

The first organized hospital services in the Transvaal came into being during 1878 at Lydenburg and MacMac because of malaria amongst the gold diggers, and an emergency hospital was erected at Pilgrims Rest for the same reason (Searle, 1965:81). These hospitals came into being as a result of need experienced by the gold diggers, and although the outbreak of malaria necessitated their establishment, they can still be seen as rudimentary occupational health services for gold diggers. Further nursing services were later established at Barberton, and in 1886 the first trained nurses were employed in Barberton to care for sick miners (Searle, 1965:82). It is clear that the gold mining industry played a major role in the development of health services in the Transvaal.

3.2.3 Health problems in the gold mining industry

As early as 1893 a total of 25049 Black workers were employed in gold mines in Transvaal, and by 1898 this figure had increased to 73354. If it is taken into account that there was virtually a 100% turnover each year, then it becomes very clear just how many people were employed by the gold mining industry during this period (Cartwright, 1971:5). Although the men were reasonably well fed, diseases were rife, and the spread of communicable diseases, especially respiratory diseases, was enhanced by the

crowded conditions that existed in the compounds. Doctors were also ignorant as to the causes and especially the prevention of these diseases (Cartwright, 1971:5-6).

As a result of the South African war, employment figures dropped dramatically. By 1902 only 37000 workers were employed, and by 1903, about 50000. This decrease in employment figures led to a shortage of workers in the gold mining industry, and in 1903 this led to a decision by the Chamber of Mines to import Chinese workers for the gold mining industry (Cartwright, 1971:7-8). At the same time, there was a very high mortality rate amongst Black employees. In 1903 an annual death rate of 54 per 1000 was reported, mainly as a result of diseases such as pneumonia, scurvy and meningitis (Baker *et al.*, 1983:11).

The Chinese workers brought their own specific problems with them, mainly due to cultural differences between themselves and their employers, sometimes also regarding outside bodies such as the Durban harbour officials. However, good provision was made for their own preferences. Chinese doctors and medicines were brought with, and the doctors were employed at a ratio of 1:200-250 workers. Simultaneously, the part-time doctors of the mines still provided clinical care for the workers, and set the standards for hygienic conditions in the compounds. Apart from other cultural problems encountered between the mining companies and the Chinese workers, health problems were compounded by the fact that the Chinese were opposed to post-mortems. No research regarding the causes of death could be carried out (Cartwright, 1971:11-12).

Between 1903 and 1910 about 50000 Chinese workers were imported (Cartwright, 1971:24), and in spite of all the problems encountered by all, the Chinese workers existed in much better circumstances that in their own country (Cartwright, 1971:13). It would appear that most of the Chinese workers were repatriated.

Statistics for 1904 indicate a varying deathrate for Mozambican employees, with the mortality rate during March a staggering 360 per 1000, and during June an equally staggering 339 per 1000 workers. The lowest figure was obtained in April with a death rate of 120 per 1000 workers.

From 1905 the mining companies also imported workers from "tropical" areas. This lead to an amazing increase in the death rate of the workers, and reached a figure of 130 per 1000 (Baker *et al.*, 1983:11).

With the success of typhoid immunization, the leaders in the mining industry decided to develop a vaccine for pneumonia. Between 1904 and 1911 various attempts were made to develop such a vaccine. In 1911 a research project was launched, but due to several mistakes, the findings were not conclusive. Simultaneously, a certain doctor Lister conducted similar research, and he reported better findings, although he ignored the variable of low employment figures from the "tropical" areas. However, by 1913 the Institute for Medical Research had finally indicated that the vaccine had no influence on the case mortality, except for a very short period after the vaccine was administered (Cartwright, 1971:25-27).

The death rate amongst Black mine workers remained high. This led to the realization that health care for the Black mine worker had to be re-evaluated.

In 1909 a certain Mr S Evans became the chairman of Crown Mines. This man thought that flies might be responsible for the transmission of pneumonia, and as a result of his insistence, Crown Mines became the first mine to install water-borne sewerage. In 1912 he went to Panama in order to find out what Colonel Gorcas, who had received world acclaim for his successful campaign in reducing the death rate amongst the canal workers, was doing. He met Dr A J Orenstein, who was Colonel Gorcas' assistant. Mr Evans was very impressed with Colonel Gorcas, and

through his motivation the Colonel was invited to South Africa in 1913. He investigated the health situation in the mining industry, and submitted his report in 1914, containing recommendations that would alleviate the death rate amongst mine workers (Cartwright, 1971:28-32). As a result of his report, Dr Orenstein was appointed by Rand Mines in 1914 as Chief Medical Officer. Lowe, however, states that his designation was Superintendent of Sanitation (Lowe, 1992(b)). As a result of the recommendations of Dr Orenstein, the death rate due to pneumonia was reduced to 2,67 per 1000 in 1917. Dr Orenstein became involved in all aspects of occupational health care in the mining industry, such as occupational diseases, injuries and compensation, hospitalization and accommodation. He later received international acclaim for his work in the mining industry (Baker *et al.*, 1983:11-120.

In 1916 the Crown Mines Hospital started with a training programme for Black nurses, and after 1917 Black and White nurses were employed in the mining hospitals of the Rand Mines group. Dr Orenstein can be seen as one of the main drives behind Black nursing education, which developed as a result of his insistence that Black nurses be trained for the mining industry. The total mortality rate amongst mine workers was now reduced to 8,45 per 1000, a dramatic reduction (Cartwright, 1971:44-49).

During the period 1919 to 1923, a typhus epidemic was reported, with an annual notification of about 8000 cases. This was mainly due to louse infestation of the recruits that came mainly from Transkei and Ciskei. A delousing station was set up at Sterkstroom, with further delousing at the Witwatersrand Native Labour Association in Johannesburg, and the incidence of the disease was dramatically reduced (Cartwright, 1971:46-47).

Mining remained the main industry in South Africa until the commencement of World War 2. Due to the war certain imported material became unavailable. Because of all the other problems that existed during the war, little was done to further the

advancement of occupational health services. However, in 1956 the Council for Scientific and Industrial Research established a research institute for pneumoconiosis under the guidance of Dr A J Orenstein. This was done in collaboration with the gold mining industry. This institute was later called the National Research Institute for Occupational Diseases, and it did much to make industries aware of the importance of occupational health care (Baker *et al.*, 1983:12).

In spite of the stagnation that occurred in occupational health services as a result of World War 2, and the problems in re-establishing occupational health services thereafter, a certain Dr M J Stewart visited mining hospitals in South Africa during 1969. He was an associate professor of orthopaedic surgery at the University of Tennessee, and the orthopaedic consultant to the Surgeon-General of the United States Army. He stated that the systems of these mining hospitals were the best and most unique that he had encountered anywhere in the world. This must be seen in the light of the fact that the mining industry employs one of the biggest labour forces in the world (Cartwright, 1971:2-3).

From the above it is clear that the gold mining industry has played a major role in the establishment of occupational health services in Southern African, as well as the development of medical services in general.

It is also only natural to assume that the registered nurses employed in the gold mining industry must have made a contribution towards this acclaimed health service. It is therefore important to discuss the organization of the health services rendered at the mine medical stations of the mines included in this study.

3.2.4 Contemporary profile of health problems encountered in the mine medical stations

The registered nurse in the mine medical station is faced with the health problems of all the different categories of employees in the gold mining company. These employees all stem from different backgrounds, as most of the mine workers are still migrant workers. The cultural difference between the nurse and the different categories of employees, is problematic in itself. Nursing care, including counselling, must be provided within the context of the employee's own culture. This may be very difficult to implement, as the gold mining industry employs many migrant workers from a variety of neighbouring countries, thus subjecting the nurse to foreign cultures.

Migrant workers form part of the labour force world wide. It is not unique to South Africa, and moreover not unique to the gold mining industry either. The possibility exists that migrant workers as a group experience specific health risks unique to themselves. Shearer (1991(a):1) identifies a number of potential health risks which develop because of the background of the migrant worker. The migrant worker is described as being keen to work, young, fit, motivated and enterprising, but also coming from a poor rural background. He comes from a demanding environment which made him strong, but rendered him vulnerable at the same time. His nutritional status may not be good, and he may harbour communicable diseases endemic to his area of origin. He will also not have immunity against diseases prevalent in the area where he is going to work. His defense mechanisms, which worked well at home, may be inappropriate, and he may end up a lonely person in an environment where he is different from the other workers. The registered nurse working in a mine medical station is faced with all the problems encountered by the migrant worker, which can include psychosomatic disorders, alcohol abuse, depression, and suicide, although this is rare.

A higher accident rate for migrant workers is usually reported, which can be related to their age and high work mobility, which

leaves them relatively untrained. Communication problems, illiteracy and inadequate safety training become directly responsible for a higher accident rate (Shearer, 1991(a):2-3).

Waldron (1989:477) mentions the specific problems encountered when migrant workers contract occupational diseases. This problem is exacerbated when compensation must be determined, as the migrant worker might have contracted the disease in the host country (as can be the case in the South African gold mines with employees from neighbouring countries). The epidemiological reports for occupational diseases in the mother country becomes complicated, because the diseases were actually contracted outside its borders.

Munro (1991:1) identifies four factors that can have an effect on the health of anybody, namely:

"1. Genetic and biological
2. Environmental
3. Patterns of behaviour - attitudes and lifestyle
4. Health services".

These factors must be related to the work situation, indicating its effect on the health status of the worker. Work *per se* can cause ill health because of the nature of the work itself. Examples of these job related conditions include silicosis, which develops because of dusty environments at the workplace, hypertension and asthma, which can develop as a result of stress experienced by the employee at work, and substance abuse, because of the availability of dependence producing substances (Munro, 1991:1).

From the figures obtained from the Freegold mines it became evident that five of the six mines collectively reported a total of 5566 occupational accidents and diseases over a period of one month. The figures are not suitable for inferential purposes as statistics could not be obtained for the same month in all the mines. Figures were obtained for a period of two consecutive months, with statistics being available for April 1989 in some mines, and May 1989 for the rest of the mines. One can,

however, conclude that a notification of 5566 occupational accidents and injuries is substantial. This is of even more importance if kept in mind that the registered nurses employed in the mine medical stations are ultimately responsible for the treatment, and/or documentation for compensation purposes of the affected individuals.

The need for continuing education for registered nurses in mine medical stations regarding occupational accidents and diseases, is demonstrated in the fact that such a large number of workers were injured or contracted a disease at work (5566 workers). The availability of the necessary accurate statistical information about the exact nature of the accidents of injuries would have been of great assistance in the planning of a suitable continuing education course.

The statistical information from the Gold Fields of South Africa Limited mines was well compiled, and on request they were readily available from Dr E G Petschel, medical superintendent of the Leslie Williams Memorial Hospital. Statistics for the periods February 1990 - April 1990 were obtained from all the mines concerned, and will be presented in table 3.1.

Table 3.1 reflects that a total of 3102 employees were treated for occupational accidents and diseases during the period reflected. The conditions mentioned are probably not all the occupational diseases encountered in the mines, but nevertheless, these employees needed occupational health care. Four mines from the Gold Fields of South Africa Limited gold mining company were included in the study. These mines are smaller that the mines of the Freegold gold mining company. Employment figures as already identified indicate that Freegold mines employed an average workforce of 84752 employees during the period January to November 1990, whereas the Gold Fields of South Africa Limited mines employed a daily average of 44379 employees during 1989, a considerably smaller workforce.

TABLE 3.1

STATISTICS OF OCCUPATIONAL DISEASES AND INJURIES IN MINE MEDICAL STATIONS OF THE GOLD FIELDS OF SOUTH AFRICA LIMITED MINES : FEBRUARY - APRIL 1991 (Figures obtained from Dr E G Petschel)

OCCUPATIONAL DISEASES	MINES				
	EAST-DRIEFONTEIN	WEST-DRIEFONTEIN	DOORNFONTEIN	DEELKRAAL	TOTAL
OCCUPATIONAL ABSCESSES	167	15	17	21	220
BAROTRAUMA	27	14	6	13	60
BACKACHE	330	316	247	73	933
TOXIC EXPOSURE TO GASES	39	15	64	25	143
TOXIC EXPOSURE TO CHEMICALS	12	0	2	13	27
HEAT ILLNESS	131	156	187	21	495
MINING ACCIDENTS	550	315	168	191	1224

3.2.4.1 Specific health hazards and conditions currently encountered in the gold mining industry

Accurate indications of specific occupational diseases often encountered in the gold mining industry were not available to the researcher during the situational analysis at both mining

companies. However, in a letter dated 4 September 1989, Dr P Allin, senior medical officer : Free State Geduld Mine, indicated that a continuing education programme for registered nurses working in mine medical stations should, at least, include the following occupational diseases:

- Heat illness,
- noise induced deafness,
- tuberculosis,
- contact and irritant dermatitis,
- pneumoconiosis,
- occupationally induced abscesses,
- exposure to nitrous blasting fumes and other noxious gases such as carbon monoxide, methane and carbon dioxide, and
- barotrauma.

Dr Allin has since been promoted to Chief Medical Officer : Department of Occupational Health, at the Ernest Oppenheimer Hospital.

Certain aspects of these diseases will be discussed, with special reference to the contribution of the registered nurse in the mine medical station to the prevention of these diseases. It is also not the purpose of this study to give a detailed analysis of each condition, and only the most important aspects of each condition will be discussed. The prevention of the conditions will then be related to the practice of the registered nurse employed in the mine medical station.

i) Heat illness

Norman and Brebner (1988:609) state that man's physiology underwent certain changes when he took up residence in more temperate climates, and in order to function within a work situation with high environmental temperatures, his physiology must change in a process called acclimatization. These changes will include an ability to sweat more freely, as well as vascular changes that will enable blood to flow close to the body surface, thereby increasing the loss of heat by radiation to the environment.

To accomplish full acclimatization will take two weeks, but is also lost very quickly. Even three or four days in temperate climates will necessitate another week of acclimatization. Heat illness may occur soon after an unacclimatized person exerts himself in a hot area. If kept in mind that body temperature can be regulated by sweating, then heat illness will occur even faster in areas of high humidity, because of the inability for sweat to evaporate in humid conditions (Norman *et al.*, 1988:610).

Heat illness is divided into:

1) Heat cramps. This condition is less serious, and occurs when people sweat profusely without replacing the lost salt. Salt tablets are not recommended as a preventive measure, and additional salt in food, with a quarter teaspoon of salt added to each litre of drinking water provides adequate prevention and treatment (Norman *et al.*, 1988:610), although this has not been proven beyond reasonable doubt.
2) Heat exhaustion. This is a fluid and electrolyte imbalance. Profuse sweating takes place. The skin feels cool while the temperature of the person remains normal. The only clinical signs are dizziness and severe malaise. If undetected, it may lead to heat stroke (Norman *et al.*, 1988:610).
3) Heat stroke. This develops as a result of severe depletion of body fluids leading to an inability to sweat. The skin feels hot and dry, and the body temperature will rise until death occurs. As a result of the fluid depletion, the blood becomes more viscous, and adds to the strain on the heart, while oxygen demands are higher due to the overheating. Death often occurs as a result of heart failure, before the temperature is high enough to damage the brain. People with known heart disease, or who are unfit, are very vulnerable in overheated conditions (Norman *et al.*, 1988:610). Lowe (1992(b)) mentions that some heat stroke cases sweat profusely.

The prevention of heat illness in the gold mining industry is

complex, because, according to Shearer (1990:225-226), mine workers work at depths of 3500 meters in extremely hot and humid conditions. Heat stroke may develop in the mine worker, because heat exhaustion is ignored as the worker is pressurized to be more productive.

Shearer (1990:226) also states that heat illness can be prevented by providing water, preferably cool water, to the worker. Mine workers take a traditional brew called "mahewu" which is sometimes supplemented with ascorbic acid. This may contribute towards the prevention of heat illness, but there is, to date, no conclusive evidence of this.

The registered nurse in the mine medical station must be able to detect heat illness, and intervene before the patient develops heat stroke. Health education to workers regarding the prevention, including early detection of symptoms and adequate fluid intake, must be provided by the registered nurse in the mine medical station. Apart from a further supervisory role in the acclimatization programme, their contribution to the acclimatization period is minimal.

ii) Noise induced deafness

Zenz (1988:274) defines occupational hearing loss as ". . . a partial or complete loss in one or both ears arising in, or during the course of, and as the result of one's employment." This loss of hearing is cumulative and permanent, and it develops over a number of years. Traumatic injury, such as in explosions, could lead to immediate hearing loss. The determination of hearing loss is done in terms of specific functions, such as the determination of the threshold sensitivity for pure tones, and the ability to hear and understand speech.

Hearing loss occurs as the result of a number of factors, including, the sound intensity, exposure time, and the individuals susceptibility to noise induced deafness. A high intensity noise level will aggravate the hearing loss (Zenz, 1988:274). There is a conceived "safe" sound level, namely 80

DBA for a period of 40 hours a week spread over 45 years (Vlok, 1991:419).

Determining the exact amount of hearing loss due to occupational exposure is not always possible. The employee's personal lifestyle, ageing processes, medicine usage, and a host of other factors can lead to the development of deafness, which cannot always be evaluated (Zenz, 1988:275).

Hearing conservation includes a variety of activities. These activities can be summarized as follows:

- Reduction of noise exposure. Zenz (1988:301-302) identifies a variety of means to reduce noise exposure. The most prominent of these would be to reduce noise at its source. Modifying existing machinery, or developing new machinery with a low decibel output are examples of this method. Maintenance of machinery is important, and can also lower the noise output. Other means to achieve the desired objective, would be to substitute noisy operations and material with less noisy processes and material, isolation of the noisy machine with resultant lower environmental noise, and the use of sound-absorptive material.
- Personal hearing protection. It is impossible to modify or re-design all machines in order to make them less noisy. Therefore, personal hearing protection also forms part of the hearing protection programme. The wearing of earmuffs or ear plugs can prevent noise induced deafness. However, workers have a tendency to adapt to noisy environments, and because their effect is not immediately obvious, they tend not to wear their protective devices (Zenz, 1988:302-309).

The registered nurse in the mine medical station can do very little about noisy machinery, or isolation of these machinery. However, employees working in areas where noise cannot be reduced must be motivated to wear their personal hearing protection devices. Health education about the long-term effects of noise must be given, and regular audiometric evaluation can be used to demonstrate either the success of the

hearing conservation programme, or the deterioration of an employee's hearing. The nurse must be aware of the first signs of noise induced deafness, and if the employee experiences these, his hearing must be evaluated immediately. Vlok (1991:420) identifies these early signs as noises or ringing in the ears after the exposure, as well as muffled hearing for some hours afterwards.

iii) Tuberculosis, sexually transmitted diseases and HIV infection

Tuberculosis is a very complex disease, with a definite possibility of social origins in combination with other contributing factors.

Communicable disease transmission is also enhanced because of close proximity in hostel rooms, and one immediately considers tuberculosis in this regard. Sexually transmitted diseases, including AIDS or HIV infection, causes grave concern, and a growing incidence of both tuberculosis and HIV infection can only be deemed of great concern to the health services of the mining industry (Shearer, 1991(a):2-3).

The psychosocial environment of the mining industry is to be blamed for the development of most of these problems. The migrant worker lives separately from his family in a single-sex hostel. This invariably leads to the development of sexually transmitted diseases because of the absence of the monogamous relationship with the wife. Problems with alcohol abuse, which can be related to violence, conflict and absenteeism, can also be encountered (Shearer, 1991(a):3). Added to the identified problems are the physical strains of the work environment, and the intense heat and humidity. It is for this reason that tuberculosis is specially mentioned as an "occupational disease". Sexually transmitted diseases and HIV infection are not deemed to be occupational diseases, but needs mentioning because of the particular factors conducive to the spread of these diseases, that exist in the gold mining industry, and in certain other industries, such as the transport industry.

The registered nurse in the mine medical station has a particular task in the prevention of these diseases. Case and contact finding must be done, and treatment given according to the policies of both the mining company and the Department of National Health and Population Development. Health education programmes must be developed and implemented regarding the clinical signs, prevention of the spread of the diseases, good personal hygiene, the importance of monogamous relationships and the importance of continued treatment must be provided for the employee.

iv) Contact dermatitis

Zenz (1988:132) indicates that 80-90% of all occupational skin conditions can be classified as contact dermatitis. It involves skin changes, which are usually accompanied by inflammation, and develops due to direct exposure to an exogenous chemical. The inflammation develops either because of a local irritation, or because of an allergy, and clinical signs vary from local areas of dryness to actual blistering. Contact dermatitis can develop as a result of exposure to virtually any chemical or substance, and the development is often related to multiple and prolonged exposure to a variety of chemicals or substances (Zenz, 1988:138-139).

Because this condition can be caused by such a variety of chemicals and substances, the nurse in the medical station must be familiar with the chemicals in use in that mine, as well as the clinical signs of contact dermatitis following exposure to these chemicals. The registered nurse in the mine medical station must have information regarding the safe usage of these chemicals. Examples of chemicals in use in the gold mining industry are cement, cyanide, sulphuric acid, mercury and lead.

v) Pneumoconiosis

Pneumoconiosis is the collective indication of a variety of dust diseases, such as silicosis, asbestosis, anthracosis, and many more. These diseases can occur in combination, such as anthracosilicosis, and others. The condition can be complicated by conditions such as cor pulmonale, bronchiectasis, lung cancer

and tuberculosis. Tobacco smoke may cause cor pulmonale, which aggravates pneumoconiosis (Vlok, 1991:420-421).

Pneumoconiosis leads to the development of fibrosis of the lung tissue, that may develop into large masses in the lungs. A chronic productive cough develops, with haemoptysis. The later clinical signs include dyspnoea and cyanosis, fatigue after slight exertion, and finally cor pulmonale (Vlok, 1991:421).

The primary prevention of this disease can be achieved through good ventilation in dusty areas, settling dust by means of dampening through spraying, and if this fails, the wearing of respirators. Employees at risk should not smoke. Vlok (1991:421) identifies regular lung function tests as a secondary preventive measure to identify early clinical signs of pneumoconiosis. The researcher believes this to be a primary preventive measure, as secondary prevention commences once disease is established. Lung function tests would then be of value to detect deterioration.

The secondary preventive measures include the removal of a workman with clinical signs of pneumoconiosis from the dusty environment, and placing him in a "dust-free" environment. This concurs with the Occupational Diseases in Mines and Works Act, no. 78 of 1973, which states that fitness certificates may not be issued to people with pneumoconiosis, amongst other diseases, as already described. Workers in the first stages of pneumoconiosis can be kept relatively healthy by preventing common colds through immunization, that can develop into pneumonia, discontinuation of smoking, and the prevention of further exposure to dusty work situations (Vlok, 1991:421).

The occupational health nurse in the mine medical station can play an important role in both levels of prevention. Health education regarding clinical signs, the necessity for wearing personal protective devices, and not smoking, is very important. The nurse also plays an important part in early detection, as in both mining companies registered nurses were trained to do miniature chest X-rays, although they do not interpret the

developed films. There was, however, a lack in understanding about preventive measures, and their role in the prevention programme, amongst most of the nurses interviewed during the situational analyses. This aspect needs clarification in the proposed continuing education programme.

vi) Occupational abscesses

Information about this condition is not readily available. Zenz (1988:155-159) mentions some skin infections that can occur as a result of the employee's occupation.

The possibility that these abscesses develop as a result of a combination of bacteria present at the workplace and the hot and humid conditions, coupled with the wearing of rubber boots, must be seen as possible causative factors in the development of occupational abscesses in the mining industry. The nurse in the mine medical station must be able to detect these abscesses, and must know the correct treatment thereof. Health education regarding the prevention of these abscesses, such as personal hygiene coupled with foot hygiene in particular, is a very important preventive measure.

vii) Exposure to blasting fumes and other noxious gases

Harashima (1983:948) defines a gas as ". . . a substance in a state which is governed by the gas laws at atmospheric temperature and pressure", and a vapour as ". . . the gaseous phase of a substance which is liquid at ordinary temperature and pressure".

Irritant gases and vapours include those gases and vapours which have an irritant action and disparate characteristics. Gases and vapours with a very low solubility and no warning odour are deemed to be the most dangerous, and include oxides of nitrogen (Gavrilescu, 1983:950).

There are some important aspects of gases and vapours that must be kept in mind, namely:

- they are measured in parts per million by volume,
- foreign gases and vapours released into the atmosphere,

will be inhaled with air, and
- many gases and vapours are hazardous or injurious to health (Harashima, 1983:948).

In the gold mining industry, some hazardous gases have been identified, and these can be classified as follow:
* pulmonary irritant gases, which include nitrogen oxide,
* chemical asphyxiant gases, which include carbon monoxide, and
* simple asphyxiant gases, such as nitrogen, carbon dioxide and methane (Harashima, 1983:948).

The oxides if nitrogen will be discussed, as they can be produced as a result of the combustion or explosion of organic nitro-compounds. Nitrogen dioxide, and its associated dinitrogen tetroxide, are deemed powerful lung irritants (Gage, 1983:1458).

The most important portal of entry for gases is the respiratory system, where they reach the lungs and are dissolved in the alveoli. Through diffusion they reach the blood vessels in the lungs. The metabolism of the gases can be studied in toxicological studies. They are excreted through the lungs, the large intestine, biliary tract, hair and sebum, and the kidneys (Harashima, 1983:949).

The action of gases and vapours in the body may be difficult to detect at the time of absorption, but at the stage of poisoning, definitive clinical signs develop, while blood tests reveal either the gas, or its metabolites. An occupational history is important for diagnostic purposes (Harashima, 1983:949). Irritant gases can cause excitation of the neural receptors in the eyes and mucous membranes of the respiratory tract, and cause certain reflexes, such as an inhibitory reflex on respiration. This may be to the extent that the person stops breathing temporarily, experiences bradycardia and arterial hypertension (Gavrilescu, 1983:950). Nitrogen dioxide and dinitrogen tetroxide can, if present in concentrations of 100-500 parts per million, lead to sudden death due to bronchospasm

and respiratory failure, or even delayed pulmonary oedema. Weeks after the explosion, an employee may die as a result of inflammatory changes caused by bronchiolitis fibrosa obliterans (Gage, 1983:1459).

Irritant gases and vapours can cause acute pulmonary oedema, which results from a change in the permeability of the pulmonary vessels, a release of histamine and other vaso-active substances which will initiate broncho-constriction. This leads to a rise in pressure in the pulmonary capillaries with serous fluid entering the pulmonary alveoli (Gavrilescu, 1983:950). It is important to remember that acute poisoning sometimes develops as a result of accidental poisoning, and can be as a result of explosions, gas leakages, and other sources of large quantities of gases, whereas chronic exposure to gases leads to chronic poisoning because of the cumulative nature of the effects of the gases. There is usually a larger number of employees affected by chronic poisoning than with acute poisoning (Harashima, 1983:949).

The main clinical signs include congestion of the nasal mucosa and the paranasal sinuses causing a violent frontal headache, nasal obstruction, and sometimes epistaxis. An inflammatory reaction may develop, and on reaching the larynx, it causes hoarseness, or loss of the voice. Oedema of the glottis with laryngeal spasms may occur, leading to intense dyspnea, cyanosis and anxiety. If irritant bronchitis develops, the patient will develop a cough, a tight feeling in the chest, accentuated dyspnea and accompanying that, cyanosis (Gavrilescu, 1983:951). Acute pulmonary oedema can develop, and is the most serious of the complications. There are three forms of this disease, with the first being a paralysing form, which is rare. This presents as a very brief period of irregular breathing, followed by a sudden loss of consciousness. The second form is a severe form, which include symptoms ranging from a very severe (characteristic of chlorine) to a mild (characteristic of nitrogen oxides) upper respiratory tract irritation. A period of 24-48 hour remission follows in the case of oxides of nitrogen, followed by the true pathological condition. This is

characterized by a productive cough with abundant, frothy and aerated white, yellow or pink sputum, dyspnea and cyanosis. The weakening heart presents with a thready, rapid pulse. Thirdly, a mild form develops, presenting only with symptoms of upper respiratory tract irritation (Gavrilescu, 1983:951).

First aid and emergency treatment of employees suffering from exposure to any of these gases, include immediate evacuation to fresh air, avoidance of any muscular movement by the victim while he is carried in a reclining position on a stretcher. Artificial respiration must be avoided, because it may lead to the development of acute pulmonary oedema. The patient must be hospitalised, receive low concentration oxygen therapy, and kept warm. Warm drinks may be administered to prevent circulatory failure. The patient must rest, and must be kept under supervision for 48 hours, to cover the remission period, and to detect the development of any clinical signs of acute pulmonary oedema (Gavrilescu, 1983:951). Gage (1983:1459) describes the treatment for nitrogen oxide inhalation, which appear to be similar to the above. However, artificial respiration is recommended if signs of respiratory insufficiency occurs. Although the danger for the development of acute pulmonary oedema is unlikely after 24 hours, the patient should be observed for 2-3 weeks, with occasional X-ray examinations.

Preventive measures include the inclusion of the process causing the hazard, dilution ventilation and exhaust ventilation systems, and personal protective devices (Harashima, 1983:950). Gavrilescu (1983:951) agrees with the wearing of personal protective devices. A further recommendation is pre-placement examinations for employees with a condition that may potentiate the actions of irritant substances. Potential employees suffering from pulmonary tuberculosis or heart conditions, may not be employed in areas where the possibility of exposure to irritant gases exists (Gavrilescu, 1983:951).

The role and function of the registered nurse in the mine medical station regarding exposure of employees to noxious gases will depend on their knowledge of the clinical signs of the

specific conditions, such as acute pulmonary oedema. The first aid and emergency treatment of the conditions must be well known to them. Health education programmes regarding these procedures can be developed, and presented to first aiders and employees alike.

viii) Barotrauma

Barotrauma appears to be primarily a disease of the aviation industry. Zenz (1988:912) discusses the development of barotitis, which is a condition that develops as the result of rapid descent in aircraft. The person becomes unable to stabilize the pressure on both sides of the eardrum, because the return of gas to the middle ear does not proceed passively. The condition occurs more readily in persons suffering from nasal mucous membrane swelling.

This condition can develop in mine workers, because of the rapid descent to great depths in the mine shaft (3500 meters were mentioned earlier). The nurse in the mine medical station cannot do much about the rate of descent, or the depths at which the employees work, but patients complaining of upper respiratory infections and allergies must be examined carefully, and if necessary be prevented from going down the mine. Medication to relieve swelling of the mucous membranes must be given as per prescription.

3.2.4.2 Specific trauma and the complications thereof

- Pulmonary trauma: Fought (1988:65) discusses the effects of trauma to the respiratory system. The most common cause of death in patients with an injury to the respiratory system, is respiratory failure. Life-threatening injuries include those to the trachea, larynx, subclavian vessels and the lung tissue itself, resulting in a haemothorax, a pneumothorax or a tension pneumothorax. Inhalation injuries are also dangerous (Fought, 1988:65).

  Pneumothorax and tension pneumothorax may be encountered as a complication of pulmonary trauma. Pneumothorax develops

as a result of a puncture wound in the pleural cavity, whether externally or from the lung itself. Air enters through either the external wound, or the damaged lung, and every time the patient breathes, air is sucked into the cavity, causing the lung to collapse. The patient then develops severe dyspnoea (Grant, Murray & Bergeron, 1986:311-312).

The care of the pneumothorax involves maintaining an open airway and the chest wound (if present) must be sealed. Grant *et al.* (1986:312) describe the method of sealing this wound by covering it with thick plastic, and sealing the edges with adhesive tape. One corner is left open to act as a flutter valve, which will allow trapped air in the pleural cavity to escape during exhalation, while it will seal the wound during the sucking phase of inhalation. This approach is also used in both mining companies. High concentrations of oxygen may be administered, and shock management is important. According to the mine medical station personnel interviewed during the situational analyses, this approach is also used in the mine medical stations of both mining companies.

Another type of pneumothorax is called the tension pneumothorax. This condition develops because an open chest wound was sealed, or sealed itself, while the damaged lung still allows air into the pleural cavity. Trapped air in the pleural cavity cannot escape because the chest wound is sealed. The patient will present with increasing dyspnea, signs of developing shock, distended neck veins, tracheal deviation to the uninjured side, uneven chest wall movement and a reduction of breathing sounds that can be heard in one side of the chest. If the chest injury was sealed completely with plastic, one corner will have to be lifted to allow air to escape if the patient's condition worsens (Grant *et al.*, 1986:312-313). In the absence of an external wound, a intravenous canula may be inserted just below the clavicle on the affected side, until the trapped air escapes, this according to the information contained in

the lecture by Prof J P Lowe on 14 January 1991, at the Leslie Williams Memorial Hospital.

The most important aspects in the treatment of these injuries include the maintenance of a patent airway and breathing. The interventions to maintain the integrity of the pleural cavity only then become important (Fought, 1988:65).

A severe complication of trauma to the respiratory system is called ARDS or Adult Respiratory Distress Syndrome. The patient presents with dyspnea, diffuse pulmonary infiltrates on chest X-Rays, hypoxia and a decreased lung capacity. The mortality rate may be as high as 50%, and if complicated with sepsis, as high as 90% of all cases (Kilian, 1990:69). Lowe (1986:14) describes a condition known as "shock lung", also called post traumatic pulmonary insufficiency. This condition develops as a result of crush injuries resulting in multiple organ failure. The condition develops, in part, as a result of the treatment to prevent renal failure often encountered after severe crush injuries. The development of the condition occurs in three phases:

* Resuscitation and developing alkalosis: Large amounts of fluid are administered to the patient in order to maintain circulation to the kidneys. The patient then presents with persistent spontaneous hyperventilation.
* Pulmonary insufficiency: Irrespective of oxygen being administered to the patient, the PO_2 remains low.
* Bradycardia and asystole: Severe anoxaemia and lactic acidosis develops, resulting terminally in CO_2 retention.

In the event of blast injuries, such as encountered in bomb blasts or other explosions, the changes in air pressure as the explosion occurs can force air into the lungs leading to rupture of the lung tissue or haemorrhage (Edwards, & Cooper, 1988:1203). It must be kept in mind that, although unlikely, blasting accidents can occur in the gold mining

industry, while other types of explosions underground cannot be ruled out altogether.

The prevention of ARDS as discussed by Killian (1990:69-70), is very medically oriented, and will not be discussed here. Morris (1986:23) states that the early use of the MAST suit for the shocked patient can reduce the incidence of ARDS. This, coupled with the prompt and effective resuscitation of the traumatized patient can contribute to successful ARDS prevention, and the registered nurse in the mine medical station can make a contribution in this regard. The MAST suit is in use at the Gold Fields of South Africa Limited Mines, and will therefore contribute to the prevention of the development of ARDS.

- Cardiovascular trauma: Cardiovascular trauma may result in either:
  * a decrease in the circulating fluid, or
  * damage to the heart and blood vessels itself.

Burns may or may not affect the blood vessels themselves, but they usually lead to massive loss of fluid, thereby reducing the circulatory fluid (Fought, 1988:65). Blasting accidents as mentioned earlier, can also cause burns, especially third degree burns, which can lead to the development of cardiovascular problems (Edwards *et al.*, 1988:1203). It must be kept in mind that blasting accidents, whether unlikely or not, can occur in the gold mining industry.

The fluid loss resulting from burns must be replaced. Severe fluid loss will result in hypotension, which in turn will result in lowered perfusion of the brain, heart, tissues and kidneys, which may result in death (Fought, 1988:65-66).

The complications of cardiovascular trauma can be prevented by means of fluid replacement and surgical intervention to prevent further blood loss. Maintenance of renal function

is essential for survival in this kind of trauma (Fought (1988:66). The MAST suit may also be used to treat shock in the traumatised patient, as it can translocate approximately 500 - 2000 ml of available blood into the patients circulation (Morris, 1986:23). The MAST suit is in use in at least the Gold Fields of South Africa Limited mines, and all registered nurses in the mine medical station should be capable of commencing intra venous infusions. The treatment of cardiovascular trauma, excluding trauma to the heart itself, is very much based on shock treatment and prevention, and these nurses should all be competent in this aspect of nursing care.

Shock can develop as a result of any type of trauma, but the main reason for the development of shock is circulatory failure. This can develop as a result of any type of trauma leading to either blood loss or fluid loss (e.g., burns). Vlok (1988:753) identifies three types of shock, namely:

- Cardiogenic shock, which develops as a result of cardiac failure,
- oligemic shock, which develops as a result of loss of blood or blood volume, and
- vasogenic shock, which results from vas dilatation because of loss of tone in the walls of the blood vessels. Vasogenic shock leads to pooling of blood in the non-essential areas, which leads to the development of peripheral circulatory shock. Anaphylactic shock, septic shock and neurogenic shock are three distinct varieties of vasogenic shock.

The registered nurse in the mine medical station dealing with the traumatic patient must be alert in order to detect the clinical signs of shock as early as possible in the patient. These clinical signs include a cold, clammy and pale skin with a normal or slightly lowered blood pressure. The pulse rate may be normal or rapid, but the extremities are cold. The temperature of the patient is subnormal. The patient may have tachypnea, and may appear

apprehensive. The patient may complain of thirst, and urinary output may be good, or slightly lowered (Vlok, 1988:753-754).

If left untreated, the condition of the patient will deteriorate rapidly, and he will present with a drop in blood pressure, a weak thready pulse, his skin will turn ashen grey, while his temperature remains subnormal and his skin will be cold. Respiration will become shallow, and respiratory failure with pulmonary oedema, congestion and atelectasis may further complicate the situation. A marked change in mental alertness will develop, which will progress to unconsciousness. Oliguria develops, as well as metabolic acidosis. Capillary oozing may occur if the patient has a wound (Vlok, 1988:754-755) as a result of disseminated intravascular coagulation.

Viljoen (1988:278) provides guidelines for the management of shock. These guidelines include aspects such as nursing the patient in a flat position, while keeping him warm. The primary cause of the shock must be rectified, and the patient's airway must be maintained, while oxygen is administered simultaneously. The blood volume must be restored as soon as possible, using two intravenous lines. A crystalloid and colloid solution must be administered simultaneously.

The nurse must have emergency medicine ready, such as inotropic drugs, corticosteroids, vasopressors, diuretics, vasodilators and sodium bicarbonate. The patient must be kept still and complications can be prevented by observing the patient's vital signs and reacting to a deterioration of these signs (Viljoen, 1988:278). These guidelines are also upheld by Vlok (1988:755-757).

The registered nurse in the mine medical station must be well versed in the skills of shock management. As a result of the closed environment of the mine, it may take up to two hours to evacuate patients from the site of the

disaster, and the injured mine worker may develop shock during this period. The registered nurse should then be able to manage the situation.

- Neurological trauma: Brain trauma, or trauma high in the cervical cord region, can become life-threatening. This type of trauma results from injuries such as cervical spine lacerations, basilar skull fractures with or without air or cerebro-spinal fluid leaks, brain lacerations and haematomas.

  Indications that the trauma is life-threatening include a period of unconsciousness ranging from 15 - 59 minutes, and the development of secondary complications such as cerebral ischaemia and oedema (Fought, 1988:66).

  Spinal cord injuries form a major part of neurological trauma, and Shrosbree (1990:182) identified rock falls, motor accidents, sports injuries and assaults as the main cause of spinal injuries in the gold mining industry. The importance of the initial neurological examination by the doctor or "informed health worker" (supposedly the registered nurse in the mine medical station) is vital in determining the treatment and establishing the prognosis of these injuries. When conducting a general examination of the multiply injured patient, the registered nurse must consider the possibility of a spinal cord injury. If the patient complains about a pain in the back or neck, with accompanying sensory disturbances, then a spinal cord injury must definitely be suspected.

  Edwards et *al.* (1988:1203) indicate that cervical and spinal injuries should be suspected in all cases of blast accidents, and the victims must be treated as such. A neck collar, sandbags to immobilize the head, and a back board are essential apparatus in preventing paralysis even before the neurological status of the patient is established. The use of the MAST suit is also of value if sub-diaphragmatic spinal cord injuries are suspected. Morris (1986:23)

mentions the use of the MAST suit in the treatment of neurogenic shock following spinal cord injuries.

Fought (1988:66) discusses the use of respiratory therapy, anti-inflammatory agents and analgesics to prevent further complications after neurological trauma. A distended abdomen and bladder can be treated with a naso-gastric tube and catheterization. This will also enable the nurse to accurately monitor intake and output, as well as kidney function.

- Musculoskeletal trauma: Several types of musculoskeletal trauma can be life-threatening. These types of trauma include trauma to the chest especially if it results in a flail chest, above-the-knee amputations and pelvic crush injuries. There may be loose and unstable bone fragments resulting from the trauma, and this may damage the underlying organs, or cause haemorrhage. The latter will decrease the volume of circulating blood. Peter (1988:62-64) estimates the mortality rate for pelvic fractures at between 5 and 50%, and emphasizes the necessity of early diagnosis of pelvic fractures by the physician. The role of the critical care nurse in the management of these patients is also mentioned. Fractures of the sacro-iliac region and unstable fractures seem to have a higher mortality and morbidity rate.

  The complications of life-threatening musculoskeletal trauma include infection, sepsis, acute pulmonary emboli and compartmental syndrome. All of these can also lead to the loss of a limb (Fought, 1988:66).

  In the gold mining industry, musculoskeletal trauma are often sustained as a result of being trapped under material such as rocks, after a rock fall. Lowe (1986:13) indicates that the trapped person often dies soon after being released, although he appeared to be quite normal during the rescue operation. The sequelae of being crushed include the following:

* Renal failure: Lowe (1986:14) states that the pathogenesis of renal failure following a crush injury is still unknown. It is deemed to be multi-factorial. Fought (1988:66) estimates the mortality rate for acute renal failure to be as high as 60%. It leads to a decreased glomerular capillary pressure, changes in renal blood flow and tubular obstruction. There are two distinct types of renal failure, namely:
  - High output failure, with defective urea clearance despite large urine volumes accompanied by the development of azotemia, and
  - oliguric renal failure with a urinary output of less than 400 ml per 24 hours, accompanied by the development of azotemia.

  The treatment of renal failure falls outside the scope of this study, and will therefore not be discussed here.

* Compartmental syndrome: Lowe (1986:15) describes the causes of compartmental syndrome as being an increased pressure in the closed fascial compartments. This leads to a reduced capillary perfusion at a level below that necessary for the cells to survive. After several hours, myoneural necrosis, with accompanying contractures, develop.

  Compartmental syndrome can develop as a result of a variety of factors. Two of these factors can be summarized as follow:
  - A decrease in compartment size, which is caused by dressings and plaster casts which were applied too tightly (Lowe, 1986:15; Muckart, 1990:65) as well as thermal injuries and surgery to closed fascial defects (Lowe, 1986:15). Muckart (1990:65) also indicate that external splintage and shock therapy using the MAST suit could lead to the development of compartmental syndrome.
  - An increase in the fluid content of the

compartment can cause compartmental syndrome, and can be caused by post-ischaemic swelling, a long period of limb compression together with immobilization, snake bites, haemorrhage, fractures and soft tissue injuries.

The diagnosis of compartmental syndrome is described by both Lowe (1986:15) and Muckart (1990:66). The registered nurse in the mine medical station can assist in making this diagnosis by observing the patient for clinical signs such as a deep throbbing pain which is often worse than expected for that specific injury, and can also be elicited by passive stretching of the affected muscles, a palpable tense compartment can be felt, and a paresis of the affected limb as a result of primary ischaemia. Paraesthesia can also develop, and it is important to find an explanation for all sensory changes in post-trauma patients. Unconscious patients cannot be assessed in this regard. The last clinical sign involves the pulses of the patient. Palpable pulses may be present long after capillary perfusion has ceased. A palpable pulse is therefore of no importance in the diagnosis of compartmental syndrome.

The role of the registered nurse regarding compartmental syndrome is very much related to the diagnosis of the condition, and not really to the treatment. The treatment is very medically oriented, and will therefore not be discussed in this study.

- Genito-urinary trauma: Peter (1988:65) estimates that approximately 15% of all pelvic fractures will be complicated by associated urinary tract injuries. The registered nurse providing nursing care to this patient

must observe the patient for clinical signs such as an inability to pass urine, a distended bladder, displaced prostate gland and blood around the urethral meatus. Potentially life-threatening sequelae include acute renal failure (as already discussed as part of musculoskeletal injuries), overhydration with intravenous fluid which will lower the patient's renal function, and an increased susceptibility to infection (Fought, 1988:66).

The most important aspect of nursing care is the initial assessment and diagnosis of the injury. This will enable the nurse to plan nursing care during the initial stages after the injury before hospitalization. The registered nurse in the mine medical station will not be rendering direct nursing care to the patient after the initial stages of treatment, but the value of this nurse lies in the skill that he must have to assess accurately the patient at the scene of the accident or the triage area, and to provide nursing care in such a manner, that further tissue damage is prevented.

v) Nonoccupational illness and injuries.

Although these diseases and injuries are contracted outside the work place, they will have an effect on the worker's productivity. The occupational health nurse must be able to treat and refer these conditions, which include conditions such as alcoholism and drug abuse (Clemen-Stone, Eigsti & McQuire, 1991:631-632). This function of the occupational health nurse regarding direct nursing care can be combined with the next as identified by Clemen-Stone et *al.* (1991:632), namely provision of nursing care for workers with acute and chronic conditions. These functions are still deemed to be important, although modern occupational health services are more preventively oriented. However, the treatment of injuries and minor ailments can prevent complications, and will lower absenteeism (Schilling, 1981:147).

In the medical stations of the mining companies included in the research, the registered nurses were offering treatment services during the daily "sick-parade". It must be kept in mind that

the mine workers are migrant workers far from their own homes, and these workers do not have private doctors. As a result the occupational health nurse offering treatment services would not be transgressing any ethical considerations when providing these services.

Conditions such as hypertension and other cardiovascular diseases, can influence the productivity of the worker, and screening can ensure early commencement of treatment, with resultant lower absenteeism (Schilling, 1981:150). Schron (1985:229-230) identifies the occupational health nurse as the ideal person to identify cardiovascular risk factors in employees. Implementation of the nursing process, because it concentrates on problem solving skills, will enable the nurse to render quality care to the employee.

In the two gold mining companies included in this study, the situational analysis revealed that non-occupational diseases are treated by the registered nurses in the mine medical stations. In the Freegold mines, the nurses actually became responsible for the supervision of the actual administering of all medicines to patients. The main reason given was possible non-compliance in medicines, which could lead to the development of dangerous situations underground. The worker may suffer from life-threatening conditions such as diabetes mellitus or epilepsy, where compliance with drug regimens is essential. The merits of this supervision is debateable.

3.3 INTERNATIONAL HEALTH CARE APPROACHES IN THE MINING INDUSTRY

There are limited literature sources available regarding the occupational health services in the mining industry in the rest of the world, and the role and functions of the registered nurses in providing care to mine workers is not clearly identified either. It is for these reasons that a discussion of the occupational health services offered to mine workers in the United Socialist Soviet Republics (U.S.S.R.), showing another

approach in health care delivery to mine workers, was included in this study. It is interesting to note that there is a vastly different approach in health care delivery, with the South African approach offering much more professional autonomy to the registered nurse. This autonomy must be valued, and continuing education programmes to ensure professional competency is essential if the profession wants to retain this autonomy.

Health services in the mining industry of the U.S.S.R. are rendered at town hospitals, which represent open type medical and sanitary units, and regional medical and epidemiological stations (Pavlenko, Volkova, Kovalchuk, Dvornivhenko, Gavrilenko, Levchenko, Kharakoz & Shilohvost , 1988:1).

In 1985 the Krivorog Research Institute of Work Hygiene and Occupational Diseases, together with other medical units, examined 1100 miners, and found a 41,4% increase in chronically ill patients since 1984 (Pavlenko *et al.*, 1988:2-3).

Certain limitations to the service were also pointed out. Audiometers and vibrotesters are not freely available in areas where workers are subjected to high levels of noise and vibrations. Only 11-17% of specific polyclinic patients were treated at sanatoria belonging to that industry, and the rehabilitation centres, or "health" workshops, were not optimally utilized. The authors felt that these problems could be addressed by providing continuing education programmes on specific topics to the doctors (Pavlenko *et al.*, 1988:3).

Research conducted at the Voroshylovgrad Medical School on 1284 male mine workers revealed that 13,3% of the workers developed pathology of the motor system. These workers work in coal mines at depths of 700 meters and more. The researchers concluded that the main etiological factors could be grouped together as being high temperatures (30 degrees centigrade and above), increased humidity of 98% or more, and the dust and gas content of the mining environment (Grabovoi, Ivchenko & Rodichkin, 1988:1-2).

It would also appear that face workers are at a greater risk of accidents. In investigating 294 accident cases, it was found that face workers constituted 52,4% of accidents cases. Furthermore, 93,8% of all accidents occurred underground. The causes of accidents could be summarized as 51,7% being due to falling pieces of rock or roofing, 32,6% due to moving parts of machinery, and 9,5% due to hand operated tools and instruments (Grabovoi *et al.*, 1988:3-4).

It is interesting to note that the Russians did not mention the role of registered nurses in the mining industry at all. It would appear that doctors, or physicians, are solely responsible for health care in industries and mines. Continuing education programmes for these doctors are seen as the solution to the problems encountered by them. In South Africa registered nurses play a very important role in health care in the mine medical stations, which can be seen as the analogue for the polyclinics in Russia.

3.4 PRESENT DAY HEALTH SERVICES IN THE SOUTH AFRICAN GOLD MINING INDUSTRY

This study includes two different mining companies, namely Gold Fields of South Africa Limited, and the Freegold mines, which is a filial of the Anglo American Corporation of South Africa. Health services offered to mine workers by these two companies differ considerably, and it may therefore be of value to discuss them separately.

No literature about the organization of health services at the Freegold mines could be traced, and the discussion will therefore be based on the findings of the situational analysis that was completed during 26 June - 7 July 1989 at their mine medical stations, the Ernest Oppenheimer Hospital, as well as the Ernest Oppenheimer Nursing College.

3.4.1 The health services offered by GOLD FIELDS of SOUTH AFRICA Limited

A situational analysis was done at four mines belonging to Gold Fields of South Africa Limited. This was done from 26 to 29 March 1990. The following mines in the Carletonville area were included in the study:

- East-Driefontein.
- West-Driefontein.
- Deelkraal.
- Doornfontein.

All these mines utilized the Leslie Williams Memorial Hospital as a referral hospital.

The health services at the mines are rendered in two categories of medical stations, namely medical stations and dressing stations. Because there is such a difference between these two categories of medical stations, they are best discussed separately.

3.4.1.1 The medical stations

The medical stations are best described by discussing the different aspects contributing to their success. This can be done as follows:

a) The infrastructure of medical stations

Duminy *et al.* (1990:218) state that medical stations are usually situated near the hostels where the workers are living. The infrastructure of the medical stations consist of the following:

"1. Dressing area
2. Examination area
3. Testing areas for hearing and vision
4. Sick bay
5. X-Ray area
6. Training hall
7. Administrative offices" (Duminy *et al.*, 1990:218).

During the situational analysis, it was found that the infrastructure was actually organized on a slightly different manner, namely:

1. Offices for the senior medical station superintendent/medical station superintendent;
2. a resuscitation area;
3. a stitching area;
4. a dressing room;
5. stores for the safe keeping of equipment;
6. X-Ray facilities at three of the medical stations;
7. an Audiometer at East-Driefontein mine;
8. a reception-cum-waiting area;
9. units for physical assessments at two of the stations;
10. a first aid training hall at three of the stations.

The medical stations are staffed by registered nurses, within the different post-designations. At Gold Fields of South Africa Limited, these post-designations include the following:

- Senior medical station superintendent;
- Medical station superintendent;
- Senior professional nurse, grade 1;
- Professional nurse, grade 1, as well as one non-registered nurse category namely,
- enrolled nursing assistant.

All the registered nurses are expected to be highly skilled in first aid, and they are also responsible for first aid training programmes offered to the mine workers and other categories of non-nursing personnel, as it is expected that all mine workers should be able to render first aid in case of a mining accident.

b) Health services offered at medical stations

Duminy *et al*. (1990:218) indicate that the services offered at the mine medical stations include a variety of health examinations, such as pre-placement examinations for new recruits, periodic six-monthly examinations for current employees, as well as physical examinations after the resignation of employees.

The pre-placement examinations are done on new recruits, and include a general physical examination, mini chest X-rays, basic audiometry and testing for visual acuity. Immunizations are given as necessary. The six-monthly routine medical examinations are carried out early in the morning before the daily sick parade. This results in 200-300 people being examined every morning. Added to the above workload, a sick parade is held for sick workers. Minor ailments are treated immediately, and the patients that cannot be handled by the nurses will either be held over for the doctor's round, or be referred to the referral hospital. It is therefore clear that the registered nurses in the mine medical stations have quite a responsibility in ensuring that all these patients receive quality care.

The medical station superintendents meet with the chief medical officer on a weekly basis to discuss problems encountered in the service, as well as policy changes in the health policies of the mining company. Doctors also visit the medical stations daily to tend to patients who cannot be treated by the nursing personnel in an attempt to keep hospital attendance as low as possible.

3.4.1.2 The dressing stations

The dressing stations are best described by using the same approach as for the medical stations. This is reflected below:

a) The infrastructure of dressing stations

The dressing stations are located either at the shafts of the mine, or underground, each serving a level of the mine (Duminy *et al.*, 1990:218). Dressing stations vary in size and sophistication.

i) The underground dressing stations

Underground dressing stations are manned by dressers, who are usually workers who have been chosen to receive further training

as a result of an interest and aptitude for first aid. The underground dressing station serves one level of the mine only, and is usually a very small area containing first aid equipment, a stretcher table, running water, a telephone and an eyewash fountain. The duties of the dressers are:

"1. to ensure that his first aid equipment is in good order
2. to provide minor first aid such as dressings, compression bandages, coldpacks, eye washes and splints, before injured workers are taken to the surface
3. to have reasonable knowledge of the working places of his area so as to guide senior medical personnel.
4. to summon help when major accidents occur in his area.
5. other mining duties such as counting and control of drill steel may also be given to dressers in "quiet" areas" (Duminy *et al.*, 1990:218).

ii) The surface dressing stations

All the facilities available in underground dressing stations can also be found at the surface dressing stations. Piped oxygen and suction are additional in the surface dressing stations. These stations are usually bigger, and may have stores for emergency and rescue equipment. They usually serve between 2000-3000 workers, and are manned by 2-3 more senior dressers. During the situational analysis it became clear that these dressers were actually enrolled nursing assistants who had received advanced training in first aid (Duminy *et al.*, 1990:218).

At the time of an accident, the surface dressing station becomes a triage area where doctors and senior nursing personnel have their base.

3.4.1.3 The mine hospital

The mine hospital used for referral purposes by the mines included in this study, is the Leslie Williams Memorial Hospital. According to Duminy *et al.* (1990:219), this hospital cares for approximately 40000 workers. It has a bed occupancy

rate of about 75%. The hospital offers a full range of surgical, medical, gynaecological and obstetrical care, with a diagnostic laboratory service, radiology department, occupational therapy and physiotherapy. It has a well designed emergency area, as well as modern operating theatres. It also has a modern six bed critical care area. Regional medical specialists are employed on a needs basis. In the event of the Leslie Williams Memorial Hospital being unable to provide health care for a specific patient, referrals are made to the Rand Mutual Hospital (Duminy *et al.*, 1990:219).

3.4.2 The health services offered by the FREEGOLD Mines

The information below was gathered during a situational analysis conducted at the Freegold mines during 26 June 1989 to 7 July 1989. Health services for this gold mining company are offered at the mine medical stations of the individual mines, and the Ernest Oppenheimer Hospital.

3.4.2.1 The medical stations

The Freegold mining group is a filial of the Anglo American Corporation of South Africa. It is divided into a Northern region and a Southern region.

Freegold North region includes the Western Holdings mine, the Free State Geduld mine and the Freddies mine, while Freegold South region includes the President Steyn mine, the President Brand mine, the Free State Saaiplaas mine and the Erfdeel mine (Potgieter, 1989:1). The Erfdeel mine was not included in the situational analysis as such, as the researcher was informed that it formed part of the Free State Saaiplaas mines.

The services offered at the Freegold mines differ considerably from those offered by the Gold Fields of South Africa Limited mines, but will be discussed in the same manner.

a) The infrastructure of medical stations

All the nursing services for each mine are co-ordinated by the senior medical station superintendent of that mine. Each mine shaft has its own medical station, which can be manned by medical station superintendents and or other registered nurses within the post-designations of the Freegold mining company. The various post-designations include

- Senior medical station superintendent;
- medical station superintendent;
- ambulance officer;
- senior professional nurse;
- professional nurse;
- medical technologist for audiometry.

The medical stations consist of the following areas:

1. Offices for the senior medical station superintendent/medical station superintendent;
2. offices for ambulance officers at some of the stations;
3. a computer area with linkage to the Ernest Oppenheimer Hospital;
4. offices for clerks;
5. a resuscitation area;
6. a stitching area;
7. a dressing area;
8. stores for the safe keeping of equipment;
9. X-Ray facilities in at least one medical station of each mine;
10. an audiometer at number 1 shaft of Free State Geduld mine and number 2 shaft of President Steyn mine;
11. the Southern region also has observation rooms, where patients can be admitted for 24 hours for observation purposes;
12. an area for dispensing everyday medicines such as analgesics and cough remedies for workers on their way to the shaft. This area is slightly separate from the medical station, next to the "tunnel";
13. a first aid training hall for at least one medical station of each mine.

b) Health services offered at medical stations

The services offered at the medical stations range from a daily sick parade for minor ailments, periodic examinations, especially audiometric examinations and examinations for visual acuity, to emergency care in accident cases. Routine miniature chest X-rays are done by registered nurses qualified in diagnostic radiography. Patients seen at the sick parade are either treated or referred to a doctor. Doctors visit the medical station twice a week, and patients who may need a doctor in between are referred to Ernest Oppenheimer Hospital.

3.4.2.2 The mine hospital

The Ernest Oppenheimer Hospital is the referral hospital for the mines in the Welkom area. Cartwright (1971:107) indicates that it is the largest industrial hospital in Southern Africa, and states that in 1971 it had a bed capacity of 900 beds. On 29 April 1992, Mrs M Jooste, senior nursing services administrator of the Ernest Oppenheimer Hospital, informed the researcher in a telephonic conversation that this hospital has 589 beds at the present moment. The bed occupancy rate on 29 April 1992, was 68%.

The hospital offers a full range of surgical, medical, gynaecological and obstetrical care, with a diagnostic laboratory service, radiology department, occupational therapy and physiotherapy. It has a well designed emergency area and operating theatres. It also has a critical care area. Regional medical specialists are employed on a needs basis. The hospital also include a spinal unit, which consist of two sections. The acute spinal unit has 35 beds, while the rehabilitation section has 170 beds, with a bed occupancy rate of 75%.

3.5 THE ROLE AND FUNCTION OF THE REGISTERED NURSE IN THE MINE MEDICAL STATION

Ginzberg, as quoted by Miller (1979:78) identified three levels

of nursing staff. They include a top management, middle management and the rank and file levels. In the mine medical station this can be applied when analyzing the different nursing posts. The top management group includes the senior medical station superintendents, the middle management group includes the medical station superintendents, and the rank and file includes all the other categories of nurse, as well as the ambulance officers.

It is within this frame of reference that the role and function of the registered nurse in the mine medical station will be discussed.

In order to describe the role and function of the registered nurse in the mine medical station, it is necessary to establish the primary and secondary functions of the organization, which, in this study, refers to the mine medical stations of the gold mining industry. This is done by identifying the primary goal of the organization (Stevens, 1978:70).

For the purpose of this study, the researcher assumes that the two gold mining companies included in the study established mine medical stations in order to provide health care to their mine workers. This health care will aim at ensuring optimum levels of health in the worker. (The level of health of all people can be improved by providing preventive, promotive, curative and rehabilitative care. Any further reference to the promotion of health in mine workers will include all four types of health care.)

The assumption must be made that the primary goal of the health care services in the gold mining industry would be the promotion of health in the mine workers. All functions performed by the registered nurses regarding the primary goal of the organization, should therefore be deemed to be primary functions. Stevens (1978:71) also states that all other functions performed, over and above the primary functions, should be deemed to be supportive functions, ancillary to the primary goal, with nursing and physician care being mainly

primary functions.

Gillies (1989:146) defines the concept 'role' as ". . . the set of behaviors and attitudes expected of an individual by those with whom he interacts". Roles can also be determined or defined through the expectations of other people.

The role of the registered nurse in the mine medical station will therefore be that set of behaviours expected from the registered nurse by the medical fraternity on the one hand, and the mine workers on the other. These expected behaviours will be stipulated in the different primary functions of the organization, and will ultimately provide a health care service to the mine workers that promote optimum levels of health.

The role and function of the registered nurse working in the mine medical station should be contained in the job description of his specific post designation, and an analysis of the available job descriptions will be included in the study.

The Freegold Mines could provide job descriptions for the senior medical station superintendent, the medical station superintendent and the ambulance officer. Job descriptions for the senior professional nurse and the professional nurse were made available to the researcher by the senior medical station superintendent of the Western Holdings mine, but on examination proved to be applicable to ward personnel in the Ernest Oppenheimer Hospital only, and were therefore not analyzed for this study.

The Gold Fields of South Africa Limited mines provide job descriptions for the senior medical station superintendent, the medical station superintendent, the senior professional nurse, grade 1, and the professional nurse, grade 1.

3.5.1 The senior medical station superintendent

The analysis of the job description of this post-designation included the job descriptions from both the Freegold mines and

the Gold Fields South Africa Limited mines. Although the approach in the compilation of the job descriptions differ widely between the two mining companies, certain roles for this post-designation were identified, and will be discussed below. The content was redistributed between different roles and functions for this post-designation.

3.5.1.1 Supervisory or management role

a) The Freegold mines.

The supervisory and management role is achieved by fulfilling certain functions. These functions can be classified as follow:

- Supervision of all the incumbents of lower rank employed within the mine medical station or stations, as applicable within the specific mining company. This supervision includes regular staff meetings, merit rating and training of staff, and the development of duty rosters;
- submission of an annual budget, and meeting with subordinates to discuss cost control;
- supervision of the payment of first aid bonuses;
- accountability for loss control in his area of responsibility (AACSA, 1988(a):1-4).

b) The Gold Fields of South Africa Limited mines.

In this mining company this post designation became very administrative oriented, The following functions were identified for the senior medical station superintendent:

- A planning function which includes establishing a nursing infrastructure and policy for the medical station in terms of the appropriate Acts, the physical lay out of the medical station, being involved in planning disaster plans, compiling the annual budget and establishing the standard stock levels of each medical station;
- a supervision function which includes delegation to the medical station superintendent and chief professional nurses, daily meetings with subordinates with duty allocation, ensuring maintenance of nursing standards, overseeing of the legal aspects of disciplinary proceedings, determining of learning needs of subordinates,

planning of leave rosters and conducting of pre-employment interviews, exit interviews, and authorizing of disciplinary action for medical station personnel according to the prescribed procedures;

- A personnel management function which include screening of all applications for vacancies, counselling of employees, developing an orientation programme for medical station personnel, conducting succession planning, and ratifying the duty rosters drawn up by the medical station superintendent (GFSAL, 1991(a):1-3).

3.5.1.2 Administrative role

a) The Freegold mines.

The senior medical station superintendent has the following administrative functions which enables him to achieve this role. He must:

- Ensure that managerial instructions are complied with;
- investigate administrative delays and complaints by other departments;
- investigate the need for changes in staffing patterns, and motivate this to management;
- participate in all the necessary meetings;
- compile and check monthly statistics;
- authorize overtime payment;
- ensure that all the incumbents maintain registration with the South African Nursing Council and South African Nursing Association;
- Explain specific patients' diagnoses to the mine management when necessary in order explain lost shifts.
- Oversee the organization of the mines' first aid competitions (AACSA, 1988(a):1-4).

b) The Gold Fields of South Africa Limited mines.

In this mining company the following functions were identified for the senior medical station superintendent. He must:

- Compile all monthly statistics;
- register the medical station as a primary health care facility with the Department of National Health and

Population Development by completing all the necessary forms;

- ensure that all the incumbents maintain registration with the South African Nursing Council and South African Nursing Association;
- develop new filing systems;
- check drug registers;
- authorize medicine orders as compiled by the medical station superintendent;
- compile all reports needed;
- monitor radiation exposure of all incumbents;
- arrange for the maintenance of all equipment (GFSAL, 1991(a):3-4).

3.5.1.3 Clinical role

a) The Freegold mines.

The clinical role of the senior medical station superintendent is achieved by fulfilling the following functions. He must:

- Ensure that standards laid down within the medical station as maintained;
- inspect patient records, accident reports and report on compensation and investigate any delays;
- submit reports to the relevant sections regarding these inspections;
- examine convalescent patients, and decide about their fitness to return to work. This includes scrutinizing records of patients who return from hospital;
- scrutinize monthly X-Ray printouts, in order to ensure regular check-up;
- advise the mine management on the reduction of sick leave shifts, and explain treatment and policies to management as applicable;
- assist in the evaluation of permanent disabilities of workers who sustained injuries, within his competency;
- do physical assessments of patients presenting at the medical station, make a medical diagnosis, and treat the patient if possible. If not, the patient is referred to the hospital. These assessments include assessment of

patients referred by the medical station superintendent for opinion, and assessing the new recruit;

- Scrutinize patient records for tuberculosis treatment, and do follow up of defaulters.
- Co-ordinate nursing personnel participation in research projects (AACSA, 1988(a):1-4).

b) The Gold Fields of South Africa Limited mines.

In this mining company the following functions were identified for the senior medical station superintendent. He must:

- Establish objectives for staff;
- ratify work programmes developed by the medical station superintendent;
- advise medical officers on patient care aspects;
- control and regulate transport and drivers;
- advise subordinates on the treatment of individual cases;
- evaluate the standard of continuing education given by subordinates;
- ensure that student nurses are appropriately educated by organizing their placement;
- do spot checks on pre-employment examinations to ensure a high standard in these examinations;
- ensure that the necessary periodic examinations are done on high risk workers;
- interpret abnormal findings in hearing tests and vision tests, and arrange for referral;
- be willing to be involved in research;
- co-ordinate pre-employment and periodic examinations;
- assess current health problems, and organize health education accordingly;
- conduct situational analyses to ensure currency of specialized resuscitation equipment;
- establish resuscitation teams;
- organize the personnel to be called out in the event of an accident;
- evaluate the situation on arrival at the scene of the accident, and decide about treatment measures, such as underwater chest drains;
- maintain patient stabilization,and co-ordinate the

rehabilitation programme.

The senior medical station superintendent is also responsible for first aid training and competitions, the inspection of the medical station and shaft emergency rooms (dressing stations, both surface and underground), and must participate in the loss control programme of the company (GFSAL, 1991(a):3-8).

3.5.2 The medical station superintendent

The analysis of the job description of this post-designation is presented below. The roles for this post-designation were identified, and the researcher has redistributed the content between different roles and functions.

3.5.2.1 Supervisory or management role

a) The Freegold mines.
The supervisory and management role is achieved by fulfilling certain functions. These functions can be classified as follow. He must:

- Supervise all the incumbents of lower rank employed within the mine medical station. This supervision includes performance appraisals of subordinates, as well as supervision of duty rosters;
- supervise training of pupil staff in the medical station;
- be responsible for the engagement, disciplining and dismissal of staff according to company policy (AACSA, 1988(b):1-4).

b) The Gold Fields of South Africa Limited mines.
The supervisory and management role is achieved by fulfilling certain functions. These functions can be classified as follow. He must:

- assist the senior medical station superintendent in the planning of the medical station;
- recommend staff complements and structures to the senior medical station superintendent;
- supervise the work of subordinates, as delegated by the

senior medical station superintendent;

- attend all meetings with the senior medical station superintendent;
- ensure that nursing standards are maintained;
- assist the senior medical station superintendent to ensure that the legal requirements for disciplinary hearings are maintained;
- initiate disciplinary actions for subordinates according to the company policy;
- counsel employees;
- ensure that orientation programmes for medical station personnel are implemented;
- assist the senior medical station superintendent in succession planning, and
- draw up duty rosters (GFSAL, 1991(b):1-2).

3.5.2.2 Administrative role

a) The Freegold mines

The medical station superintendent has the following administrative functions. He must:

- Be personally responsible for all mine and legal documents within the mine medical station under his supervision;
- give first aid instruction, arrange for examinations and competitions, and authorize payment of first aid bonuses;
- check drug cupboards and stores in medical stations under his supervision;
- check special medicines and drugs for patients, as well as the drug registers for these medicines, and the individual patients stock within the station or stations under his supervision;
- motivate patients to continue with treatment;
- participate in the loss-control programme of the mining company;
- investigate and act upon system discrepancy reports;
- authorize overtime duties and payment for all medical station personnel;
- complete all correspondence with the South African Nursing Council and South African Nursing Association (AACSA,

1988(b):1-4).

b) The Gold Fields of South Africa Limited mines.

The administrative role is achieved by fulfilling certain functions. These functions can be classified as follow. He must:

- Maintain staff rosters, personnel records and administrative records, and supply the information to the senior medical station superintendent;
- complete registration forms with the South African Nursing council and South African Nursing Association and submit it to the senior medical station superintendent for authorization;
- maintain the filing systems of the medical station;
- complete the drug registers according to the legal requirements;
- order medicines, and submit the orders to the senior medical station superintendent for authorization;
- ensure that the medical station personnel comply with the correct use of personal protective equipment;
- conduct regular inspections of the equipment in the medical station (GFSAL, 1991(b):1-2).

3.5.2.3 Clinical role

a) The Freegold mines.

The clinical role is achieved by fulfilling certain functions. He must:

- Compile monthly health statistics and accident reports;
- Compile the report forms required for fatal mine accidents and assaults, and locate witnesses;
- examine the body or bodies of fatal accident cases, notify management of the possible causes of death, and authorize the removal of the body or bodies;
- examine convalescent patients, and decide about their fitness to return to work. This includes scrutinizing records of patients who return from hospital;
- do physical examinations of novices, ex-leave workers and workers requesting transfer to underground work. Recommend

appointment, rejection or treatment as the case may be;
- examine fire fighters for fitness when necessary;
- supervise routine X-Rays and X-Rays of persons who are discharged;
- assist in the evaluation of permanent disabilities of workers who sustained injuries, within his competency;
- examine food handlers six-monthly;
- do routine basic physical assessments on proto teams;
- examine persons who were subjected to blasting or other fumes;
- compile report documentation for people subjected to blasting and other fumes, and authorize payment of lost shifts.
- do physical assessments of patients presenting at the medical station, make a medical diagnosis, and treat the patient if possible. If not, the patient is referred to the hospital;
- admit patients to bed in observation room and observe them during the day;
- scrutinize records of patients returning from hospital, investigate queries and report to the senior medical station superintendent if necessary;
- take charge of medical care to injured patients in case of underground or surface accidents, as well as road accidents where applicable;
- perform standby duties after hours and on week ends for emergencies and accidents;
- inspect all resuscitation centres, first aid boxes and stores of the mine (AACSA, 1988(b):1-4).

b) The Gold Fields of South Africa Limited mines.

The clinical role is achieved by fulfilling certain functions. These functions can be classified as follow. He must:
- Develop work programmes in conjunction with the chief professional nurse, and submit it to the senior medical station superintendent for ratification;
- assist the senior medical station superintendent in the control of transport and drivers;
- refer individual cases to the senior medical station

superintendent for confirmation of a diagnosis, and arrange hospital admission;

- examine and classify patients before they can return to work after an accident of illness;
- conduct continuing education programmes for subordinates;
- participate in the education programmes of student nurses;
- conduct pre-employment examinations and refer problem cases to the senior medical station superintendent;
- refer abnormal hearing and vision test results to the senior medical station superintendent;
- screen food handlers, and other high risk workers;
- assist the senior medical station superintendent with research;
- assist the senior medical station superintendent in all preventive health care programmes;
- lead resuscitation teams;
- organize resuscitation teams in the event of an accident;
- maintain patient stabilization;
- examine patients daily for possible inclusion in the rehabilitation programme (GFSAL, 1991(b):2-4).

The medical station superintendent must assist the senior medical station superintendent in all first aid training and competitions, the inspection of the medical station and shaft emergency rooms (dressing stations, both surface and underground), and must participate in the loss control programme of the company (GFSAL, 1991(b):3-5).

3.5.3 The ambulance officer

The analysis of the job description of this post-designation was done on the job description of the Freegold mines. The roles for this post-designation were identified, and will be discussed below. The researcher redistributed the content between different roles and functions.

3.5.3.1 Supervisory or management role

The supervisory and management role is achieved by fulfilling

certain functions. He must:

- Supervise all the incumbents of lower rank employed within the mine medical station. This supervision includes signing of attendance registers, and reporting absenteeism to the supervisor;
- compile staff duty and leave rosters on a monthly and annual basis;
- perform the duties of the medical station superintendent in his absence.

3.5.3.2 Administrative role

The ambulance officer has the following administrative functions which enables him to achieve this role. He must:

- Check daily attendance registers of patients, and investigate and report absenteeism to the medical station superintendent;
- be responsible for all the medicines kept in the medical station;
- issue special medicines and drugs for patients, and update the drug registers for these medicines;
- participate in the loss-control programme of the mining company;
- check the content of treatment trolleys on a regular basis, and replace malfunctioning and missing items when necessary;
- order stationery on a monthly basis;
- report to medical station superintendent on a daily basis.

3.5.3.3 Clinical role

The clinical role is achieved by fulfilling certain functions. He must:

- Compile daily health statistics and check reports compiled by clerical personnel;
- compile the report forms required for fatal mine accidents and assaults, and locate witnesses;
- examine convalescent patients, and decide about their fitness to return to work. This includes scrutinizing

records of patients who return from hospital;
- examine all Black/Black assault cases, and compile the necessary documentation;
- supervise routine X-Rays and X-Rays of persons who are discharged;
- ensure that all special medicines are administered correctly;
- enquire about the condition of all patients sent by the medical station to the hospital, and report to management;
- give health education to patients, especially about continued medicine use and possible side-effects;
- be responsible for all medical and surgical patients of the whole mine after hours;
- resuscitate injured workers underground, and accompany them to the surface (AACSA, 1988(c):1-3).

3.5.4 The senior professional nurse, grade 1

This post structure exists at the Gold Fields of South Africa Limited mines. The following functions were identified.

3.5.4.1 Supervision and administration

The supervisory and administrative role is achieved by fulfilling certain functions. He must:
- Supervise and assist nurses in their daily duties;
- instruct staff with regard to action programmes in mass emergency situations;
- control supplies regarding ordering, delivery, adequacy, suitability, storage, economical use and prevention of waste;
- order habit forming drugs from the hospital, and maintain the drug registers;
- ensure that statistics are kept.

3.5.4.2 Clinical role

The senior professional nurse must:
- Assist the medical station superintendent with patients

reporting ill daily, by examining them, making a diagnosis and providing treatment;
- assist the medical station superintendent to monitor the progress of convalescent gangs;
- conduct pre-employment examinations;
- assist the medical station superintendent at the scene of all accidents;
- check food handlers and other high risk groups;
- assist with tuberculosis prevention programmes;
- assist with the evaluation of mentally ill patients, and
- support the objectives of the loss control programme (GFSAL, 1985(a):1-2).

3.5.5 The professional nurse, grade 1

This post structure exists at the Gold Fields of South Africa Limited mines. This category of nurse is employed in a clinic, and not in the mine medical station (GFSAL, 1985(b):1). It therefore warrants no further disoussion, as the objectives of this study is directed at the mine medical stations.

3.6 CONCLUSION

The gold mining industry was absolutely pivotal in the development of occupational health services in South Africa. This was demonstrated in the discussion on the development of occupational health services in South Africa since the founding of the Cape of Good Hope.

1870 marks the approximate beginning of a new era for South Africa, with the discovery of diamonds, and shortly thereafter, gold. The need for occupational health services in the mining industry developed directly as a result of the many and varied health problems encountered by the miners.

Dr A J Orenstein, who later became world famous for his contribution in the occupational health field, came to South Africa on invitation to try to solve the high mortality rates amongst the mine workers, especially the Black recruits. As a

result of his input, the death rate for Black workers could be lowered to 2,67 per 1000 recruits in 1917. Nursing education for Black nurses was established in the mining hospitals as a result of Dr Orenstein's recommendations, whereby the gold mining industry made a major contribution to the health services of South Africa.

A profile of current health problems encountered in the mine medical stations of the gold mining industry was developed, highlighting the most important disease conditions, types of trauma, and the complications thereof, as encountered in the gold mining industry.

The infrastructure of the mine medical stations of those Carletonville mines included in the study and that form part of the Gold Fields of South Africa Limited gold mining company, as well as those of the Freegold mines included in the study, were analyzed. The health services offered by both mining companies were highlighted. Lastly the role and function of three categories of registered nurse employed in the Freegold mines, and four categories of nurse employed in the Gold Fields of South Africa Limited mines were analyzed and discussed.

In chapter 4 the specific role and functions of the registered nurse working in the mine medical stations will be discussed within the parameters of the nursing disciplines occupational health nursing, primary nursing care including primary health care, ethos and professional practice of nursing, and trauma nursing services as offered within the gold mining industry. Simultaneously, the content will serve as a theoretical framework for a continuing education programme for registered nurses working in the gold mining industry, and more specifically, in the mine medical station. The major emphasis of these services developed historically, and remain currently, the discipline of occupational health nursing science.

CHAPTER 4

OCCUPATIONAL HEALTH NURSING IN THE MINE MEDICAL STATIONS

OVERVIEW OF THE CHAPTER

The aim of this chapter, is to analyse occupational health nursing in the mine medical station, thus demonstrating how the different nursing disciplines are interlinked in the unique nursing care setting of the mine medical station.

This aim is achieved through:

- discussing the South African legislature affecting the practice of the registered nurse in the mine medical station of the gold mining industry;
- illustrating the contribution of the registered nurse in the gold mining industry to the health services offered by the gold mining industry within the discipline of occupational health nursing science
- demonstrating the contribution of the registered nurse, as occupational health nurse, to the management of occupational diseases and accidents,
- demonstrating the contribution of the registered nurse in the mine medical station, to the total nursing care of the mine employee, with specific reference to management of diseases conditions, first aid and emergency care, and
- illustrating the effect of computer usage and research on the practice of the registered nurse in the mine medical station.

4.1 INTRODUCTION

Occupational health nursing science appears to be the main drive behind the establishment of nursing services within the mine medical stations, as demonstrated in the historical development of occupational health services in South Africa. However, three nursing disciplines are represented in the nursing care offered at the mine medical stations. Apart from occupational health nursing science, the other two nursing disciplines are:

- Primary health nursing science, including health assessment, diagnosis, treatment and care.
- Trauma nursing science.

Occupational health nursing science *per se*, encompasses aspects of primary health nursing science and trauma nursing science. The specific organization of nursing services in the mine medical stations of the gold mining industry, necessitates a separate brief discussion on each of these nursing disciplines.

The legal basis for the practice of the registered nurse in the mine medical stations must be analyzed in order to place the scope of practice of the registered nurse in the mine medical station in proper perspective.

4.2 THE LEGAL BASIS FOR THE PRACTICE OF THE REGISTERED NURSE IN THE MINE MEDICAL STATION

A number of Acts of Parliament in the Republic of South Africa have an influence on the scope of practice of the registered nurse in South Africa, and the rendering of occupational health care. These Acts will now be discussed.

4.2.1 The Nursing Act, No 50 of 1978

The most important aspect pertaining to the practice of the registered nurse in the mine medical station, would probably be section 38A of the Nursing Amendment Act, No. 71 of 1981. For

the purposes of this study, it would be best to quote this section in totality. It reads as follow:

"Notwithstanding the other provisions of this Act and the provisions of the Medicines and Related Substances Control Act, 1965 (Act No. 101 of 1965), of the Pharmacy Act, 1974 (Act No. 53 of 1974), and of the Medical, Dental and Supplementary Health Service Professions Act, 1974 (Act No. 56 of 1974), any registered nurse who is in the service of the Department of Health, Welfare and Pensions, a provincial administration, a local authority or *an organization performing any health service* and designated by the Director-General: Health, Welfare and Pensions after consultation with the South African Pharmacy Board referred to in section 2 of the Pharmacy Act, 1974, and who has been authorized thereto by the said Director-General, the Director of Hospital Services of such provincial administration, the medical officer of health of such local authority or *the medical practitioner in charge of such organization*, as the case may be, may in the course of such service perform with reference to-

(a) the physical examination of any person;

(b) the diagnosing of any physical defect, illness or deficiency in any person;

(c) the keeping of prescribed medicines and the supply, administering or prescribing thereof on the prescribed conditions; or

(d) the promotion of family planning,

any act which the said Director-General, Director of Hospital Services, medical officer of health or *medical practitioner*, as the case may be, may after consultation with the council determine in general or in a particular case or in cases of a particular nature: Provided that such a nurse may perform such act only whenever the services of a medical practitioner or pharmacist, as the circumstances may require, are not available" (Nursing Amendment Act, No. 71 of 1981:2,4. My italics.)

From the above, it is clear that the registered nurse in the mine medical station may legally perform a physical assessment, diagnose a condition, and prescribe treatment based on the findings of the assessment, if authorised to do so. The medical

practitioner in charge of the service would be responsible for obtaining this authorization.

If the registered nurse is prescribing, administering or providing medicines to any patient while not being authorized to do so, as spelled out above, he is transgressing the Medical, Dental and Associated Health Professions Act, No 56 of 1974, and the Medicines and Related Substances Act, No 101 of 1965 (South African Nursing Council (b), 1992:1).

4.2.2 The South African Nursing Council : Regulation No R. 2598 of 1984

Regulations relating to the scope of practice of persons who are registered or enrolled under the Nursing Act

Certain definitions are contained in these regulations. The most important definitions are:

- '"diagnosing" shall mean the identification of, and discriminating between physical, psychological and social signs and symptoms in man',
- '"health needs" shall mean those signs, symptoms and processes which denote the individuals' interaction with any actual or potential health problem and which require nursing intervention',
- '"nursing regimen" shall mean the regulation of those matters which, through nursing intervention have an influence on the preventive, promotive, curative and rehabilitative aspects of health care and includes the provision of nursing care plans, their implementation and evaluation thereof and recording of the course of the health problem, the health care received by a patient and its outcome whilst a patient is in the charge of the nurse',
- '"prescribing" shall mean giving the written directions regarding those treating, nursing care, coordinating, collaborating and patient advocacy functions essential to the effective execution and management of the nursing regimen',

- '"registered person" shall mean a person who is registered as a nurse or as a midwife in terms of the Act or as a medical practitioner or dentist in terms of the Medical, Dental and Supplementary Health Service Professions Act, 1974 (Act 56 of 1974)'. and
- '"treatment" shall mean selection and performance of those therapeutic measures essential to the effective execution and management of the nursing regimen" '.

The above definitions are necessary when taking into account that the registered nurse in the mine medical station is rendering nursing care, and must fulfil the requirements of these regulations. The terms of the scope of practice can be summarized in the following:

- Section 2(a) refers to the diagnosis of health needs, and the prescribing, provision and execution of nursing regimens to meet these needs, or refer the patient as necessary.

- Section 2(b) refers to the execution of treatment regimens as prescribed by a registered person. This registered person may well be the registered nurse in the mine medical station who prescribed for a patient.

- Section 2(c) refers to treatment and care of a patient, administering medication and monitoring the condition of the patient, whether reaction to treatment, or reaction to stress, injury or trauma.

- In section 2(d) the preventive and promotive role of the nurse is described, while

- section 2(o) refers to the role of the nurse in facilitating an optimum state of health for the patient.

- Sections 2(p) and 2(q) deal with the establishment and maintenance of nursing regimens, and an environment that will promote the physical and mental health of the patient, as well as preparing the patient for and assisting with

operative, diagnostic and therapeutic acts for the patient.

- The co-ordination of therapeutic regimen from all categories of health personnel for a patient is contained in section 2(r).

The regulations as discussed above are important in totality, but the most prominent aspects have been highlighted. The effect on the practice of the registered nurse in the mine medical station, is clear. The nurse will have to be well acquainted with these regulations in order to render safe, and legally defensible nursing care.

4.2.3 The South African Nursing Council : Regulation No R. 2418 of 1984.

Regulations relating to the keeping, supply, administering or prescribing of medicines by registered nurses

These regulations refer to the registered nurse mentioned in section 38A of the Nursing Act, 1978 (Act 50 of 1978).

- It enables the nurse to supply, administer or prescribe unscheduled medicines, as well as medicines listed in schedule 1, schedule 2, schedule 3 or schedule 4 of the Medicines Control Act, 1965 (Act 101 of 1965).

- This authorized nurse may supply, administer or prescribe these medicines, but is legally bound to immediately enter the diagnosis as made by the nurse, the name, quantity, strength and dosage of the medicine, the number of the schedule to which the medicine is listed by the Medicines Control Act, as well as the date and time when the medicine was prescribed, supplied or administered to the patient, on his record. The nurse must then enter his/her name and category of registration in block letters, and add a signature.

- The nurse must also ascertain that the medicine supplied to the patient is either in the original or prepacked form, by

ensuring that the label contains the approved name, quantity and strength, number of the schedule to which it is listed by the Medicines Control Act, the name of the patient, as well as his file and/or treatment record number, the dosage of the medicine, and the address of the body who supplied the medicine.

These regulations enable the authorized nurse to prescribe medicines in the absence of a medical practitioner or pharmacist, and in the event of the registered nurse in the mine medical station being authorized, these regulations would definitely be applicable. In a telephonic discussion with Mrs K de Witt, Professional Officer of the South African Nursing Council on 21 February 1992, the legal status of the registered nurse who is prescribing, administering or providing medicines to a patient was made very clear. No registered nurse may prescribe medicines to any patient unless authorized to do so by the South African Nursing Council, according to procedure explained above. Treatment protocols may be used only as a guideline when prescribing medicines to the patient, and then only by the authorized nurse. The registered nurse issuing the prescriptions remains responsible and accountable for this prescription.

4.2.4 The Mines and Works Act, No. 27 of 1957

The safety of mine workers is ensured in this Act. A brief summary of such safety measures will now be given.

The Act makes provision for the establishment of a mine safety committee, and section 9(a) makes provision for people with specialized knowledge to advise the mine safety committee on safety matters, thus ensuring that knowledgeable people will make decisions about the safety and health of the mine worker. In the case of an accident, the Inspector of mines and machinery is instructed to investigate it if death or serious bodily harm ensued. The Inspector has to file a report, highlighting the circumstances leading to the accident.

An age limit is set for male employees (16 years of age), and the Act specifies that no female may be employed underground, except in specific capacities, such as the engineering division.

A multitude of regulations are contained in the Act, providing for the safety, health and welfare of persons employed in the mining industry. The mining industry must prevent and combat air, land and sea pollution, where applicable, and environmental conservation at and near the mine is specified. Dangerous areas and byproducts must be rendered as safe as possible. Lastly, people endangering the safety of, or causing serious bodily harm to any person in the mining industry, is punishable by law.

This is a brief summary of this Act. No explicit mention of the contribution of the registered nurse to the health and safety of the mine worker is contained in it, but the registered nurse can ensure that his contribution to the mine safety committee is of an advisory nature, based on sound knowledge.

4.2.5 The Occupational Diseases in Mines and Works Act, No. 78 of 1973

This very lengthy document deals with the prevention of, and compensation for, occupational diseases.

The Act makes provision for the establishment of a Medical Bureau for Occupational Diseases, and the Minister of Mines is instructed to appoint a Director for the Medical Bureau of Occupational Diseases. Much of what is contained in the Act, refers to this Director. A wide variety of powers are assigned to him. He must direct and control all medical examinations provided for in the Act. The Minister may appoint a medical practitioner to advise him on matters of a medical nature.

The Minister may also declare a specific job as risk work when workers are exposed to the following hazards:

- Dust of such a nature and concentration that it is harmful, and
- gasses, vapours or chemical substances that are harmful or

potentially harmful.

Once this risk work is identified, the mine becomes a controlled mine.

Many conditions are deemed compensable, with tuberculosis and pneumoconiosis being mentioned.

Risk work may not be performed without a certificate of fitness, which must be issued by a certification committee. The name of the risk work employee must be entered in a register. Once a mine becomes a controlled mine, all workers must be examined for compensable diseases within six months. In order to retain the certificate of fitness, all workers must undergo periodic examinations. If certain conditions arise, such as a the deterioration of a worker's health, an interim examination may be performed.

In section 27 the Director is instructed to provide all the results of examinations to the certification committee, if:
- compensable diseases are detected in a previously healthy worker, and/or
- existing compensable diseases deteriorate.

Temporary fitness certificates may be issued, but are only valid for six months. No fitness certificates may be issued to people suffering from tuberculosis, pneumoconiosis, or other compensable diseases.

People who were previously employed in the mining industry may apply for a physical assessment in order to determine whether they contracted a compensable disease while in the employ of the mining industry. The Director will then make arrangements for such an assessment. If a private practitioner suspects a compensable disease in his patient, he may communicate with the Director, who will submit any previous findings to the practitioner. The cardio-respiratory organs of all miners who die while in service, as well as retired and ex-mining employees who worked in high-risk areas, must be removed and sent to a

prescribed place (Rand Mutual Hospital) for investigation. Legally these people must undergo a post-mortem, although their relatives may refuse permission for such a procedure.

Section 39 provides for the establishment of a medical certification committee that makes decisions about compensable diseases. These diseases are graded into different degrees, and the medical certification committee will make the decisions about the presence, nature and degree of compensation necessary for each patient. The Act specifies the compensation for all persons affected by compensable diseases, or their dependants if they are deceased.

Section 120 deals with the Minister's ability to make arrangements for the investigation of all matters affecting the health of persons employed in the mining industry, as well as the medical treatment thereof. The Act thereby makes provision for research regarding the management of compensable diseases, to be conducted.

This lengthy, but very important Act, however, makes no provision for any contribution by registered nurses to the mining industry. The registered nurse as an occupational health nurse in the mine medical station, can conduct all the physical assessments as identified in the functions of the occupational health nurse. The job descriptions of these nurses currently enables them to conduct these assessments. The importance of good record keeping cannot be over emphasized, especially since it may have compensation implications. The registered nurses in the mine medical stations must therefore familiarize themselves with the Act.

4.2.6 The Machinery and Occupational Safety Act, No. 6 of 1983

This Act makes provision for the designation of safety representatives, who are, amongst other duties, responsible for safety inspections of the workplace. Any threats or potential threats to the safety of the employee must be reported to the

employer or safety committee. There is also provision for the establishment of safety committees, responsible for recommendations to the employer regarding the safety of the workplace. These committees may co-opt people on the grounds of their knowledge about health matters onto the committee. An important task of the safety committees is the reporting of specific incidents where employees were injured, died, became unconscious or incapacitated for a specified period of time, or lost a limb. These conditions are specified in section 17 of the Act and specifically refers to situations in the workplace, such as hazardous working conditions that could cause heat stroke and heat exhaustion, accidents or exposure to hazardous articles. Sections 35 and 36 deal with the promulgation of regulations regarding facilities necessary for the safety of the employees. The planning and lay-out, construction, use, etc. of facilities are explained, as well as the safety equipment and safety and health measures necessary to maintain the health of the worker. The necessity for first aid and the availability of emergency equipment necessary in a workplace is also discussed (RSA, 1983:10-16, 36-40).

This is a summary of the most important sections of the Act specifically concerning the health and safety of the worker. There is no explicit mention of the role and function of the occupational health nurse, but the nurse can be co-opted on to the safety committee because of his/her knowledge about health matters. Record keeping of accidents and injuries is of cardinal importance for the execution of section 17. The registered nurse as an occupational health nurse in the mine medical station performs a vital task in this regard.

4.2.7 The Machinery and Occupational Safety Act, No. 6 of 1983 : Facilities regulations

A wide variety of facilities are mentioned in these regulations, which was made under the jurisdiction of section 35 of the Machinery and Occupational Safety Act, No. 6 of 1983. These regulations can be summarized under the following headings:

- Sanitation. Regulations pertaining to the provision of

toilet facilities such as toilet paper and toilet seats, washing facilities such as shower and hand washing facilities, as well as clear marking of male/female facilities. Facilities must be provided to ensure privacy.

- Safekeeping. Facilities must be provided for the safekeeping of the personal property of workers while they are wearing protective clothing.
- Change-rooms. Change-rooms must be provided for employees who change clothing during working hours. This section refers to the adequacy of facilities, separate facilities for males and females without inter-leading doors, provision of privacy, and the presence of windows in the facilities.
- Dining-rooms. The regulations regarding dining-rooms makes provision for a separate dining-room for people who, by nature of their work, can pose a pollution threat to other workers. The rest of the regulations refer to general cleanliness and the availability of tables and chairs in the dining-room.
- Prohibition. This regulation prevents people from smoking, eating or drinking, in designated areas.
- Drinking water. Drinking water must be available to employees at work. Taps containing water unsafe for drinking, must be clearly marked.
- Seats. Workers that will be more productive while in a sitting position must be supplied with chairs.
- Condition of rooms and facilities. The general hygienic conditions of rooms and facilities are prescribed (RSA, 1990:1-5).

The role and function of the occupational health nurse is only implied in these regulations. No explicit functions designated for occupational health nurses are contained in it. However, the occupational health nurse, and therefore the registered nurse in the mine medical station, is in the position to inspect and ensure maintenance of safety and hygienic conditions. The job description of the senior medical station superintendents makes provision for these inspections, and it therefore forms an important part of their daily duties. Knowledge of the exact

nature of these regulations is therefore of importance.

4.2.8 The Machinery and Occupational Safety Act, No. 6 of 1983 : General safety regulations - Draft amendment

This draft amendment replaces regulation 3 of the general safety regulations as contained in Government Notice No. R. 1031 of 30 May 1986, as amended by Government Notice No. R. 433 of 20 June 1986, and refers to section 35 of the Machinery and Occupational Safety Act, no. 6 of 1983.

The draft amendment specifies first aid regulations, which can be summarized as follow:

- All workers must have reasonable access to first aid.
- A first aid box is required if more than five employees are employed.
- Suitable first aid equipment, depending on the activities at the workplace, must be provided. Minimum requirements for the content of the first aid box is specified in the annexure to regulation 3.
- At least one person in possession of a valid first aid certificate must be readily available during all working hours for every 50 employees, or, every 100 employees in the case of shops or offices defined in the Basic Conditions of Employment Act, no. 3 of 1983.
- In the case of activities that pose special risks, the first aider must be trained to treat employees who have been injured as a result of that risk.
- A permanent notice must indicate the position of the first aid box.
- Employees working in high risk areas, and suffering from cuts, abrasions or injuries, must be treated before being allowed to work in that area.
- The employer must ensure that specified items are contained in the first aid box.
- An eye wash-fountain must be provided if special hazards to the eyes of employees are posed.
- A deluge-shower must be provided if the workplace poses

specific hazards to the skin of employees.

- The content of a first aid box is specified in the annexure to regulation 3 (RSA, 1991:20-22).

The registered nurses working in mine medical stations are all involved in all aspects of first aid, especially training and supervision. It is therefore of the utmost importance that they are aware of with regulations affecting the planning of the content of the first aid box, training of first-aiders, and practising of first aid in the mine shaft.

4.2.9 The Basic Conditions of Employment Act, No. 3 of 1983

The Mines and Works Act takes precedence over this Act. The Act prescribes working hours to be observed (not more than 60 hours per week for security guards, and not more than 46 hours per week for ordinary employees, meal times excluded, with a maximum working day of 12 hours), as well as the granting of sick leave (not less than 30 days per annum if the employee is working five days per week, and not less than 36 days per annum for all other workers, with full pay on an aggregate of 36 days per annum during a period of three years), annual leave (at least 21 days per annum for guards and security guards, and 14 days per annum for all other employees during a period of 12 months, which may not coincide with sick or period leave) to a worker. Meal interval specifications are also specified. No employer may allow an employee to work for more than five hours without a meal interval of at least one hour. Employees and employers may, however, come to an agreement where meal intervals are limited to 30 minutes. Overtime work is specified, and may not exceed three hours per day, or ten hours per week. The employee and employer may, however, come to an agreement in this regard. This agreement must be reached before the overtime is worked. Termination of services is also discussed (Strauss, 1987:234-238).

Although the Mines and Works Act takes precedence over this Act, transgression of the Act can lead to health threats to the employee. The occupational health nurse will have to discuss

these threats with the employer on behalf of the worker in the case either of complaints following the identification of such threats.

4.2.10 The Workmen's Compensation Act, No. 30 of 1941

This Act specifies the compensation of a workman, as defined, in case of accidents and diseases, as contained within the scope of the Act, for accidents and injuries sustained as a result of his employment. There is a salary ceiling applicable here, Strauss (1987:253) indicates this as being R24 000 per annum. In 1991, this figure was R46 000 (Lowe, 1992(b)). However, the Rand Mutual Assurance Company insures workers of all mines registered wioth the commissioner on behalf of the workmen's compensation commissioner. All the mine workers are insured, and there is no salary ceiling applicable.

The employer must register with the workmen's compensation commissioner, and the employee must prove that the injury was sustained at work. The compensation is fairly substantial, and a detailed list of the calculation of the compensation for loss of function, as well as injuries sustained, is contained in the Act. Compensation is also payable to the widow and children of employees in case of fatal accidents (Strauss, 1987:253-254).

The occupational health service is usually the point of entry into the health care system for the person who has sustained an injury at work, with the occupational health nurse being the first person to treat the person, apart from first aiders. The documentation regarding the accident and resultant injuries is of the utmost importance because of the compensation implications as stated in the Act. Mistakes in record keeping can delay compensation, cause it to be incorrect (whether too little or too much), or lead to no compensation at all.

Because most of the time the occupational health nurse is the first contact person, (s)he becomes the most obvious person to take care of this documentation, and the importance of this cannot be over emphasized.

4.2.11 The Unemployment Insurance Act, No. 30 of 1966

Strauss (1987:254) identifies the main aim of this Act as providing financial assistance to workers during periods of unemployment, illness and pregnancy, and includes benefits for the dependants of deceased workers. There is again an income ceiling, of R30 000, and domestic and casual labour are examples of workers excluded from benefits.

The benefits are calculated according to a set scale of about 45% of the normal weekly salary of the employee. Payment of benefits comes from a fund, established through contributions of employees, amounting to a certain percentage of their income. Benefits are payable to unemployed workers who are willing to work, but unable to secure employment. The beneficiary must have contributed to the fund for at least thirteen weeks prior to being unemployed. Maternity benefits are available eighteen weeks prior to the confinement, and eight weeks after the confinement in the case of a live child. The latter period is shortened to four weeks in the case of a still-born child. For maternity benefits, the beneficiary must have contributed to the fund for eighteen weeks prior to the lodging of a claim. Benefits for illness depend on whether the illness is specified by the act, and leads to a worker being unemployed because of an inability to work as a result of the illness. The worker must have contributed to the fund for at least thirteen weeks prior to the termination of his services (Strauss, 1987:255-256).

This Act has few implications for the practice of the registered nurse, and then mainly in the field of maternity leave and illness benefits. The most important aspect would again be accurate record keeping. However, the medical practitioner will play a more important role in this regard, as medical certificates may be of importance in securing the benefits.

4.3 NURSING DISCIPLINES REPRESENTED IN THE MINE MEDICAL STATIONS

4.3.1 Occupational health nursing science

"Occupational health nursing is the application of nursing principles to help workers to achieve and maintain the highest level of wellness throughout their lives" (Salazar, Wilkenson & Rabadue, 1991:434). This description summarizes the essence of occupational health nursing.

Ekeberg (1991:322) explains the occupational health services of Sweden. There are some similarities noticeable, as all government employees have access to occupational health services, as do most of the employees in large and medium enterprises . While the mine workers in the South African gold mining industry are not government employees, all of these workers have access to occupational health services provided by the employing gold mining company at the mine medical stations. These services are mostly provided by registered nurses, but also by medical practitioners. Occupational health nursing is perceived to be the primary concern of the registered nurse in the mine medical station.

Salazar (1987:225) states that occupational health nursing is distinct from other types of nursing, and lists certain aspects of the occupational health nurse's practice such as competency in community nursing science, being knowledgeable about current legislation and the ethical implications applicable to the scope of practice of that particular post, and skills in occupational health nursing. Keller (1983:401-402) describes the services offered by occupational health nurses as ranging from emergency care for occupational accidents, injuries and diseases, to preventive programmes and disease treatment. Their ultimate scope of practice will, however, be determined by the policies established by the management and administrative personnel of the employing body.

Lusk, Disch & Barkauskas (1988:457) developed a specific scope of practice for the occupational health nurse, which can be applied in the mine medical station situations of the gold mining industry. This scope of practice includes the following:

* health assessments,
* environmental control and surveillance,
* health education,
* wellness programmes,
* counselling,
* management of health services,
* community relations, and
* special programmes to fulfil the needs of the company.

Rogers (1990:536-537) adds the management of health programmes, primary health care and risk management to the above mentioned aspects. Research and policy making are also included as important new developments in the scope of practice of the occupational health nurse. Rogers (1990:537) is of the opinion that occupational health care can improve employee health and productivity, while simultaneously reducing health costs and absenteeism. At the same time an unresponsive management can thwart the nurse's efforts. Occupational health nurses will now be held accountable for cost effective health services in order to become fully credible members of the occupational health team. They will have to be able to provide occupational health nursing services that are result oriented and profit productive, and continuing education programmes will enable them to improve the image of the nursing profession, and to advance the practice of the occupational health nurse, over and above the previously mentioned requirements (Bertsche, 1990:336). The theoretical base for occupational health nursing has become very complex, even more so in the mine medical stations within the gold mining industry.

4.3.2 Primary health care

Primary health nursing will be rendered within a primary health care health service. The South African Nursing Council (1992(a):2 - 3) believes that primary health care:

- addresses the main health problems in the community while providing all four aspects of health care (preventive, promotive, curative and rehabilitative).
- It includes, *inter alia*, at least certain aspects of health care, such as health education on prevailing health problems, adequate food supply coupled with adequate nutrition, pure water and basic sanitation, and immunization against major infectious diseases.
- It involves all related sectors in the community and population development departments, such as agriculture, food, housing, education and industry.
- Maximum community and individual self-reliance and participation in the planning, organization and operation of primary health care is required, while it develops community participation.
- It must have an appropriate referral system, and
- it relies on the total health team, including physicians, nurses, pharmacists, health inspectors and social workers.

As a result of the introduction of the concept of primary health care, the main aim of health services shifted from curative services to preventive services in health care on a global basis. The above mentioned aspects of primary health care form the pillars on which these preventive services will be built, and the registered nurse will play an increasingly important role in this regard. Vlok (1991:256) indicates that primary health care is increasingly being rendered by registered nurses in Black communities within the Republic of South Africa, where a lack of medical doctors exists, and where the needs of the community are being inadequately met.

The benefits of a primary health care approach, such as its comprehensive approach, its approach to disease prevention and health promotion, the lower costs involved, and the fact that the services currently offered are of a primary health care nature, necessitates the full implementation of primary health care in the gold mining industry. The registered nurse in the mine medical station will play an important role in this implementation. There are, however, three important sub

concepts that must be discussed in order to clarify fully the position of the registered nurse in primary health care.

4.3.2.1 Primary care

MacDonald (1988:798) defines primary care as ". . . usually involving community-based health workers, providing distributive care to an ambulatory population". From this definition the impression is created that primary care is community based care, and therefore this forms an important component of primary health care. However, Vlok (1991:255) differentiates between primary care and primary health care. Primary care is described as a one-to-one patient-doctor medical consultation with a strong curative accent, while primary health care extends further to include preventive measures as well. This definition is too narrow, and as already illustrated, the registered nurse renders both primary health care and primary care at the same time, which makes the distinction of theoretical value only.

It is clear that primary care actually falls within the parameters of primary health care, and is not even a sub-component, but an integral part of it. At this point in time, the registered nurse in the mine medical station is definitely rendering primary health care to the employees at the two gold mining industries.

4.3.2.2 Primary nursing

Primary nursing is an American concept that was developed as a result of the need to solve the fragmentation of patient care caused by team nursing (Miller, 1979:80; Gibbs, 1988:443; Rinke, 1984:1227; Rosenman & Jenkins, 1986:32).

Primary nursing became an applied approach to the rendering of nursing care, by including aspects of readmissions, home care, clinic visits, and many more aspects of nursing in the definition (MacDonald, 1988:798). It does not have to be hospital oriented only (Rinke, 1984:1227; Zander, 1985:20).

Primary nursing can enable the creative nurse with a high level of professional commitment, to experience a greater degree of job satisfaction (Binnie, 1987:36, 37; Rinke, 1984:1227; Weeks, Barrett & Snead, 1985:24 and Bowers, 1987:38). Job satisfaction occurs specifically because the nurse has a greater opportunity to use his/her knowledge and skills, while being granted the necessary recognition. Job satisfaction is also experienced because nursing care becomes more patient centred, and less ward oriented (Gibbs, 1988:444), and leads to lower staff turnover (Scherer, 1988:37). The lower staff turnover is of benefit to both the nurse and the patient.

Although primary nursing does not require an all registered nurse staff, it does require enough registered nurses to be able to divide the patients amongst the available registered nurses, without overloading the staff (Zander, 1985:19). Binnie (1987:36-37), although not differing from Zander, states that primary nursing can be implemented in a more acceptable way if existing money is used to employ more registered nurses, and fewer staff nurses or nursing assistants. The appointment of registered nurses will improve the knowledge and skills pool in the unit.

There are also disadvantages in using a primary nursing approach. Bowers (1987:36-37) identified the impression that the role of the charge-nurse becomes diffuse when implementing primary nursing, and the exact nature of accountability and responsibility within the unit is lost. Gibbs (1988:446) experiences this disadvantage as an advantage, and sees the charge-nurse as a coordinator, who is able to deal with enquiries, offer support to the staff, and can offer assistance with patient care itself. Bowers (1987:38) also discusses other problems encountered by the nurse, such as high levels of stress generated by the higher levels of autonomy, as well as frustration, especially during times of staff shortages, as also described by Giovanetti (1986:132). Bowers (1987:38) concludes by stating that nurses may feel alienated from the other health team members, such as doctors. Irrespective of whether this alienation is true or not, the nurse remains co-responsible for

the patient with the doctor, and must therefore accept responsibility and accountability for his own actions. For this reason the nurse, whether rendering primary nursing or not, is only a subordinate of the doctor if the doctor is a medical superintendent, the employer, or placed in a service position in direct authority over the nurse (Searle, 1986:88). Taking responsibility for the care of the patient should therefore not cause the registered nurse within the Southern African situation, including the gold mining industry, to experience unnecessary feelings of alienation.

Turnock (1987:71) identifies another problem area, which, if coupled to the problem of weakness, can be of disadvantage to the patient, namely, an inability to implement the method correctly, because the nurse is not conversant with the different methods of planning nursing care. A final word of warning is issued regarding the fact that nurses are often too weak to do anything other than follow a leader. The nurse will then only assert an own viewpoint on the care of a patient if made responsible for this by the charge-nurse (Bowers, 1987:38).

The registered nurse in the gold mining industry can render primary nursing. The fact that it can be implemented outside the hospital situation, renders it perfect for adaptation within a primary health care service. Because of the sheer workload, the registered nurse in the mine medical station is in any case rendering health care to individual patients, which is what primary nursing care is all about.

4.3.2.3 Primary health nursing

This discipline of nursing developed as a result of the changes that occurred in the practice of the registered nurse. The registered nurse now possesses more complex professional abilities, and as a result of the technological development affecting nursing care, the nurse is expected to possess a wider knowledge base in order to provide quality nursing care. The nurse must now be able to do a complete physical assessment in order to make a nursing diagnosis. The modern registered nurse

is a professional person who has greater responsibilities and independence. This is experienced within the framework of the policies of the employing body (Shamian, Frunchak, Miller, Georges & Kagan, 1988:18).

The job descriptions of all the categories of registered nurse in the mine medical station indicate that the nurse working in the mine medical station conducts a variety of physical assessments on a daily basis, such as the daily assessment for minor ailments, occupational diseases, assessments after an accident and assessments of patients convalescing. Because this forms part of their functions within the sphere of occupational health care and primary health care, the necessity for clinical competence as well as current knowledge about the developments in nursing, is clearly demonstrated. Although physical assessments are not the only component of primary health nursing and primary health care, it is important to remember that these assessments form an important part of the nurse's functions. It also becomes necessary to distinguish between primary nursing and primary care, with special reference to the contribution of the registered nurse to the health services rendered within the mine medical station.

For the purposes of this study it would be appropriate to combine primary care, primary nursing, and primary health nursing into primary health care. The role and functions of the registered nurse in the gold mining industry, already rendering primary health care, can then be stated within the ambit of this finer breakdown of nursing care within primary health care.

4.3.3 Trauma nursing science

4.3.3.1 Terminology defined

The following concepts need to be defined:

a) Disaster.

There are a variety of definitions available for this concept. Dixon (1986:580), Petersen (1987:32) and Reid (1987:5) provide

three different definitions of the concept. These definitions contain certain similarities regarding the magnitude, time interval, cause and effect of the event. A disaster can therefore be defined as an event that happens suddenly, caused by a catastrophe, or disruption between hostile elements and the resources for survival of the community, and it leads to the community being plunged into a situation where they are suffering and become unable to provide care for themselves. This results in the community needing help, food, shelter, medical services, protection and whatever else that may be needed for survival.

The magnitude of the disaster will depend on the size of the community. Dixon (1986:580) states for example, that even a car accident with five injured people may be deemed a disaster in a small community.

b) Trauma.

Tanaka (1988:350) defines trauma as ". . . a subjective experience of an unusually stressful event that involves a realistic danger of death. A traumatic event may affect only a single person or many people at once; it may be of human origin (e.g., rape, bombing, or wars) or natural origin (e.g., lightning strikes, volcanic eruptions, or floods)". Traumatic events are also usually unique in nature.

4.3.3.2 Mining disasters

Ligthelm and Swanepoel (1988:240) describe mining accidents as a separate type of disaster, and indicate that it usually involves only a few victims. Rescue operations may, however, be complicated, which can probably be ascribed to the fact that the mine shaft is a closed environment. An example of a South African mining disaster is the Coalbrook disaster, which occurred in 1960, and claimed 437 lives.

4.3.3.3 Disaster management

All emergency and disaster care personnel must be well versed in

the disaster plan in use in their area of operation. Effective disaster plans are essential for the successful management of any disaster. Hicks (1988:17) describes the beneficial effects of prior training and practise trials on the nursing care rendered during the Piper Alpha oil rig disaster.
A trauma score system is in use at the mining hospitals but not at the mine medical stations (Lowe, 1992:1; Allin, 1992:1). A trauma score is a simple method to assess the condition of a patient. It is based on marks allocated for specific vital signs of the patient, e.g., respiratory rate, respiratory expansion, systolic blood pressure and capillary refill. This part of the assessment forms the cardio-pulmonary assessment (Grant *et al.*, 1986:50-51).

The cardio-pulmonary assessment is also coupled to a neurologic assessment or coma scale. There are a variety of these coma scales available, but the Glasgow scale will be discussed. This scale is also based on marks allocated for specific clinical signs as observed in the patient, e.g., eye opening, verbal response and motor response. The total marks obtained in this assessment are then converted according to a scale provided on the assessment form. This mark is an indicator of the patient's neurological status, and is combined with that of the cardio-pulmonary assessment, in order to obtain a final mark (Grant *et al.*, 1986:50-51). The trauma scale in use at the Leslie Williams Memorial Hospital is based on the Glasgow Coma Scale, and is equivalent to the trauma score used by the Johannesburg Hospital's trauma unit (Copy of trauma scale obtained during pilot implementation of continuing education programme for registered nurses in mine medical stations, 7 - 25 January 1991).

The registered nurse in the mine medical station should develop the necessary skills in utilizing a trauma score system. This nurse can also be involved in developing a survey form that could be successfully implemented in gold mining disaster situations.

There is a mass casualty plan at the Freegold mines (see

Annexure A), which can be used at the mine medical stations. The duties of the different categories of nurse are identified on this mass casualty plan. At the Gold Fields of South Africa Limited Mines, disaster plans were also established at the Leslie Williams Memorial Hospital. Because these plans were not drawn up by the registered nurses at the mine medical stations, they need no further discussion.

Searle (1989:21-22) identifies certain essential tasks for the nurse administrator regarding the planning of disaster care. If the nurse administrator is the equivalent of the senior medical station superintendent/medical station superintendent, then it is important that this nurse has a basic understanding of the principles of disaster care, within his own nursing service. The needs of the rest of the personnel in the mine medical station must be established, in order to help them to provide effective disaster care. A disaster plan that details the nursing care to be rendered during a disaster must be formulated and this must be done in co-operation with the central disaster planning committee of the mining company. Training programmes for the personnel must be developed, based on the identified learning needs.

The management of the disaster at the scene is divided into two distinct aspects, namely:

i) The primary survival scan. This scan is carried out by the first medically trained person who arrives at the scene of the disaster. The scan involves management of major haemorrhage, airway obstruction and other respiratory problems. The scan, however, is purely identification of the problem, and then referral to someone else for management. It does not involve triage. The aim of the scan is purely the correction of life-threatening conditions, while establishing the number of survivors, as well as the number of dead.

ii) Open and closed incidents. An open incident means that there is easy access to the victims, while the closed incident means that the victims are restricted to an area with limited access. Before triage can commence, victims

might have to be evacuated (Dixon, 1986:581-582). Mining accidents and disasters would be classified as closed incidents.

4.4 APPLYING THE NURSING PROCESS IN THE MINE MEDICAL STATIONS

Each nurse will be held responsible for his actions. Accountability extends towards a number of people, namely:

- the patient receiving the nursing care;
- the professional statutory body determining standards for nursing care;
- the employing body, and
- professional colleagues.

The nursing process will provide an accountability framework within which the nurse will be able to deliver safe nursing care (Kozier, Erb & Blais, 1992:94).

4.4.1 The nursing process defined

There are two aspects of importance that need to be defined.

1) Care planning. This can be defined as:
   "A systematic approach to planning patient care which enables the nurse to provide effective nursing which will meet the individual needs of the patient" (Hunt & Marks-Maran, 1986:5).
2) The nursing care plan, which can be defined as:
   "The visible and written record of the implementation of care planning. It documents the use of this approach. A Nursing Care Plan has the following components:
   - a nursing assessment of the patient;
   - details of the care planned to meet the patient's problems and needs;
   - evaluation of the care given" (Hunt *et al.*, 1986:6).

It is clear from these definitions that the nursing process can be used as a practical tool to deliver nursing care in clinical settings to those in need of it. The nursing process forms the

basis for documenting all nursing care rendered to the patient. The nursing process can also be used as a framework for research in nursing (Bullough & Bullough, 1990:56). An example of the format in which the nursing process is written, is provided in Annexure B.

4.4.2 Elements of the nursing process

Currently, the available nursing literature favours five steps in the nursing process, namely:

i) Assessment.
ii) Diagnosis.
iii) Planning.
iv) Implementation.
v) Evaluation (Kozier *et al.*, 1992:95, Bullough *et al.*, 1990:59-78, Hunt *et al.*, 1986:25-57).

However, the assessment step may include diagnosis, and the process then only consists of four steps, as demonstrated by Aggleton and Chalmers (1986).

It is perhaps necessary to discuss each of these steps separately.

4.4.2.1 Assessment

Assessment can be seen as the most important step of the nursing process. Any nurse rendering nursing care without an assessment of the needs of the patient, renders costly, inefficient and nonprofessional nursing care. Assessment will make the difference between deliberate and automatic nursing actions (Bullough *et al.*, 1990:59).

A database must be developed through this assessment. This database will be compiled through the use of a health history from the patient, the physical examination of the patient, a physician's history, if available, and the results of diagnostic tests performed on the patient. Any other relevant contribution of other health professionals may be added (Kozier *et al.*,

1992:95).

The physical examination forms part of this step, and although it is outside the scope of this study to describe the process of the physical assessment, the contribution of Viljoen (1988) in this regard warrants mentioning. The author provides a South African approach to the nursing assessment, which enables the nurse to perform a safe and complete comprehensive nursing assessment on any patient, including the mine worker.

4.4.2.2 Diagnosis

In this step, the registered nurse will focus on the analysis and interpretation of the collected data (Bullough *et al.*, 1990:65). The process of deriving the diagnosis is based on analysis and synthesis, which will require objectivity and deductive reasoning from the nurse (Kozier *et al.*, 1992:109).

A nursing diagnosis must include the following:

- The identification of the problem, as experienced by the patient, followed by
- the identification of the cause of the problem.
- Lastly, the manner in which the patient responds to the problem must also be identified.

The North American Nursing Diagnosis Association (NANDA) developed a set of approved nursing diagnoses to be used by all nurses (See Annexure C)

It is important, however, to establish which resources are available for education purposes in the facilities to be used before the nursing diagnosis is implemented in practice. Deliberate and advanced planning is necessary for the success of such a venture (Shore, 1988:47). In the mine medical stations resources for practising the nursing diagnosis are available, but as pointed out in the above, well planned guidance will be needed for the implementation thereof.

4.4.2.3 Planning

Planning nursing care is a goal-oriented activity. Techniques and strategies must be planned, while allocating tasks, to meet the goals for nursing care for each patient. These goals are based on the nursing diagnosis (Bullough *et al.*, 1990:66).

When writing the nursing care plan, the following should be included:

* Long-term and short-term goals, which will specify the response of the patient to nursing care. An example of these goals would be: " Client will demonstrate an increase in physical mobility".
* Outcome criteria, which add specificity to the goals, and contain specific, observable, and measurable responses that can be elicited from the patient. An example of an outcome criterion is: " Client drinks 2500 ml of fluid daily" (Bullough *et al.*, 1990:74).
* Nursing strategies must be developed that can be used to describe the nursing care that will be rendered. This nursing care will enable the nurse to achieve the set goals (Bullough, *et al.*, 1990:74).

Nursing care plans are also developed to provide individualized nursing care to the patient, while simultaneously ensuring that the patient will receive continuous care. The nursing process can give direction to the nurse regarding the specific needs of the patient that must be documented. The person in charge of the unit can use the nursing process to decide about staff allocation to specific patients (Kozier *et al.*, 1992:135).

When writing nursing care plans, they must be dated and signed. The plans must contain an indication of which problems need to be re-assessed, while the nursing orders must be listed according to each goal in order of priority (Kozier *et al.*, 1992:135).

In the mine medical stations, no nursing care plans are in existence, and the senior medical station superintendents and

medical station superintendents should develop nursing care plans for all the conditions discussed in Chapter 3, paragraphs 3.2.4.1 and 3.2.4.2, p. 43 - 66.

4.4.2.4 Implementation

During this step, the activities and strategies planned during the planning phase are implemented. In community nursing science, the emphasis in the implementation of nursing care plans would be the promotion, maintenance and restoration of health, and the prevention of illness and disability (Bullough *et al.*, 1990:71).

4.4.2.5 Evaluation

This step involves evaluation of the effectiveness of the implemented nursing care. It is not a haphazard activity and criteria for successful evaluation must be established (Bullough *et al.*, 1990:78).

This proces involves:

- developing specific criteria for nursing care;
- gathering data relevant to these criteria;
- measuring the effectiveness of the nursing care by interpreting and comparing the gathered data with the criteria, and
- judging and making decisions regarding the effectiveness of the nursing care rendered (Bullough *et al.*, 1990:79).

The records that must be kept by the nurse regarding the nursing care rendered to the patient are of the utmost importance for the evaluation of nursing care. This aspect was somewhat lacking in the mine medical stations, as the statistics were not always up to date, or were hard to trace when required by the researcher.

4.4.3 Implementing the nursing process

The South African Nursing Council states in regulation R. 2598

as amended in regulation R. 1469, that nursing acts and procedures ". . . may be performed by scientifically based physical, chemical, psychological, social, educational and technological means applicable to health care practices " (The South African Nursing Council, 1984(b):2). This acknowledges the implementation of the nursing process, which is a scientific approach to nursing.

An integral part of the nursing process involves the implementation of the planned nursing care. Although this planning is based on the nursing diagnosis, it must be remembered that the registered nurse authorized to function within the scope of Article 38A, can make a medical diagnosis, and prescribe treatment for the patient.

At present the nurses of the Freegold mines are not authorized to function under the auspices of Article 38A, and treatment protocols are in use. Treatment protocols exist for all commonly encountered medical conditions. Examples of these protocols were obtained during the situational analysis at the Freegold mines, and a complete set of these protocols was given to the researcher on 30 March 1992. The treatment protocol for sexually transmitted diseases, the first on the index to protocols, can be discussed as an example (see Annexure D for the index to the protocols). A clear sequence of steps to be followed when the patient presents himself is provided. The different clinical signs in the correct sequence, are provided. This sequence will include the diagnostic tests to be performed, the treatment, the allergy test to be performed, and the possible diagnosis (Ernest Oppenheimer Hospital, 1991, 1-4).

Searle, Robertson, Booyens, Nel and Troskie (1988:131-133) summarize a viewpoint on treatment protocols, more commonly known as standing orders, as follows:

- Standing orders must be deemed to be mere guidelines, and not legal prescriptions. For this reason the term standing guidelines is preferred, as it clarifies the legal position of these guidelines.
- The guidelines must be clearly written, and must explicitly

state the conditions under which they can be used.

- Guidelines must be addressed to the registered nurse in charge of the unit, with a signature from the doctor issuing them, thus making them applicable only to his own patients.
- Scheduled drugs may not be included in the guidelines, except for emergency use.
- The doctor issues the prescription, but because the nurse is accountable for his own actions, he must decide whether the prescription will be accepted. If accepted, then the prescription must be given strictly according to the guidelines.
- After discontinuation, the guidelines must be retained for a period of three years or longer, as decided by the controlling authority. The nurse must see to this, as it provides proof that he acted in good faith.

The treatment protocols of the Freegold mines conform to few of the requirements discussed by Searle. During the interviews conducted for the situational analysis, the registered nurses were also not aware of the legal implications of the practice of the registered nurse. Because the treatment protocols are in use, the importance of the South African Nursing Council circular 5 of 1992, as already discussed on p. 93, and the viewpoint on standing orders (treatment protocols) as clarified with Mrs K de Witt also previously discussed on p. 96, must be made known to the registered nurses in order to avoid possible litigation cases in future.

In conclusion, the nursing care offered to the mine worker must be quality patient care. Searle (1989:22) summarizes quality patient care by including the following as essential components:

- The safety of the patient, with his property and good name, which forms the legal basis of nursing care.
- The timeous, ethical, knowledgeable, accurate, skilful, humane, empathic and sympathetic approach to patient care.
- Nursing care making provision for the dignity and individuality of the patient, irrespective of his race, colour or religion, social, cultural, political or economic

status.

Nursing care can only meet all these aspects if it is individualized, total care. A functional assignment or nursing approach cannot meet these demands, as the nurse will be unable to meet all the needs of the patient (Searle, 1989:22). Nursing care plans can be developed for all patients suffering from the condition mentioned in Chapter 3, paragraphs 3.2.4.1 and 3.2.4.2, p. 43 - 66. This will enable the registered nurses to render scientific nursing care which can be evaluated using an approved quality assurance programme.

4.5 OCCUPATIONAL HEALTH NURSING IN THE MINE MEDICAL STATIONS

The historical development of occupational health nursing in the Republic of South Africa is rooted in the health needs of the mining industry. The functions of the occupational health nurse needs to be clarified, in order to place it in perspective with the nursing services offered in the mine medical stations.

4.5.1 The role and functions of the occupational health nurse in the mine medical station

Schilling (1982:146 - 153) identified the following functions for occupational health nurses:

- Placing and maintaining people in suitable work.
- Providing treatment at work.
- Controlling recognized hazards and identifying unrecognized hazards.
- Avoiding potential risks.
- Screening for early evidence of non-occupational disease.
- Supervision of vulnerable groups.
- Health education and safety training.
- Counselling.
- Surveillance of sanitary, catering and welfare amenities.
- Environmental control outside the workplace.

Rogers (1990:537) concurs with these functions, but adds the necessity to conduct needs assessments to establish the health care needs for a diverse work force; the development, implementation and evaluation of preventive strategies and protective programmes, over and above the already mentioned health education and safety training; the monitoring of laws and regulations dealing with the work place; the maintenance of appropriate documentation and reporting systems; conducting and participating in research and the provision of overall management of health programmes.

When discussing the functions of the occupational health nurse, with special reference to the occupational health nurse in the mine medical station of the gold mining industry, the above mentioned functions become unmanageable, as there are too many of them. It is therefore appropriate to use the more condensed approach given by Clemen-Stone *et al.* (1991:626-634).

4.5.1.1 Administration and management

The administration of occupational health services may consume a significant part of the occupational health nurse's time. The management of the organization must therefore grant the occupational health nurse the necessary authority, responsibility and accountability to make decisions, and to act as the nurse deems necessary. This implies decisions regarding the planning, implementation and evaluation of the occupational health service, maintenance of occupational health records, development of a community health nursing policy and procedural document, emergency procedures and the training of personnel (Clemen-Stone *et al.*, 1991:627). This is not happening at the moment. The registered nurses in the mine medical stations are not involved in the action of disaster planning at the different mining companies, as this was deemed to be the task of the loss control department. This was also the case in the development of a pneumoconiosis prevention plan, to name but two of the administrative aspects not included in the functions of the registered nurse as occupational health nurse in the mine medical stations of the gold mining industry. This function of

the registered nurse in the mine medical station will need to be addressed once a continuing education programme for these nurses has been developed.

4.5.1.2 Record keeping

The keeping of accurate records in occupational health nursing is of the utmost importance, especially if seen in the light of the legal obligations of the registered nurse, but must also conform to the company's policy (Clemen-Stone *et al.*, 1991:627-628). Responsibility and accountability can be proven through the evaluation of the nurse's record system.

The record system should also reflect accurate records of the results of the pre-employment examination, also called the pre-placement examination, and periodic screening examinations conducted on the workers (Clemen-Stone *et al.*, 1991:628).
The registered nurse is also responsible for record keeping regarding workplace observation and health statistics. Investigating the notification of occupational diseases and injuries in the mine medical stations of both Freegold North and Freegold South, posed certain problems. Statistics at the Freegold Mines were deemed confidential, and were unavailable to the researcher. The statistics available at the Gold Fields of South Africa Limited mines had to be transcribed from month end reports. The researcher was informed that both the mining companies were in the process of changing to a new reporting system.

4.5.1.3 Student supervision

The occupational health nurse has an administrative function, as already identified. However, part of this function involves student supervision, and participation in student education programmes (Clemen-Stone *et al.*, 1991:628). Glugover (1985:286) explains how occupational health nursing was included in community nursing science programmes. In South Africa occupational health nursing is already included in the basic educational programme of student nurses (South African Nursing

Council, 1985(a):8). Furthermore, nursing subjects with a clinical component require accompaniment for the teaching of this component (South African Nursing Council, 1985(a):10).

Although the person responsible for teaching the subject is ultimately responsible for ensuring that the student has reached all objectives, the expertise of the person in the clinical situation cannot be ignored. It is for this reason that Lepping (1985:547-551) suggests the use of mentors in occupational nursing science programmes. A mentor is selected, presented with the objectives of the study, and assumes responsibility for guiding the student towards the achievement of the objectives.

It is not suggested that practical guidance be taken over by a mentor, but the contribution of this person can be invaluable in the education programme of community nursing science students. The occupational health nurses in the mine medical stations render a unique health care service, and can be very valuable in the education programmes of community nursing science students. It is therefore important that they remain up to date regarding the knowledge and skills required in their practice. This function is now contained in the job descriptions of the medical stations superintendent, who is responsible for developing continuing education programmes for subordinates, and participate in the education programmes of student nurses (See Chapter 2, paragraph 2.5.2, p. 23 - 24).

4.5.1.4 Community resource collaboration

This is also basically an administrative function. The registered nurse must be knowledgeable about all the community resources available to the worker. Counselling services on topics such as alcoholism, drug abuse and violence should be made available to the worker by the registered nurse (Clemen-Stone *et al.*, 1991:628-629). The registered nurse in the mine medical station will come into contact with problems such as alcohol abuse, drug abuse, and the patient needing counselling when newly diagnosed as HIV infected or suffering from AIDS. However, the respondents in the study indicated that they were

not involved in counselling activities, as that was delegated to the employee assistance programme (EAP) department. The services of a psychiatrist was available at both mining groups.

The development of employee assistance programmes (EAPs) and health assistance programmes (HAPs), is an American approach in solving employee problems. According to Duvall (1986:71), EAPs were originally developed specifically as an assistance programme for the alcoholic worker. Oher (1987:22) views the modern EAP as a work site resource that is available to the employee for solving personal problems. The employee's efficiency and effectiveness can be improved by identifying and addressing his problems through assessment, referral and/or counselling. EAPs offer assistance to workers with problems such as marital problems, family problems, all forms of addiction, financial problems, and even psychological assistance. All regular employees should be eligible for assistance (Oher, 1987:22, 24). The modern EAP contains the following features:

- Assistance with personal problems, and it is
- confidential, voluntary, free, accessible, sometimes 24 hours per day, and it is accessible to all employee groups.
- It is also accessible to dependants of employees,
- It is staffed and run by professionals, and will provide training for supervisors and shop stewards to be able to make referrals to the programme (Duvall, 1986:71).

The type of services offered has an influence on the planning of EAPs, as it will be determined by the knowledge of workforce needs, community resources available and the skills of the programme personnel (Oher, 1987:23).

Roman and Blum (1988:504) states that HAPs are primarily concerned with the primary prevention of disease in employees, thereby lowering costs related to health matters for the employer as well as the employee. EAPs, on the other hand, deal with symptoms that are already present, which summarizes the differences between EAPs and HAPs. EAPs are more costly than HAPs.

The advantages of HAPs primarily centres around the prevention of diseases, the health benefits for the worker (both physically and psychologically), as well as the increase in productivity by the employee and the long-term cost control in the workplace (Maki, Piland, Smith, Phillipp & Runyan, 1988:232). Utilization may, however, pose some problems (Roman *et al.*, 1988:506). HAPs are mostly voluntary except when companies have specific prescriptions, such as weight limits for certain posts. Certain critics indicate that these programmes are mostly utilized by those employees already experiencing problems. The preventive nature of the programme is therefore lost.

As previously indicated, EAPs are already being implemented, especially at the Gold Fields of South Africa Limited mining company. There are some distinct similarities between both EAPs and HAPs and the existing occupational health services in the gold mining industry. In the Republic of South Africa, the registered nurse who is a registered psychiatric nurse is capable of being incorporated into EAPs and HAPs, because of the specific counselling techniques contained in the programme leading to such a registration. The enabling factor for those registered nurses without the qualification would be a continuing education programme.

4.5.1.5 Quality assurance and accountability

The cost of medical and nursing services necessitates the delivery of quality care to the patient. Clemen-Stone *et al.*(1991:629) describes quality assurance programmes as important instruments in the evaluation of the delivery of nursing care, which can be done by means of self-evaluation, peer review and an audit. This evaluation will enable the registered nurse to identify weaknesses and strengths of the service, and enable the nursing care planner to make provision for the deficiencies. This aspect can also be included in the practice of the registered nurse in the mine medical station. Already the senior medical station superintendent and medical station superintendent are responsible for supervision of the lower incumbents, and a quality assurance programme will provide

a scientific basis for the evaluation of the nursing care rendered by the lower categories of nurses.

4.5.1.6 Environmental surveillance

Clemen-Stone *et al.* (1991:629-630), Jarvis (1985:286), Saucier (1991:147-149) and Stanhope and Lancaster (1988:799-780) all agree that workplace assessment is of the utmost importance for the occupational health nurse. This will enable the registered nurse to know the workers, be knowledgeable with the workplace and possible health problems of the workers, and plan measures to prevent accidents based on the knowledge of the dangers in the workplace.

Measures for the prevention of occupational accidents must be available and utilized. Research is one way of revealing unrecognised hazards in the work place. Occupational health personnel, which includes occupational health nurses, can make a contribution to the planning of the workplace in order to minimize potential risk areas (Schilling, 1981:148-150).

Another aspect of environmental surveillance, is the supervision of sanitary installations. The management of the company must be advised on the requirements for sanitary installations, and, once completed, the installations must be inspected routinely to maintain standards of cleanliness and hygiene (Schilling, 1981:153). The legal obligations for this aspect was discussed in paragraph 4.2.7, p. 100 - 101 of this chapter.

The occupational health nurse also has the opportunity to prevent adverse effects of the industry on the environment and community outside the industry through supervision of waste product disposal (Schilling, 1981:153).

In the gold mining industry many potential risks exist, such as the development of heat illness in the worker not fully acclimatized, the inhalation of toxic fumes after the use of explosives, and the development of pneumoconiosis. The registered nurse in the mine medical station has access to all

the necessary information in order to conduct research and to become involved in the prevention of these health risks.

4.5.1.7 Direct nursing care

Clemen-Stone *et al.* (1991:630-631) states that direct nursing care includes all nursing services from assessment to rehabilitation.

The registered nurse must therefore be skilled in conducting a physical assessment and to carry out medico-surgical, rehabilitation, emergency and community nursing practice. The registered nurse is also in an excellent position to provide promotive health care to workers at their work place. Direct nursing care include the following aspects of nursing care:

i) Physical assessment.

The registered nurse must be skilled in conducting a physical assessment of the adult. This will enable the nurse to conduct pre-placement and return-to-work examinations.

Slaney (1980:82) and Waldron (1989:24) state that the occupational health nurse must have knowledge of the physical and psychological demands of each job within the organization. This will enable the nurse to determine the type of pre-placement examination required by each worker.

The pre-placement examination is conducted for three reasons. Firstly, to determine whether the person applying for the post will be physically able to fulfil the job expectations (Lloyd, 1984:360). Waldron (1989:23) agrees with this, and phrases this as fitting the worker and the job in the best possible way. Secondly, the pre-placement examination is performed to identify conditions that can be treated by the occupational health nurse, and thirdly, to obtain baseline information regarding the health of the applicant (Lloyd, 1984:360). Pre-placement examinations are specifically important in detecting physical and mental disabilities which would render an applicant unfit for a specific job. Because of the unnecessary expense of examining

potentially healthy people, these examinations could be limited to people who applied for work in potentially dangerous areas, such as dusty areas (which are encountered in the gold mining industry). Screening procedures that require less highly trained personnel may also be adopted (Schilling, 1981:146-147). O'Malley (1984:191) supports this, and indicate that routine chest X-Rays, as an example of simplifying the examination procedure, could be abolished for most categories of workers, while health surveillance programmes can be introduced for defined categories of workers. Abolishing routine chest X-Ray examinations would not be possible in the dusty gold mining environment. Health surveillance programmes can be of benefit to all the mine workers.

The registered nurses working in the mine medical stations of the mining companies included in the study reflect pre-placement examinations and periodic examinations on their job descriptions, as discussed in Chapter 3, paragraph 3.5, p. 80, 84 and 87. However, all but one of the Freegold respondents verbally indicated that they were not involved with pre-placement examinations, as it was deemed to be the responsibility of the loss control department. Periodic examinations were very much scaled down to the miniature chest X-Rays performed by those in possession of the supplementary diagnostic radiography diploma.

The registered nurse in the mine medical station of the gold mining industry must keep the legal guidance regarding physical assessment as described in paragraphs 4.2.1, 4.2.2, and 4.2.3, p. 91 - 96, in mind.

ii) Rehabilitation.

This forms another facet of direct nursing care. The registered nurse may be involved in occupational, physical and medical therapy programmes while rehabilitating the worker. The registered nurse must remember that rehabilitation must commence immediately, as a direct relationship exists between the time of injury or disease development, and the success of the rehabilitation programme. A longer time lapse between injury or

disease development and rehabilitation measures being implemented, will lower the chances of successful rehabilitation (Clemen-Stone *et al.*, 1991:631). It is for this reason that the registered nurse in the mine medical station must also be involved in the rehabilitation of the permanently disabled worker.

Permanent disablement can occur as a result of mining accidents. It is necessary to determine whether there is primary or secondary disablement. Primary disablement usually develops as a result of the loss of a limb. The secondary disablement is not easily detected, or solved. This can develop as a result of the time period that lapsed between the accident and the person's ability to return to work, if at all possible, and can refer to the person's loss of skill or development of emotional problems as a result of the accident (Waldron, 1989:460).

The rehabilitation of the person can be simple, such as providing the person who lost a leg with an artificial leg. The rehabilitation regarding secondary disablement is more difficult. Before a person can be fully rehabilitated, it is necessary to assess the patient, and his remaining abilities, in order to determine the vocational guidance needed by the person (Waldron, 1989:461).

The occupational health nurse must be capable of doing this assessment for the person in the employ of the gold mining industry, as this nurse may become responsible for the later rehabilitation and health care, once the other disciplines have resolved problems such as an artificial limb, vocational training, or whatever the case may be, of the disabled employee. Both areas of Freegold had a rehabilitation centre for paraplegic employees at one of the hostels, and the mine medical station personnel were responsible for the supervision of their care.

iii) Immunizations.

Clemen-Stone *et al.* (1991:631) see immunizations also as direct nursing care, and state that incompletely immunized people can

develop communicable diseases with resultant loss of productivity. According to the job descriptions of the mine medical station personnel, only the senior professional nurse, grade 1, is responsible for immunization procedures, without the actual immunizations being identified. At the Gold Fields of South Africa Limited mines only tetanus immunizations are given routinely. This function of the occupational health nurse can be included in the job description of all the registered nurses in the mine medical station, and can be done together with the pre-placement examination.

iv) Emergency care.

Clemen-Stone *et al.*(1991:631) identify emergency care as a very important function of the occupational health nurse, and it forms part of direct nursing care.

During any disaster, injuries may vary from simple grazing and lacerations to catastrophic injuries. According to the medical stations personnel and medical officers interviewed at the two mining companies, this applies to both mining companies as well. A discussion on the more serious and life-threatening injuries that are encountered in the gold mining industry will be given below.

a) Types of injuries

Fought (1988:64) identifies different types of injuries which can become life-threatening. These injuries will include the following:

- Penetrating wounds: These wounds may result in cardiac tamponade, or impair neurological function.
- Blunt trauma: These injuries are caused by crushing injuries, or acceleration/deceleration injuries. It is one of the most common causes of trauma to organs or organ systems.
- Fractures: Fractures occur as a result of trauma, but the fractured bones can cause trauma to adjacent organs, especially in the case of fractures of the long bones, chest or pelvis.

The above mentioned types of trauma can all be encountered in the gold mining industry. Penetrating wounds are encountered after rock falls, assaults, or falling down a chute, while blunt trauma can occur as a result of any type of accident. At the East-Driefontein mine a patient was observed after he was crushed between the train and an scotch-cart, sustaining both penetrating trauma and crushing injuries. Rock falls also cause blunt trauma. Fractures can be encountered as a result of many types of accidents, such as falling down a chute, a rock fall, or any other types of accident. Acceleration/deceleration trauma can occur as a result of falling down a chute, but barotrauma can also be an example of acceleration/deceleration trauma.

4.5.1.8 Health education and health promotion

Health education and health promotion focuses on prevention of disease and promotion of health. Clemen-Stone *et al.* (1991:632-633) state that this function can improve the quality of life of the worker, and can include activities such as blood pressure control, weight control and nutrition education. It is necessary to establish the worker's knowledge, culture, background and attitudes. Creative approaches must be used to impart information to the worker. Rogers (1990:539) also states that the work site is the ideal place where screening, education and preventive services can be provided, as both employers and employees will benefit from the reduction of health expenditures through early detection of diseases and the development of improved life-style.

It is important that counselling is not confused with health education. Both can be rendered by nurses. Counselling is provided for people who need sensitive listening, that will enable them to implement their own problem solving skills (Schilling, 1981:152). Clemen-Stone *et al.* (1991:633) state that the registered nurse can use counselling to assist the worker to see work as a developmental task. By doing this, anticipatory guidance can be provided that will enable the worker to meet possible crises and challenges that can arise in

the person's work career. If the person is experiencing problems outside the scope of the registered nurse, an appropriate referral can be made.

Regarding the health education and counselling function of the registered nurse in the mine medical station, the presence of sexually transmitted diseases, AIDS, tuberculosis and epilepsy amongst the mine workers, necessitates urgent attention by the registered nurse. The registered nurses in the mine medical stations were involved on a very limited scale regarding health education, and no counselling services were provided.

4.5.1.9 Research

Clemen-Stone *et al.* (1991:633-634) state that research forms an integral part of any professional nurse's practice and theory. It contributes to the expansion, advancement and refinement of the body of knowledge of the nursing profession. Rogers (1990:541) mentions the availability of research regarding the roles, education and scope of practice of occupational health nurses. The author also mentions the lack of research regarding cost effectiveness of occupational health services, as well as the limited research regarding certain work place hazards, such as the environmental/mechanical, physical and psychosocial aspects of the industry.

The job description of the senior medical station superintendent as discussed in Chapter 3, paragraph 3.5.1, p. 77 - 82, identifies research as one of the functions of the registered nurse in the mine medical station. Empirical observation has not revealed any such activities, and a continuing education programme can be an enabling factor in getting the registered nurses in mine medical stations interested in, and involved in research projects.

In a discussion of the occupational health services of the American Army, Deeter, Prier & Schmidt (1987:128) described all the above functions, but added hearing conservation programmes, job-related immunizations, sickness absence control (which forms

part of the loss control function of the gold mining industry), epidemiologic investigations, pregnancy surveillance (as applicable in the gold mining industry), and record maintenance. This also forms part of the occupational health services offered in the gold mining industry.

Analysis of the job descriptions of the registered nurses of the two gold mining companies included in the study revealed a scope of practice fitting all the above. The occupational health nursing services rendered by the registered nurses in the mine medical stations are therefore not unique when compared to occupational health services internationally. Continuing education programmes will enable these nurses to remain current in the knowledge and skills required to render a quality service to the employees of these companies. If the benefits of an occupational health nursing service are taken into account, then this service is of vital importance in the mine medical station.

4.5.2 The occupational health nurse as occupational epidemiologist

Occupational epidemiology is an enabling instrument for the planning and administering of health care to the worker. Health hazards leading to the development of occupational diseases or injuries can be identified and preventive measures can be developed. Health information systems can be developed to establish priority areas, allocate resources, identify interventions, and implement and evaluate the effect of the intervention. This will allow the occupational epidemiologist the biggest possible coverage of the workers, at a reasonable cost (Munro, 1991:2).

Occupational epidemiology is, as already indicated, research based, and the job description of the senior medical station superintendent already contains a research component. This nurse must therefore have the necessary knowledge and skills and motivation, to participate in, and/or initiate epidemiological research in the mine medical station. The value of statistical indicators in epidemiological studies cannot be underestimated,

and therefore the registered nurses in the mine medical station should be made aware of the true value of statistical reports on their own development, and not submit them because the mining company expects it.

4.5.3 The use of computers in occupational health services

Computers can be used by registered nurses to improve the quality of an occupational health nursing service. Jones (1985:76 - 78) identifies the following areas for successful use of computers:

i) Health surveillance, where the computer can be used to record all personal data about the employee, such as the initial health screening, periods of ill health, type and location of work undertaken and the nature of the hazards in the work place.

ii) Health education, where a print out of each individual employee can be provided reflecting a statistical analysis of his health, work and habits. This can be effective in bringing about change in the health behaviour of the employee, by highlighting risk areas.

iii) Epidemiology and research can be aided, because access to information becomes readily available. Accuracy of the information loaded into the computer is, however, essential.

Empirical observation revealed the following:

- The Freegold mines utilize a computer data retrieval system for their patients, which is the exact equivalent of the data retrieval system described by Jones (1985:76 - 77). The computers are linked to a central data bank at the Ernest Oppenheimer Hospital. However, this data retrieval is done by clerks employed in the mine medical stations. This approach is acceptable, especially since the mining company employs a large workforce that is spread over several work sites. Computer analysis of health data in small companies employing 200 - 300 employees, is not viable, especially if the data is intended for occupational

epidemiology (Anon, 1986:214).

- At the four mines from Gold Fields of South Africa Limited included in the study, a computer aided diagnostic system was implemented during June 1990. The system was developed by Dr S Javett, and was called the Diagnosis On Computer (DOC) system. The system was tested in field trials in various places throughout Southern Africa. A brief summary of the findings reveals that a well trained nurse using the system can be 15% more efficient than a doctor, the accuracy rate for diagnoses was approximately 90% and when the treatment section was used, the accuracy rate rose to 96%. Examination time from commencement to the diagnosis was reduced to four minutes, while both patients and nurses accepted the system, thus relieving the pressure on doctors. The system brought about a saving of between 37 and 72% in the medicine bill (the scope is very wide). However, the last functions of the programme regarding referral or admission needed more attention (Javett, 1990). The researcher attended a training programme for this system. The system was implemented in the mine medical stations, but during January 1991, the researcher was informed that the system was discontinued after approximately one month of usage, because a variety of problems were encountered.

The South African Nursing Council (1992(b):1) rejects the sole use of the DOC system on the basis of the legal aspects of the Medical, Dental and Associated Health Professions Act, No 56 of 1974, and the Medicines and Related Substances Act, No 101 of 1956. The nurse using the DOC system, while authorized to function under the auspices of Article 38A of the Nursing Act, may use the DOC system responsibly as supplementary to the diagnosis and treatment of a health problem in a patient, but the nurse will ultimately still be held responsible and accountable for his actions. The usage of the DOC system by registered nurses in the mine medical stations would therefore have been illegal, as none of them are authorized to function under the auspices of Article 38A of the Nursing Act, No 50 of

1978.

4.5.4 The registered nurse as an employee

It is perhaps necessary to mention that nurses usually form the largest occupational group themselves, within the health sector. It is therefore important to remember that nurses themselves are subjected to occupational hazards, such as the physical, psychological and mental demands on the nurse during daily practice, the risk of contracting communicable diseases from patients, allergies and dermatosis that can develop as a result of the various chemicals in use in the health care settings, the harmful effects of X-rays and other forms of ionizing radiation, and many more (The International Council of Nurses, 1983:1482). The nurse must especially be aware of the dangers of communicable diseases, such as AIDS in the modern nursing practice, and continuing education programmes for the registered nurse in the mine medical station, must highlight these dangers and their prevention.

4.6 FIRST AID IN THE GOLD MINING INDUSTRY

Carreck (1987:10) discusses the medical services to a group of collieries in the United Kingdom. In these collieries, first aid is provided by officials holding a current first aid certificate. At the medical centres medical centre attendants render first aid. All people providing first aid are trained by the collieries' medical service, and are supervised by a registered nurse, who is called a nursing officer. These nurses must either hold, or work towards achieving, an occupational health nursing certificate. This situation is also applicable in both gold mining industries included in this study, except for the certificate in occupational health nursing required of registered nurses. The main objective of this study is to develop a continuing education programme for registered nurses in mine medical stations that will lead to negotiations for the listing of an occupational health nursing qualification with the South African Nursing Council.

In the United Kingdom, the Health and Safety Act (1974) makes provision for the establishment of a health and safety executive. This executive must employ at least one employment nursing advisor in each of its 21 field areas, and they have the responsibility for first aid training, and the approval of first aid training courses. At this point in time, these nurses do health assessments, investigations, venepuncture and they obtain urine specimens (Trevelyan, 1990:537). If this situation is compared to the task of the registered nurse in the gold mining industry, the similarities are striking.

The job descriptions of all categories of nurse in the mine medical stations reflect an involvement in first aid training. Certain first aid qualifications are also required for certain posts, such as mine first aid for all employees under the age of 50 years, a gold medal, preferably with an instructors qualification, for all senior medical station superintendents. This situation is not unique to South African mine medical stations.

Hall (1983:172) describes a survey that revealed resource wastage by a number of industries in the United Kingdom. These industries acquired costly first aid material that was later found to be unsuitable. Large quantities of medicines should not be bought, as most medicines have an expiry date. This situation was not encountered in the mine medical stations of either company. However, the registered nurse in charge of the casualty department of the Ernest Oppenheimer Hospital in Welkom had the impression that the approach in rendering first aid, and the equipment used in the case of a mining accident, was out-dated and in need of modernization. An example of this was the heavy metal first aid boxes used by the registered nurses in the mine medical stations. These could be replaced with lightweight canvass shoulder bags, holding the necessary first aid material. Instead of carrying heavy oxygen bottles, new lightweight oxygen cylinders were available, but not used by the registered nurses in the mine medical stations.

Hall (1983:172-173) also states that nurses and first aiders

should work together as a team, with first aiders referring patients with injuries beyond their expertise to the nurse. Co-operation between nurses and first aiders can be achieved by ensuring that the first aiders are well trained, while allowing the nurses with whom they will be working, to train them. This approach will not only lead to a standardization in practice, but will also ensure that both nurses and first aiders are well acquainted with the procedures. They will also be accustomed to working with each other. This approach will also lower the training costs for small companies.

The above mentioned approach is also followed in the gold mining industries included in the study, as the registered nurses are responsible for all first aid training to a very large extent.

4.7 CONCLUSION

In conclusion, it is perhaps appropriate to mention the views of Rogers (1990:540) on the need for education for the occupational health nurse, with the emphasis on professionalism in occupational health nursing and the specific mention of the occupational health nurse's personal responsibility for professional growth.

In this chapter, the nursing rendered by registered nurses in the mine medical station of the gold mining industry was discussed within the ambit of three different nursing disciplines, namely occupational health nursing science, primary health nursing (within the larger primary health care), and trauma nursing science. The legal status of this registered nurse was also clarified.

In Chapter 5, the theory of curriculum development will be discussed, which will conclude the theoretical perspective of this study.

CHAPTER 5

THE THEORY OF CURRICULUM DEVELOPMENT

OVERVIEW OF THE CHAPTER

The aim of this chapter, is to provide an explanation of the process of developing a curriculum for a continuing education programme for registered nurses working in the mine medical stations of the gold mining industry.

This aim is achieved through:

- Defining a curriculum.
- Explaining the process of curriculum development.
- Explaining the elements of a nursing education curriculum, more specifically, the curriculum for a continuing education programme for the registered nurses in the mine medical stations.

5.1 INTRODUCTION

The initial nursing education programme, before registration with the South African Nursing Council, is only the first step in a lifelong process of learning. In order to remain current, the professional nurse will embark on a continuous process of learning after completing the initial nursing education programme. It is also essential that the professional nurse take responsibility for continuing education, which may be done informally, or formally. In the latter case class attendance will be required (Cork, 1987:1).

A formal continuing education programme, like the initial nursing education programme, necessitates the development of a structured curriculum. Cork (1987:1) states that curriculum planners must have knowledge and understanding of the principles of curriculum planning in order to develop a coherent, structured and comprehensive educational programme.

5.2 CURRICULUM DEFINED

Before attempting to define the concept of a curriculum, it is important to distinguish between different types of curriculum. Bradshaw (1989:65-66) identifies four types of curriculum, namely:

1) The official curriculum, which reflects the statutory requirements for the programme. McNeil (1990:103) prefers the term "formal curriculum" for this type of curriculum, which is not the same type of curriculum as the next.
2) The formal curriculum, which contains the detailed syllabus as planned by the teaching institution (Bradshaw (1989:65). McNeil (1990:103) states that this type of curriculum is based on the teacher's interpretation of what should be included in the curriculum, and calls this type of curriculum the perceived curriculum.
3) The actual curriculum, which reflects the actual learning and teaching that takes place, as decided by the individual

teacher (Bradshaw, 1989:66). It is also called the operational curriculum (McNeil, 1990:104).

4) The hidden curriculum, which deals with the transmission of values and attitudes from the teacher to the student (Bradshaw, 1989:66).

McNeil (1990:103-104) identifies an additional two types of curriculum, namely:

- The ideal curriculum, which represents ideals and can describe desired directions. This curriculum usually comes into being as a result of special interest groups.
- The experiential curriculum, which contains the student's perception of the curriculum.

The distinction between these types of curriculum is important, because it will determine what will ultimately be taught. Even though the curriculum developed in this study may be the official curriculum, all the other types of curriculum can influence the ultimate presentation, as the teaching staff becomes involved in the completion of the process, namely in developing the micro-curriculum, and presenting the subject.

A variety of definitions for the concept "curriculum" exist, such as the definitions compiled by Bevis (1982:8), Kerr as quoted by Copcutt (1984:43) and Modukanele (1985:24), the definition by Redman as quoted by O'Connor (1986:309), and lastly the definition of Stenhouse as quoted by Cork (1987:2). On studying these definitions, one finds certain similarities between them, such as the premise that learning is planned and directed by the school (educational institution) in order to achieve certain learning objectives.

Foshay (1987:341) views a curriculum as a dynamic and ever-changing entity. He compares a curriculum with a life-form, and states that it is a constantly changing organic whole. For this reason Foshay (1987:341) accepted the definition of the concept "curriculum" as developed by Kuhn, who stated that a curriculum

is a "disciplinary matrix". This approach was adopted because the "disciplinary" aspect refers to the ". . . common possession of the practitioners of a particular discipline", while the matrix aspect refers to the fact that the curriculum is ". . . composed of ordered elements of various sorts, each requiring further specification" (Foshay, 1987:341).

Frandson (1981:60) views the curriculum for continuing education as ". . . a structure providing cyclical programs that will define and redefine what is current, and substantive, and useful." Dobson and Dobson (1987:279) have developed certain key elements to be included in any curriculum. These elements include an orderly progression, applicability to problems encountered in individual cases as well as being dynamic but not prescriptive.

Choosing one suitable definition is not easy, as there are so many to choose from. The process of choosing one definition is further complicated by certain factors such as those mentioned by Dobson *et al.* (1987:277-278) who state that defining any phenomenon is an attempt accurately to interpret and represent the phenomenon to be defined. It is also true that no definition of the concept "curriculum" can be deemed right or wrong, as all these definitions are merely different interpretations of the same phenomenon.

The above reasons serve as a motivation for the development of a new definition for the concept "curriculum" applicable to this study, as the curriculum will be appropriate only in a continuing education context for registered nurses employed by the gold mining industry. This definition reads as follow:

> The curriculum for continuing education for registered nurses employed in mine medical stations of the gold mining industry can be deemed a disciplinary matrix, made up of carefully planned and detailed learning opportunities developed for an educational institution that will enable

the registered nurse to remain an informed, competent and safe practitioner. The theoretical component and practical component must receive equal consideration, taking into account the target population of the education programme. The curriculum must be offered periodically, and must constantly develop and change according to an ongoing analysis of the specific health needs of the mine workers within the gold mining industry.

5.3 THE CURRICULUM PLANNING PROCESS

The process of curriculum planning and evaluation in education institutions world wide is very often still done by means of the so called "Tyler Rationale". This method was developed in the 1940's, and is merely a technical approach with no reference to what exactly should be included in any curriculum. It is a relatively cheap and effective method, but is not concerned with the question of whether the ultimate goal of the educational programme is really the desired outcome of the programme, or merely the end of a specific training programme (Apple & Taxel, 1987:162-163).

The "Tyler Rationale" is based on four basic steps, namely:

i) Defining behavioral objectives.
ii) Determining ways of achieving these objectives.
iii) Organizing those ways according to scope and sequence.
iv) Evaluation of the process by means of a test (Calitz, Du Plessis & Steyn, 1982:4, Uys, 1982:11).

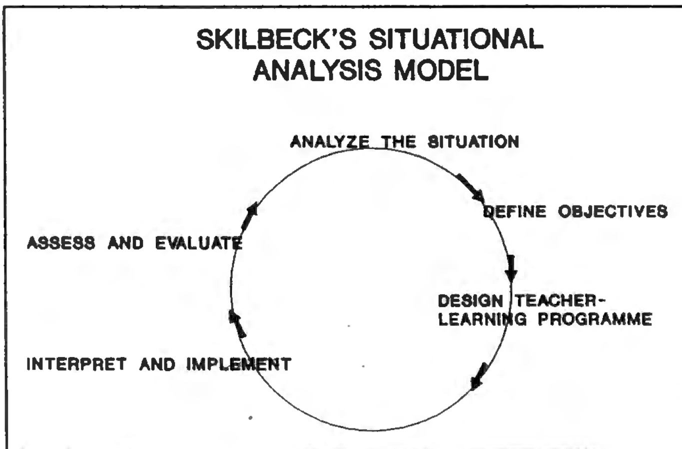
Calitz *et al.* (1982:4-5) and Sharpes (1988:42) describes the seven step procedure for curriculum development as developed by Hilda Taba. This procedure takes student needs into account when planning a curriculum, and is prioritized with the assessment of student needs as the first step. In order of priority, the other steps include the formulation of objectives, the selection and organization of content, the selection and organization of

learning experiences and the evaluation of the curriculum.

The seven steps as developed by Taba (Calitz *et al.*, 1982:4-5, Sharpes, 1988:42), were an important development in the curriculum planning process, but Pendleton and Myles (1991:59) also draw attention to the fact that there is a relationship between theory and practice in nursing education. This relationship is cyclical and interwoven, and therefore curriculum planning must include a curriculum for both theory and practice.

The curriculum planning process described above took student needs into account, which was an improvement on the "Tyler Rationale" which merely dealt with the final product, but the curriculum development process was further refined when Skilbeck's Situational Analysis Model was developed. This model, as described by Pendleton *et al.* (1991:60), can be shown graphically as follow:

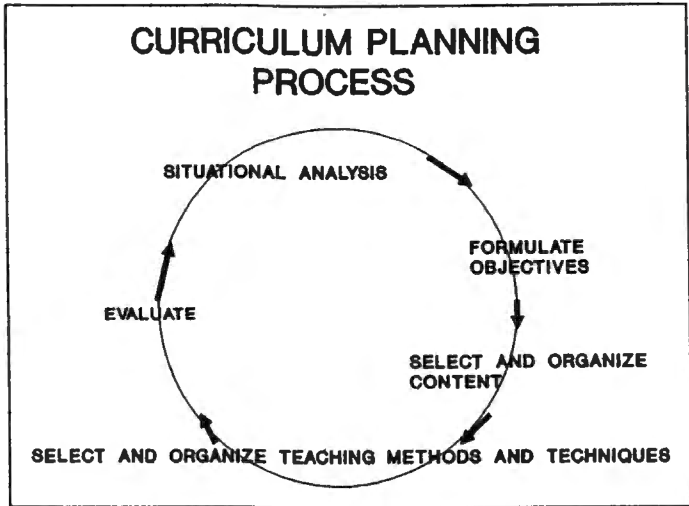
FIGURE 5.1



Although this model makes provision for situational analysis, and thereby takes student needs into account, it groups too many aspects into one, as demonstrated in the teacher-learner

programme. It appears as if this step contains both content selection, and selection of teaching methods and techniques. It is for this reason that the revised curriculum process, as identified by Nicholls and Nicholls (1978:21), Calitz *et al.* (1982:6) and Nolte (1985:99) was developed. This model is best illustrated in figure 5.2.

FIGURE 5.2



The process of developing a curriculum is also performed at three levels, namely the macro-, meso-, and micro-curriculum. The macro curriculum is developed by the institution presenting the programme, such as a university and the Department of Education (Calitz *et al.*, 1982:7). In this study, the macro- curriculum is developed within the parameters provided by the South African Nursing Council in their regulations and directives for post-basic programmes. Because this continuing education programme is a career focused programme, few problems were encountered in determining the macro-, and meso-curriculum and maintaining the relationship between the different subjects (See Annexure E, the proposed curriculum).

The macro-curriculum usually decides about content on the horizontal level, in other words, what content must be offered simultaneously. At the same time, a meso-curriculum must be developed by the department presenting the programme. The meso-curriculum deals with the vertical component of the programme. This aspect deals with the cumulative learning that occurs over the different year levels (Calitz *et al.*, 1982:7-8). The continuing education programme developed in this study will not exceed a period of one year. However, there will be cumulative learning during the course of this year. The vertical component will therefore also be included.

The meso-curriculum is also sometimes called the syllabus, but this may be confusing, as the syllabus often only refers to subject content. Subject content is, however, contained in the micro-curriculum. This aspect of the curriculum is developed by the person teaching the subject (Calitz *et al.*, 1982:8).

Each of the steps identified in figure 5.2 will be briefly discussed.

5.3.1 The situational analysis

Skilbeck's situational analysis model can be used to demonstrate the use of the situational analysis. This model recommended that an analysis of internal and external factors be conducted. Pendleton *et al.* (1991:61-62) provide examples of both the internal and the external factors, although the examples were derived from the United Kingdom's nursing education programme, called "Project 2000". An analysis of these examples enables one to identify the type of information to be obtained for both the internal and the external factors.

Internal factors include:

- The development of a profile of the educational institution and clinical environment.
- The educational philosophy underpinning the whole

curriculum.

- The human resources available in the educational situation.
- The student's needs as negotiated throughout the programme (Pendleton *et al.* 1991:62).

External factors include:

- The use of education to develop a nurse, who will be able to utilize knowledge to make decisions at work.
- The nature of society and the concept "health".
- The problems that evolve around professional autonomy for nurses within the policies of the employing body.
- The change in the philosophy of health care, with resultant new practice paradigms demonstrating the extended role of the nurse as practitioner in his/her own right, taking responsibility for health education within a holistic health care setting (Pendleton *et al.* 1991:61-62).

If the internal and external factors are analyzed, it becomes clear that the external factors refer to three distinct populations, namely:

i) The students, or potential students in the case of the continuing education programme planned for the gold mining industry.

ii) The employing body, which is the gold mining industry in this study.

iii) The community utilizing the nursing services, which consists of mine workers in this study.

The external factors also include the regulations and directives of the South African Nursing Council.

The internal factors refer to the educational institution only, which in this study refers to the Ernest Oppenheimer Nursing College, and the Gold Fields Nursing College.

Dividing the situational analysis into an analysis of different populations, is also recommended by O'Connor (1986:79-82), Farmer

(1988:117) and Nolte (1985:103-104), who discuss the necessity for including the potential student population in the assessment. By doing this, the curriculum planner will ensure that the needs and interests of the learners are being met. In the situational analysis conducted for this study, the potential student population was included in order to establish their exact learning needs. The potential population in this study refers to the registered nurses in the mine medical stations of the gold mining industry.

Raulf and Ayres (1987:12-17) and Winstead (1987:30-35) describe the necessity for conducting a feasibility study in the education department, in order to determine whether the proposed programme can be presented by the institution. It was for these reasons that the Ernest Oppenheimer Nursing College and the Gold Fields Nursing college were included in the situational analysis conducted for this study.

Tinkham, Voorhies and McCarthy (1984:185-186) provides a framework highlighting the different kinds of information that will be needed in order to assess the needs of the community. The information required can be summarized into the following categories:

i) Obtain data about the community itself, describing its characteristics and uniqueness.
ii) Obtain data about the people, such as their age and sex distribution and geographical distribution.
iii) Obtain information about the environment where the community is situated, such as housing, levels of air and water safety, and other health-related factors.
iv) Determine the channels of communication available to the community, both formal and informal, and identify the key communicators in the community.
v) Obtain the vital statistics of the community.
vi) Obtain data about the health and health-related facilities in the community, including resources and personnel; and
vii) determine the available community nursing services with

their resources and interrelations.

The guidelines as described by Tinkham *et al.* (1984:185-186) were used to compile the data collection tools for the situational analysis that was conducted at the Freegold Mines in Welkom during 26 June - 7 July 1989, and the Gold Fields of South Africa Limited mines in Carletonville, during 26 - 29 March 1990.

A data collection tool was developed to establish the needs of the potential students, who are registered nurses working in the mine medical stations of the two gold mining companies (See Annexure F). This was done because the main objective of this study is the development of a continuing education programme for the registered nurses working in the mine medical stations of the gold mining industry.

Further data collection tools were developed to establish the abilities of the potential educational institutions to present and maintain the continuing education programme (See Annexures G & H).

Storey (1983:36) emphasises the importance of including the population that will utilize the service (or mine workers in this study) in the situational analysis. Regarding the population that will utilize the services of the registered nurses on completion of the continuing education programme, the researcher decided to obtain statistics only on this population because of the large numbers of mine workers employed within the gold mining industry, and the cultural and language barriers. This was done because the registered nurse must gear the nursing services offered at the mine medical stations in such a manner that it will meet the health needs of the mine workers. An analysis of the statistics should yield a profile of the health needs of the mine workers.

Different approaches can be used when conducting a situational analysis, such as a written approach, and a verbal approach.

O'Connor (1986:86-93) discusses a variety of methods contained within the written approach. These methods include the following:

1) Checklists, which are structured questionnaires. The major disadvantages of this approach lies in the fact that the learner may not concentrate on the content, or important items might have been left out.
2) Written analysis of jobs and skills can be done by using existing job-descriptions as a basis. This may again not necessarily reflect learning needs.

O'Connor (1986:93-95) also describes certain verbal techniques, such as the following.

1) Interviews can be used for groups and individuals, but the lack of anonymity may be distracting in group context.
2) Surveys, such as telephone surveys, can be conducted in order to establish learner needs, but this has the disadvantage that the findings will be based on people's expressions of needs, which may be difficult to order and categorize.

A further three approaches warrant mentioning, namely the observation technique, which involves actual observation of the person at work, as well as performance appraisals and job analysis; the record analysis based on statistical and patient records; and a trend analysis, with an analysis of recent professional development and publications as a basis for establishing learner needs (O'Connor, 1986:95-101).

In this research, data collection was done using the following approaches:

- Interviews were conducted with the registered nurses in the mine medical stations of both mining companies included in the study.
- The lecturing staff of the Ernest Oppenheimer Nursing College and the Gold Fields Nursing College were also interviewed.

- Checklists or structured questionnaires were used during the interviews, collecting the data identified by Tinkham *et al.* (1984:185-186).
- The job descriptions of the registered nurses in the mine medical stations were also analyzed.
- The registered nurses working in the mine medical stations were observed at work. This was done to establish the extent of correlation between the job descriptions and the actual tasks performed by the registered nurses, as well as the extent of the physical assessments conducted by the registered nurses in the mine medical stations.
- Lastly, a record analysis based on the statistical records of the health status of the mine workers, was also done.

The situational analyses were conducted using a combination of the methods described by O'Connor (1986:86-96). This then concludes the situational analysis.

5.3.2 The formulation of the objectives

The nurse educator developing a curriculum must be very clear on what must be achieved through offering the programme. This clarity will ensure acceptance by other educational institutions, such as universities and colleges (Linc, 1987:173). One way of ensuring this clarity, is through the development of goals. Linc (1987:172) also indicated the importance of goals in terms of monetary gains for the institution. Well formulated goals can ensure the securing of resources for the department offering the programme.

Developing objectives for educational programmes is also no new approach in education, as it is an integral part of the "Tyler Rationale". Modukanele (1985:24) and Raichura (1987:59) draw attention to this factor by describing four questions that form an integral part of objective formulation. The questions can be summarized as follow:

i) What are the educational purposes of the school?

ii) Which educational experiences can be offered in order to attain these purposes?

iii) How can these educational experiences be effectively organized?

iv) What can be done in order to determine whether these purposes have been attained?

Nolte (1985:118) identifies three important aspects regarding the use of objectives in teaching. Of these, the researcher deems the following two to be of importance for this study:

- Objectives put specific content within the proper context, and
- objectives enables the lecturer to make effective decisions.

Farmer (1988:117) identifies a very important aspect. This aspect refers to the fact that objectives are an aid in determining whether the goal of the education programme has been accomplished. Objectives must therefore be measurable, and stated in behavioral terms.

The following types of objectives can be identified:

1. Terminal objectives. These objectives form a global statement of what the student must know at the end of the programme. Developing terminal objectives for continuing education is very difficult, as continuing education is supposed to be a life-long experience (O'Connor, 1986:311). Uys (1982:33) states that these objectives can also be called "Programme " objectives. They are based on the findings of the situational analysis, and state all activities that will be achieved through presenting the programme. O'Connor (1986:311) concurs with this, and adds that programme objectives are usually given in the form of behavioral objectives, which state the exact behaviour that is expected of the student after completion of the programme. These objectives must be learner centred, rather than teacher centred, and must describe observable

behaviour that must be achieved, as well as the degree of competency required in this behaviour (O'Connor, 1986:106).

2. Level objectives. These objectives enable the lecturer to stagger information in the event of the programme being offered over a period longer than one year (O'Connor, 1986:311). Uys (1982:33) states that the level objectives can be used to identify the lecture material that must be presented early in the programme, and which material can be presented later in the programme.

3. Uys (1982:34) identifies course objectives as a third type of objective. These objectives identify what is to be presented in the different courses within each level. They can be further subdivided into unit objectives, which are specific and written in order to divide the content of each course into manageable units.

In developing a continuing education programme for registered nurses working in the mine medical stations of the gold mining industry, only terminal objectives will be developed (See Annexure E). This decision is based on the fact that it is unlikely that the continuing education programme should be of a longer duration than one year, thus rendering the development of level objectives unnecessary. The course objectives will be developed by the teaching staff developing the micro-curriculum.

There are certain key elements that must be observed when writing the objectives, namely:

- Objectives must be unambiguous.
- They must specify the conditions under which the final behaviour will occur.
- They must state the standard that must be achieved by the student.
- They must deal with one learning outcome at a time (Hinchliff, 1986:83, 86).

The above elements can be demonstrated in a more practical format by analyzing a specific objective, which will also be applicable

for this study. The South African Nursing Council provides the following objective in circular 84/m89 (South African Nursing Council, 1988(a):1), which contains the teaching guide for the compulsory subject "Nursing Dynamics" in post-basic clinical programmes. The objective reads as follow: "Demonstrate an understanding of the position and the contribution of the nurse practitioner in the national health system and the factors which have an influence thereon". This objective is clear, and not open to mis-interpretation (unambiguous). It also states the conditions under which the final behaviour will occur by referring to the position and contribution of the nurse practitioner in the national health system and the factors that will influence this. The standard that must be achieved is stated , because the student must demonstrate an understanding of certain material, and it also deals with a single learning outcome, as the definition refers to the nurse practitioner within the national health system.

Farmer (1988:117) identifies three components of importance for the writing of objectives. These are: "1) performance; 2) a condition; and 3) a criterion". This can also be applied to the objective discussed in the previous paragraph. "Demonstrate an understanding. . . " refers to the performance aspect, while the condition would be that the curriculum must be designed in such as manner that the student will be enabled to demonstrate this understanding. The criterion is contained in the rest of the objective, by stating what the student must be able to demonstrate, namely, ". . . the position and the contribution of the nurse practitioner in the national health system and the factors which have an influence thereon".

Lastly, it is important to remember that objectives must be written to accommodate the cognitive, psychomotor and affective aspects. Uys (1982:37) states that objectives must be written for these three levels, in order to prepare the student for the total spectrum of human behaviour. Bloom's taxonomy for the cognitive level, as quoted by Uys (1982:36) is widely used in

modern education, and not only in nursing education. This taxonomy can be used to test the student at 6 levels, namely, knowledge, comprehension, application, analysis, synthesis and evaluation. The affective level can be tested by setting objectives according to the taxonomy developed by Krathwohl, as described by Uys (1982:36-37). The objectives for this taxonomy will also be set at different levels, namely giving attention, react, appreciate, organize and that which is typical for a specific value.

Objectives developed for the psychomotor domain will give attention to every aspect of nursing that will deal with the student's motor skills and skills in completing procedures (Uys, 1982:36).

The terminal and programme objectives developed for the continuing education programme for registered nurses working in the mine medical stations of the gold mining industry, are included in the curriculum itself (See Annexure E).

5.3.3 Selection of content

The selection of the content to be offered in the curriculum, is also part of the curriculum planning process. O'Connor (1986;315) states that the content is selected by considering the objectives and curricular threads, or strands, as favoured by authors such as Torres and Stanton (1982:43-46). Strands can be divided into vertical and horizontal strands. The vertical strands identifies the content (concepts and theories) while the horizontal strands is process oriented. It concentrates on the use of the content by the student (Torres *et al.* 1982:43). This will enable the person offering the programme to reach the set objectives, and eliminate the inclusion of unnecessary lecture material. However, Ewan and White (1984:15) warns that lecturers usually transfer their own preferences, values and goals to students through the emphasis of their teaching, irrespective of the prescriptions contained within the curriculum (the hidden

curriculum). The lecturer may use his own initiative in the selection of the content to be offered, but this approach is of value only if the lecturer remained current (O'Connor, 1986:118). As already discussed, the person teaching the content will be developing the micro-curriculum. In order to ensure that the objectives of the curriculum are reached, these aspects of objectivity regarding personal preferences, values and goals, as well as currency regarding developments in the field of specialization, becomes vitally important.

Literature reviews may also be used for content selection, and can be used alone, or as a means to ensure comprehensiveness in the curriculum (O'Connor, 1986:118). The researcher used O'Connor's approach for content selection, by considering the student needs as identified in the result of the situational analysis at the Freegold mines, the Gold Fields of South Africa Limited mines, the Ernest Oppenheimer Nursing College, and the Gold Fields Nursing college, together with a literature review while developing a proposed continuing education programme for registered nurses in mine medical stations of the gold mining industry. This continuing education programme is developed to ensure that the professional nurse remain up-to-date regarding developments in the nursing profession, and to enable the student (Registered nurse) to acquire new skills necessary to provide a comprehensive service to the mine worker experiencing health needs. The value of continuing education must not be under-estimated as a means to keeping the professional nurse up to date as regards to knowledge and skills. The South African Nursing Council stated its viewpoint in regulation R 879 of 2 May 1975, as already discussed in Chapter 2, paragraph 2.2, p. 15.

Cross and Farnell (1988:88) suggest a core curriculum for registered nurses, as a means of continuing education. The core curriculum consists of eight modules, such as an overview of the nursing process, the physical assessment, diagnostic studies, intravenous therapy, teaching the patient and his family, intervention for anxiety, stress and crises, emergency procedures

and nursing management. These were all implemented in the continuing education programme for registered nurses in mine medical stations within the gold mining industry. The curriculum itself can be seen as a core curriculum for continuing education for all registered nurses employed in the gold mining industry, and not only in the mine medical stations.

Ewan *et al.* (1984:18) have developed guidelines for decisions regarding curriculum content, using the following four criteria:

"1. Deficiencies in practice. . .
2. Individuals sick or well. . .
3. Exactly how is time spent by nurse in contact with patients. . .
4. Direct care within complexities of health care. . . ".

The above mentioned criteria are important in selecting content for a curriculum, but in the unique setting of the health services within the gold mining industry, criteria 3 & 4 become less important, while criteria 1 & 2 become even more important, as the individuals working in the gold mining industry have unique and varied health needs, and the scope of practice of the registered nurse in the mine medical station, is vastly different from that of the registered nurse in a hospital ward.

In conclusion, Ornstein (1987:22) discusses the knowledge explosion that has occurred since the beginning of this century. This necessitates a future orientation when content for any curriculum is selected, as knowledge becomes obsolete within a short period of time. A future orientation will ensure that the lecturer will pay continuous attention to content selection, based on recent developments in the field of study.

The institution offering a continuing education programme to registered nurses working in mine medical stations, will have the task of ensuring that the curriculum is changed and updated on a regular basis, in order to maintain currency. The persons teaching the different subjects will have to update the

situational analyses in order to remain informed regarding the needs of the registered nurses and the mine workers. The curricular strands, or threads, will have to be revised in accordance with new developments in knowledge and skills, as well as the availability of current and applicable literature, while simultaneously updating their own knowledge and skills.

5.3.4 Selection and implementation of teaching methods and techniques

Before attempting to select teaching methods, it is perhaps important to ask the question "Who may teach the students?". Cork (1987:2) identifies a variety of settings for nursing education, which include one-to-one education, groups and classroom education. These settings will influence the selection of the teaching personnel, as one-to-one education can be done by non-lecturing personnel in the practical setting. De Young (1990:2-4) highlights the importance of certain qualities that will be recognizable in the good teacher. These include the ability to maintain sound interpersonal relationships with students, while being professionally competent. The teacher must also exhibit certain personal qualities, such as enthusiasm for the subject, a willingness to admit errors, cheerfulness and consideration for the student. If these qualities are kept in mind, the selection of an appropriate teacher should not pose any difficulties. The selection of an appropriate teacher is perhaps as important as selecting the teaching methods, because choosing an unsuitable teacher can be to the detriment of the student, thus rendering the educational programme unsuccessful.

The selection of appropriate teaching methods and techniques is equally important for the success of the educational programme. The selection of these methods and techniques must be based on certain principles. Pendleton *et al*. (1991:124-125) identify the following principles:

- The teaching personnel should address those factors that predisposes learning, such as previous learning

experiences, and experiences in life.

- The structure of the content must be clearly stated, in order to promote understanding in the student.
- The material to be learned must be sequenced in a logical manner.
- The nature and pacing of rewards and punishment must be clearly stated in the theory of teaching, with intrinsic rewards being the ultimate goal.

The above principles will enable the teacher to select the teaching method best suited to the student population. This selection process will be even further enhanced if the principles of andragogy is kept in mind.

Pendleton *et al.* (1991:125) state that adults need to be more self-directive when studying, while their reservoir of experiences is also wider. This provides a wider selection of choices that will enhance learning and problem solving, because their approach is usually problem oriented, and not subject-centred. Learning is an active process, and that the need to learn serves most of the time as the motivation for embarking on an education programme, thus providing support for the drive behind true adult learning (Blodgett, 1987:63-64).

When selecting the specific teaching method, a variety of methods and techniques are available to the teacher. Traditionally, the lecture method of teaching was used. Tye and Tye (1986:101-102) highlight the main disadvantages of this method. It is based on students listening to the lecturer, with little, or no, participation from them. They may fill in work sheets, and take tests, with questioning mainly being based on recall of information. The student seldom, if ever, gets really objective positive or negative feedback about his own effort. It is also important to remember that, despite the disadvantages, the lecture method is still a means of transmitting a big volume of information to large numbers of students (Murray, 1982:18), especially if this information is an introduction to new material

for the student, or integrates and synthesizes knowledge from several fields and sources (De Young, 1990:75). In the continuing education programme for registered nurses, the lecture method will have a place, but these students are mature registered nurses, and andragogical principles will have to be kept in mind when developing lectures for them.

Another approach that will be of value to registered nurses taking a continuing education programme, is the self-study approach, which can be developed as a study package. The implementation of this approach depends on the development of the learning package, a classroom orientation for students regarding the package, clinical contact with the students and lastly lecturer consultation time available to the student (Thies, 1987:248-249). Similar self-study techniques have been developed for distance education packages using a printed and non-printed approach. The printed approach involves printed material being sent to the student, who works through this material, while being able to contact the lecturer for further guidance. The material may consist of textbooks, audio-cassettes and even computer aided systems. The non-printed approach is based on radio and television teaching. There are disadvantages to this approach, such as the influence of previous experiences on the learner's willingness to accept new information presented in this format, as well as differences in peoples' listening patterns. Material may be lost to the learner not used to listening to the radio or watching television (Pratt, 1987:74-79).

De Young (1990:109-117) discusses the use of seminar work, brainstorming and debate as teaching methods. Each of these methods can be adult education oriented, especially since the seminar can be used to develop group process and leadership skills. The seminar is used in small groups, and is ideal for continuing education programmes. The content to be covered must be of such a nature that the students, who will present the seminar, will be able to master the material quickly. Material that will need years of clinical practice, will be unsuitable in

this approach. The whole group must be involved in the seminar, and the seminar leaders must ensure this involvement.

Brainstorming is another teaching method that can be used in continuing education programmes. De Young (1990:112-114) views the use of brainstorming as an important method to solve any problem situation that arises in class. The method can be used to reach solutions for this problem, which may be actual or potential. This method can be used in class and in the clinical situation.

Debate can also be used as a teaching method. Debate can be seen as a discussion method, but it is also based on the premise that solutions already exist. In debate, the opinion of one group must be changed by the other group, who will suppose that they have the solution to the problem. It is for this reason that the use of debate as a teaching method has lost its popularity (De Young, 1990:114-117).

The use of computer aided education is extensively described in the available literature. Carrier (1987:52-60) describes the use of computer aided education in a variety of settings, such as continuing education, education for business training, in nursing education, and the education for the handicapped. The principles inherent to adult education as discussed above, are applicable in all situations using computer aided education. As far as continuing education is concerned, computers will provide new information to students, while simultaneously providing reinforcement during the learning process. Computers can be used to formulate new ideas, and to provide access to information for the user. Clinical skills and problem solving, especially in the field of physical assessment, lends itself to computer aided instruction, which can be easily implemented by Gold Fields of South Africa Limited, because this mining group is in possession of the Diagnosis On Computer system, or DOC system, as described by Javett (1990:1). However, the South Africa Nursing Council is not in favour of the use of the DOC system in situations other

than an aid to the registered nurse. This document has been discussed in more detail in Chapter 4, paragraph 4.5.3, p. 138.

The approaches that are founded on the principles of andragogical education, are the approaches of choice for the implementation of the continuing education programme developed in this study. This choice is based on the fact that the students are mature, registered nurses, and the fact that the use of these approaches will limit the periods that the students (registered nurses in mine medical stations) will have to leave the medical stations in order to attend classes.

It must be kept in mind that continuing education is necessary for professional growth, and that any continuing education programme should be deemed true adult education. It is therefore necessary to investigate the different approaches used in continuing education programmes, and to select them according to their appropriateness to the situation of the gold mining industry (See Chapter 2, paragraph 2.5, p. 22 - 28).

5.3.5 Evaluation

After presenting the content to the student, evaluation is necessary in order to establish whether the objectives were reached. There are various techniques that can be used in the evaluation of students. Frith and Macintosh (1984) discuss some of these techniques.

Evaluation of the theoretical component of the curriculum, can be done by means of written of oral evaluation. When using the written approach, the following techniques can be used.

1) Objective items, also called multiple choice questions. Frith et *al.* (1984:54-55) states that these items are developed in such a manner that there will only be one predetermined correct answer.
2) Open-ended questions, also called essay type questions. These questions may be short or long, and no specific

parameters as to the length of the answer is contained in the question. This type of question can be used to establish the student's command of a language, or his ability to reason, synthesize, argue or reflect learned material (Frith *et al.*, 1984:55).

Oral evaluation is of specific use in the evaluation of language and music, but is also widely used in other disciplines (Frith, *et al.*, 1984:104-106).

Practical evaluation must also be done. Frith *et al.*(1984:97) state that the practical evaluation is mainly concerned with presenting the student with the opportunity to suggest and justify solutions for these problems.

The teaching staff must also be evaluated. Pendleton *et al.* (1991:191-193) describe methods for teaching staff evaluation.

Teaching staff evaluation can be done by means of self-evaluation. In self-evaluation the person reflects on the experience of teaching, and must be conscious of himself during the lecture. Afterwards, the person must have time to reflect on what happened during the lecture, by looking at what went wrong, what changes can be implemented for future presentations, were objectives reached and lastly, whether the resources were used to the best of that person's abilities (Pendleton, 1991:192).

The teaching staff can also be evaluated by the students. Students can be asked to write on a blank piece of paper, or to fill in a questionnaire (Pendleton, 1991:192-193).

In the pilot presentation of the proposed programme, the students were evaluated by means of open-ended questions, and the teaching staff were evaluated, together with the curriculum itself, in a written student evaluation, using blank pieces of paper. The results will be discussed in Chapter 7, paragraph 7.3.4, p. 250.

5.4 ELEMENTS OF THE CURRICULUM

O'Connor (1986:310-313) identified the following elements of the curriculum.

5.4.1 The conceptual framework

The conceptual framework forms the basis of any curriculum, and it is based on the philosophy of the institution presenting the curriculum to the students. The conceptual framework must link the educational programme to the expectations expressed by the society, thereby providing the curriculum with identity and accountability to the public (O'Connor, 1986:310). These sentiments are also expressed by Storey (1983:36), who states that "The philosophy which surrounds the learner should be one that stems from society's need, through the service which meets those needs, into the education department, extending to areas where students gain practical experience". If these principles are maintained, conflict between the consumer, the education department, the students and the health care services are limited.

The development of a frame of reference for any curriculum is very important in order to provide new members of the profession or the teaching institution with a written statement on the philosophy of nursing, an explanation of terminology, and other relevant information such as the characteristics of the students subscribing to the institution (Modukanele, 1985:23).

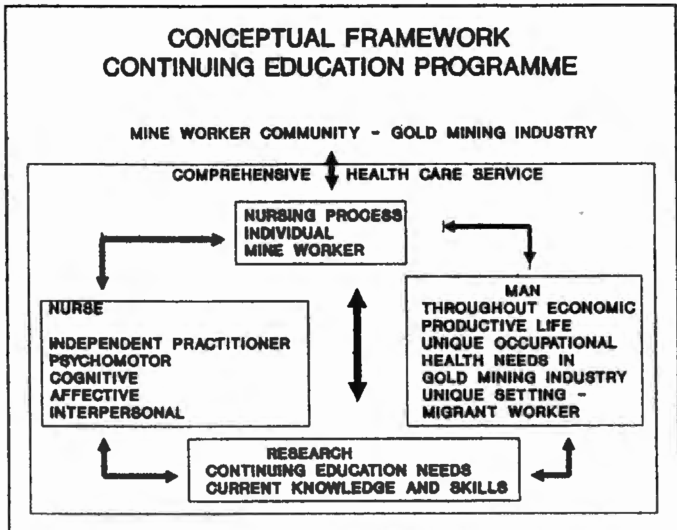
A philosophy and or beliefs of either the educator or educational institution about concepts such as health, society and nursing can give direction as to what content should be included in the curriculum (Raichura, 1987:59).

Ultimately, the philosophy of the teaching institution will influence the concepts and theories selected for the conceptual framework, but these concepts and theories should have a broader

range and must be explicated in more detail than those contained in the philosophy. The conceptual framework must provide the foundation from which the total curriculum is devised, while the philosophy only provides a point of view, and it can be a speculation about the value and nature of things (Bevis, 1982:34)

It is for the above mentioned reasons that a suitable conceptual framework was specifically developed for the curriculum for continuing education for registered nurses employed in the mine medical stations of the gold mining industry. The curriculum will not contain any specific philosophy. The curriculum will be available to any institution prepared to present it to the registered nurses in the mine medical stations, and as such, each institution will have the opportunity to adapt the curriculum according to the philosophy of that institution. The conceptual framework is graphically illustrated in figure 5.3.

FIGURE 5.3



EXPLANATION

This conceptual framework is a schematic representation of the concepts "nursing" and "nursing education" as contained in the continuing education programme developed in this study, for the registered nurses employed in mine medical stations. The important concepts contained in this conceptual framework are:

- The nurse.
- Man.
- The nursing process.
- A comprehensive health care service.
- The community, which in this study refers to the mine workers employed in the gold mining industry.

The nurse is deemed to be an independent practitioner who is in interaction with man and the greater community through psychomotor, cognitive and affective skills and the scientific principles contained in the nursing process.

Man is a bio-physical, psychological and social being, created by God. Each individual needs care from conception to death, throughout his economic productive life, and is viewed as a unique being with specific health needs (in this study, occupational health needs), which are influenced by his values, beliefs and religion, rooted in his culture.

Nursing takes place within the framework of a comprehensive health care service. In this study, nursing refers to the actions that take place within the framework of the comprehensive health care services offered at the mine medical stations of the gold mining industry.

Research aims at establishing needs for continuing education programmes. This continuing education in nursing aims at the scientific development of the nurses' skills and knowledge, in order to provide for career fulfilment through providing care to those in need of it.

5.4.2 The curricular strands

Curricular strands are designed to define the emphasis of the curriculum. There are two types of curricular strands, namely:

i) Horizontal strands. These strands delineate specific programme components in a logical manner (O'Connor, 1986:311). Horizontal strands refer to the use of content, and is process oriented (Torres *et al.*, 1982:43).

ii) Vertical strands. These strands identify certain concepts that must be addressed in every lecture session, and cross these concepts with the horizontal strands. They are based on the conceptual framework, philosophy and objectives of the curriculum (O'Connor, 1986:311). The vertical strands build on previous content areas, and can therefore be used to identify different levels within the curriculum process (Torres *et al.*, 1982:43).

The specific curriculum strands developed for this study are presented below:

HORIZONTAL STRANDS

MAN

Conception ←——————→ Death

Health ←——————→ Illness

NURSING

Cognitive — Affective — Psychomotor

Dependent ←——————→ Independent

NURSING PROCESS

Scientific problem solving process

←——————→

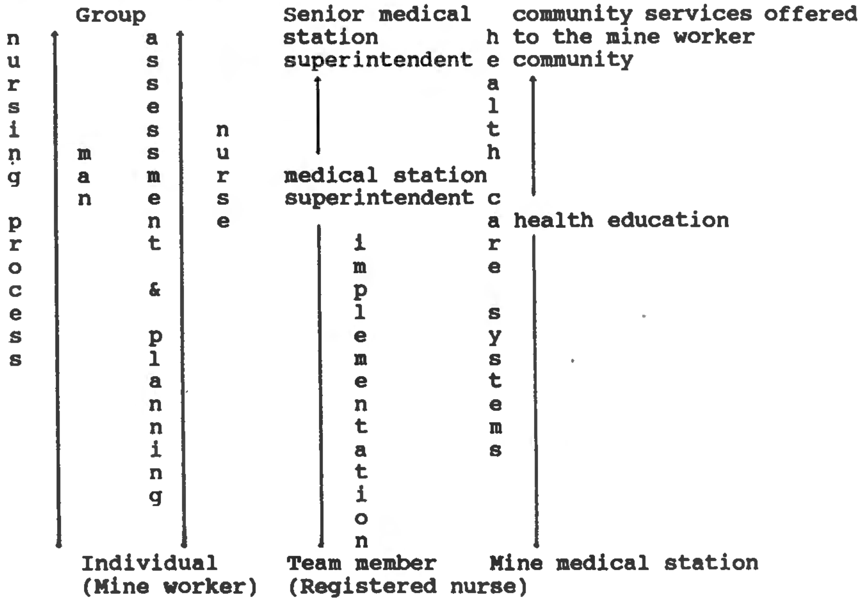
MORAL END ETHICAL ISSUES

Continuing education as a means of professional development

←——————→

The above mentioned strands identify the important issues for the conceptual framework, and indicate the continuum on which they must be implemented in the curriculum.

VERTICAL STRANDS



In the above, the different levels of implementation of knowledge in the curriculum have been identified. Although the curriculum will only extend over a period of one year, the content will have to be introduced in a cumulative manner, starting from the simple, and working towards the complex.

5.5 IMPLEMENTATION OF A CURRICULUM

Greaves (1987:110-111) sets prerequisites for the implementation of any new curriculum. It is important to keep in mind that there will be a certain time lapse between the development of a curriculum and its implementation. There are, however, a few aspects of importance that need mentioning.

Firstly, terminology must have the same meaning for the curriculum developer, the nurse administrator and the student. This will prevent confusion. Explicitness is important, and necessitates a focus on personal contact with the student, clear communications, available resources and the right attitude between student and lecturer (Greaves, 1987:110-111).

Secondly, few curricula will be completely correct at first implementation (Greaves, 1987:110). It is for this reason that a pilot-implementation of the proposed curriculum for continuing education for registered nurses in the gold mining industry, was conducted. The implementation and results will be discussed in Chapter 7, paragraph 7.3.2, p. 247 - 249.

Thirdly, three essential perspectives have been identified in order to provide a positive direction to the implementation of the curriculum. These perspectives are:

"1) The need to develop an on-going dialogue and study into the phenomenon of change and its implications for nursing education and practice.

2) The need to develop debate and continuous consultation on the implementation of the new system and its resulting curriculum changes.

3) The need for nurse educators, practitioners and managers to re-examine their current attitudes and practices with regard to re-shaping expertise and development of a preparedness to respond to a changing pattern of nursing requirements both clinically and educationally" (Greaves, 1987:114).

The above mentioned perspectives are essential for the successful implementation of any new curriculum, as continuous re-thinking and research is necessary in order to maintain currency, as well as to ensure that the health needs of the community to be served by the programme, are being met. The community to be served consists of both the student population and the population that will utilize the services of the students after they have

completed the programme.

5.6 EVALUATION OF THE CURRICULUM

Evaluating a curriculum, means determining whether implementation of the curriculum has achieved the set objectives. In reality, this is very complex. O'Neil (1986:37) states that evaluation of a curriculum will provide feedback regarding specific aspects of the curriculum that will affect the further development of the curriculum. Burns (1984:213) states that all educational offerings must be evaluated, more so with adult education, as the adult learner will require feedback on the success of learning. There are different approaches to the evaluation of a curriculum, and these approaches are discussed below.

The first approach is called "formative" evaluation, which deals with guiding the development of the curriculum (Cork, 1987:30). O'Neill (1986:38) also discusses this method of evaluation, and states that the evaluation must not interfere with the scheduling of the curriculum, and must economize in aspects related to the students and the energy spent by the educating body.

The second approach is called "summative" evaluation, which deals with the evaluation of an established curriculum (Cork, 1987:30, O'Neill, 1986:37). O'Neill (1986:37) states that this evaluation can be done through a questionnaire to both the students and the employing body.

Cork (1987:30) discusses some of the aspects of evaluation of a curriculum. The evaluation must not only determine whether the curriculum is successful or not, but also detect the factors that contributed towards its success or failure. Evaluation tools are available for evaluating whether goals and objectives have been reached or not, while the students' evaluation of the programme will validate the expenditure to the financing body (Farmer, 1988:118). For the purposes of this study, formative evaluation

was used, as a new curriculum must be developed. The evaluation included a written examination by the students, as well as a written evaluation of the programme by the students. The results of these evaluations will be discussed in Chapter 7, paragraph 7.3.4, p. 250 - 251.

5.7 CONCLUSION

In this chapter the development, implementation and evaluation of a new curriculum was discussed. The different elements of the curriculum, and more specifically, a curriculum for continuing education for registered nurses working in mine medical stations of the gold mining industry, were identified. A continuing education programme for registered nurses was developed following the steps identified in this chapter, in an attempt to ensure that the potential students will learn that which will enable them to function effectively in their career after completion of the programme.

This chapter concludes the theoretical perspective of this study. Part 2 forms the empirical perspective. The research methodology will be discussed in chapter 6, and the findings and recommendation of the study will be discussed in Chapter 7.

PART 2

THE EMPIRICAL PERSPECTIVE

CHAPTER 6

RESEARCH METHODOLOGY

OVERVIEW OF THE CHAPTER

The aim of this chapter, is to explain the research design, research techniques used, the target population and the data collection. The data analysis will also be explained

6.1 RESEARCH DESIGN

In this research a survey research design was used. Wilson (1985:242) holds the following opinion about survey designs: "Survey designs can have the purpose of describing characteristics, opinions, attitudes, or behaviors as they currently exist in a population". A descriptive survey design was used, because it was necessary to ". . . provide an accurate portrayal of a population that has been targeted because of some specific characteristics. . . " (Wilson, 1985:142).

Seaman (1987:182) identifies four different approaches in descriptive survey research. They are:

- The descriptive case study.
- The comparative study.
- The classification study, and
- The concept-formulation study.

The descriptive case study is used to examine and describe single units, such as a person or a group, whereas the comparative study was designed to describe and compare more than one case. In the classification study, the collected data is categorized and each category is named. The last approach involves the organization of observations and descriptions into a meaningful and coherent whole (Seaman, 1987:182-184)

Applying the guidelines provided the researcher was able to classify this research as being done according to the concept-formulation approach. The research aimed at establishing the learning needs of the registered nurses in mine medical stations of the gold mining industry. This would enable the author to develop a suitable continuing education programme. This continuing education programme could then be deemed a new concept.

Wilson (1985:144) and Seaman (1987:185) identify advantages of survey research designs, which include the fact that information can be gathered from a large number of people, with the minimum expenditure of money and time. Wilson (1985:144) mentions the

fact that the methodology can be explicitly stated, while Seaman (1987:185) states that the compilation of the research data will lead to the development of a holistic view of the research.

It was for the above mentioned reasons that this research design was chosen.

The most important disadvantage is probably the fact that the data obtained tend to be superficial and lacking in depth (LoBiondo-Wood & Haber, 1986:130-131). This research used sections from a pre-developed data gathering instrument as a basis for the development of a structured interview schedule, drawn up in the form of a structured questionnaire. This enabled the author to interview the respondents, while simultaneously observing them in their work situation. This was done to overcome the identified disadvantage.

6.2 THE RESEARCH METHODOLOGY

The research was conducted as follow.

6.2.1 The target population

The target population was identified as all registered nurses working in mine medical stations of the two mining companies, Freegold mines and Gold Fields of South Africa Limited. The need for a continuing education programme had been identified by the registered nurses of the Freegold mining company. This aspect was discussed in Chapter 1, paragraph 1.4, p. 2 - 4.

The target population was limited to two specific geographical areas.

The first area is called the Freegold Mines, which can be identified as follows:
The gold and uranium division of the Anglo American Corporation of South Africa Limited is represented in two regions in the Orange Free State. These two regions comprise the Freegold mines, and are constituted as follows:

- The Freegold North region, which consists of the Western Holdings, Free State Geduld, and Freddies mines.
- The Freegold South region, which consists of the President Steyn, President Brand, Free State Saaiplaas and Erfdeel mines (Potgieter, 1989:1).

Each of the individual mines included in the two Freegold regions is individually responsible for developing its own health maintenance policies, and policies for employing and retaining nursing personnel (Potgieter, 1989:2-3).

The second area belongs to the Gold Fields of South Africa Limited gold mining company, and can be identified as follows: The four mines belonging to the Gold Fields of South Africa Limited gold mining company, namely East- and West-Driefontein, Doornfontein and Deelkraal, were included in the study in order to establish whether the need for continuing education as expressed by the registered nurses in the Freegold mines was experienced in other mining companies as well. The lack of contact between the two companies ensured the prevention of contamination of the data. The senior medical consultant for the Gold Fields of South Africa Limited gold mining company, Prof J P Lowe, selected these specific mines to be included in the study. Although no correspondence is available on this matter, the researcher was informed that the same health maintenance policies and policies for recruiting and retaining nursing personnel was followed as indicated by the Freegold mines.

The total population of registered nurses was included in the study because the target population was not perceived to be so big that all the registered nurses could not be included in the research. However, those on leave were excluded from the study. The target population for this research ultimately included fifty two (52) registered nurses from the Freegold mines, and eleven (11) from the Gold Fields of South Africa Limited gold mining company.

6.2.2 The literature review

A computer search done at the Ferdinand Postma Library of the Potchefstroom University for Christian Higher Education enabled the author to complete the literature review. Key words such as nurse, nursing, in-service education, occupational health nursing, primary nursing, and traumatology were used. The ERIC and MEDLINE data revealing systems were used. Relevant primary and secondary sources were studied.

6.2.3 The research instrument

6.2.3.1 Type of instrument

The research was conducted using a descriptive survey design. For this reason a structured pre-coded questionnaire (hereafter called a checklist) was used as a guide to interview the respondents (See Annexures F, G & H). The interview was used for the following reasons:

- The population was relatively small, and was therefore not unmanageable.
- It was necessary to obtain personal feelings from the respondents, while observing them in their work place, which would be impossible if a mailed questionnaire was used.
- The facilities of the mine medical stations had to be assessed, and this would necessitate a visit to the mine medical stations, making a structured interview the logical choice.

6.2.3.2 The development of the instrument

This research is based on a needs assessment. For this reason, a needs assessment tool for community assessments given by Tinkham *et al.* (1984:185-186) was used as a guideline in the development of the checklist. A list of the different kinds of information that are needed in order to assess the needs of the community is provided. The information required can be summarized into the following categories:

i) Data about the community itself, describing its characteristics and uniqueness.
ii) Data about the people, such as their distribution and characteristics.
iii) Information about the environment where the community is situated, such as housing, levels of air and water safety, and other health-related factors.
iv) Determine the channels of communication available to the community, both formal and informal, and identify the key communicators in the community.
v) Obtain the health statistics of the community.
vi) Data about the health and health-related facilities in the community, including resources and personnel, and
vii) determine the available community nursing services with their resources and interrelations.

In developing the checklist, the following communities were identified:

1) The potential student community. This referred to the registered nurses in the mine medical stations.
2) The potential teacher community. This referred to the lecturing personnel of the nursing colleges attached to the two gold mining companies, viz the Ernest Oppenheimer Nursing College, and the Gold Fields Nursing College.
3) The consumer community, which referred to the mine workers utilizing the nursing services in the mine medical stations.

In collecting the data, specific attention was paid to the first two communities, and the health statistics of the third, or consumer community, was the only aspect attended to for this specific community. This was done because the author needed to establish the types of services to be offered to the mine workers based on their demand for specific services, and not their individual needs.

The data was obtained through the use of two different checklists, as the situational analysis was conducted at the mine medical stations as well as the nursing colleges belonging

to the two mining companies. The possible responses to the questions were provided, but an open category was left for answers outside the provided answers. The responses were coded for computer analysis, and the added responses were coded after completion of the interviews.

Checklist A (Annexure F) was developed for the mine medical station personnel. It consisted of 25 questions, and the data reflected 18 different test items. The discussion of the data analysis will be done according to these items. The results of the checklist were categorized into four groups, namely:

i) Category A - biographical data. This was obtained in questions 1 - 10.
ii) Category B - scope of practice. This was obtained in questions 17 - 22.
iii) Category C - job satisfaction. This was established in questions 24 and 25.
iv) Category D - need for continuing education programmes. This was established in questions 11 - 16 and 23.

Checklist B (Annexure G) was developed for the teaching staff of the Ernest Oppenheimer Nursing College, while the Gold Fields Nursing College necessitated the development of Checklist C (Annexure H). Checklist B consisted of 21 questions, and the data reflected 9 different test items. Although not all the data obtained in this checklist were used in the presentation of the results of the data analysis, the discussion of the data analysis was done according to these items. The results of the checklist were categorized into three groups, namely:

i) Category A - biographical data. This was obtained in questions 1 - 11.
ii) Category B - teaching experience. This was obtained in questions 12 - 13.
iii) Category C - perceived need for a continuing education programme for registered nurses in the mine medical stations. This was established in questions 24 and 25.

Checklist C (Annexure H) consisted of 11 questions, and the data reflected 7 different test items. Although not all the data

obtained in this checklist was used in the presentation of the results of the data analysis, the discussion of the data analysis was done according to these items. The results of the checklist were categorized into three groups, namely:

i) Category A - biographical data. This was obtained in questions 1 - 9.

ii) Category B - teaching experience. This was obtained in questions 10 - 11.

6.2.3.3 Pretesting of the instrument

The instrument was tested by presenting it to two registered nurses not connected to the gold mining industry. One is a lecturer colleague at a university and the other was employed in a community nursing service in East London. The lecturer is unfamiliar with any mine medical service, and the other person is familiar with the Freegold mine medical services. This was done to identify shortcomings in the checklist, and to refine it before conducting the research.

6.2.4 Permission to undertake the research

Permission to undertake the research was obtained from Dr I Potgieter, Medical Consultant of the Anglo American Corporation of South Africa Limited on 13 March 1989 (see Annexure I). The researcher was referred to Dr B A Brink, Medical Superintendent of the Ernest Oppenheimer Hospital for further information, and ultimately to Dr P Allin, Chief Medical Officer, Department of Occupational Health of the Ernest Oppenheimer Hospital. All further arrangements were made with Dr Allin, and he was kept informed about the progress of the research.

Permission to undertake the research at the Gold Fields of South Africa Limited mines is implied in a letter from Prof J P Lowe, Consulting Medical Officer of the Gold Fields of South Africa Limited mining company, dated 22 January 1992. (See Annexure J) All the arrangements for this research was made with Prof J P Lowe, and Dr E Petschel, Medical Superintendent of the Leslie Williams Memorial Hospital, and Prof Lowe was kept informed of

the progress of the research.

6.3 DATA COLLECTION

The data for this research was collected in three phases.

Phase one was the data collection in Welkom at the Freegold Mines and the Ernest Oppenheimer Nursing College, and was completed during 26 June - 7 July 1989.

Phase two was the data collection in Carletonville at the Gold Fields of South Africa Mines and Gold Fields Nursing College during 26 - 29 March 1990.

Phase three involved the final visit to the Freegold mines and the Gold Fields Nursing College, in order to ensure currency of the collected data, and was completed on 30 - 31 March 1992.

Because the research was based on an interview system, all the data was collected and there was no delay in the return of questionnaires. On completion of the interviews for each mine included in the study, the researcher was shown the facilities of the medical stations, and was given time to observe the nursing personnel at work in the medical stations.

6.4 DATA ANALYSIS

The checklists filled in during the interviews were coded for computer analysis after completion of the situational analysis. The analysis was done at the University of Fort Hare, using the SAS-programme.[1]

On completion of the analysis, the results were presented to the Department of Statistics at the University of Fort Hare for comments and guidance.

The data analysis is presented in tables reflecting frequencies

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[1] SAS-programme = Statistical Analysis System.

and percentages, as well as in histograms and pie-charts. Descriptive statistics were used in the discussion of the findings.

In order to establish consistency in the answering pattern, cross references were done in some of the questions, and presented in table format.

6.5 CONCLUSION

In this chapter the research methodology used was discussed. The development and testing of the data gathering tools was discussed. The processes of data collection and data analysis were also explained, as well as the presentation of the analyzed data.

The granting of permission to undertake the research is clarified.

In the next chapter, the data analysis and detailed presentation of the analyzed data will be done.

CHAPTER 7

ANALYSIS AND DISCUSSION OF RESEARCH FINDINGS

OVERVIEW OF THE CHAPTER

The aim of this chapter is threefold, namely:

- to analyze the research findings;
- to explain the pilot implementation of the continuing education programme for registered nurses in the mine medical stations of the gold mining industry; and
- to analyze the evaluation of the pilot implementation of this programme.

7.1 INTRODUCTION

This research is based mainly on the assessment of the need for a continuing education programme for registered nurses working in the mine medical stations of the gold mining industry. This needs assessment, or situational analysis, was followed by the development of a curriculum for continuing education based on the outcome of the situational analysis. The curriculum was tested by means of a pilot presentation of the programme to a group of registered nurses employed in the mine medical stations of the Freegold mines in Welkom, and the Gold Fields of South Africa Limited mines in Carletonville, and an evaluation of this pilot presentation was done in order to finalize the curriculum.

7.2 THE SITUATIONAL ANALYSIS

The situational analysis was done in order to determine the need for an educational programme that will suit both the employing bodies and the potential student population within the gold mining industry. The nursing colleges that could possibly present such a continuing education programme were identified. The nursing colleges are the Ernest Oppenheimer Nursing College in Welkom, and the Gold Fields Nursing College in Kloof. This was done in order to determine their abilities to present a continuing education programme for registered nurses working in the mine medical stations of the gold mining industry. A checklist was developed for each group, i.e. the registered nurses in the mine medical stations (Checklist A), and the nursing college personnel (Checklists B and C).

In the discussion of the data analysis, Freegold will refer to the Freegold mines, while Gold Fields will refer to the mines from the Gold Fields of South Africa Limited company.

7.2.1 The mine medical stations

7.2.1.1 The infrastructure of the mine medical stations

The specific health problems encountered in the mine medical

stations, as well as the infrastructure and health services offered at the mine medical stations were discussed in Chapter 3, paragraph 3.2.4, p. 40 - 66, and paragraph 3.4, p. 68 - 75. However, the actual physical structures of the medical stations needs mentioning.

In the Freegold North region, the investigation was commenced at the Western Holdings mine. The buildings at shafts 1 - 3 are old and at shaft 1 there is virtually no privacy for the patient. Patients are seen, examined, and treated in the same locale as the admission office. There is a small room for injections or obtaining urine specimens, which offers some form of privacy. Shafts 4 - 6 have new buildings, which offer the necessary facilities to the patients, such as cubicles where they can be examined thus providing privacy, waiting rooms, and resuscitation areas.

The buildings at shaft 1 of the Free State Geduld mines are new, although the corridor where patients have to wait for treatment is very narrow. The rest of the buildings at the other shafts are old, but do offer very limited privacy to the patients.

Shaft 5 of the Freddies mines has a very big medical station, with a new building. It offers facilities for health education by means of video and television facilities. Shaft 9 has a small square, but functional, building, with partitioning to offer privacy to the patients. However, shaft 3 has a very old building, which offers very little to the registered nurse in order to make his job easier. The building is on more than one level, and the facilities are of such a nature that there are little corners and rooms leading off each other.

At the Freegold South region, the President Steyn mines were assessed first. President Steyn mines have very modern buildings at shafts 1 - 2, with perhaps the most modern of all the buildings at shaft 2. There is a large room with five modern audiometers at shaft 2, and a large modern hall where first aid classes are being offered. At shaft 4 the buildings are old, yet still functional. There are video and television

facilities available for health education at all the medical stations.

All the buildings at President Brand Mines, with the exception of shaft 5, are old, not offering much privacy to the patients, especially at shaft 2.

Free State Saaiplaas has two very modern buildings at shafts 3 and 4, with a very old, non-functional building at shaft 2, this being an old mine. At shaft 2 the rooms making up the medical station are scattered over a large area, with the stores being quite a distance from the actual medical station.

The situational analysis at the Gold Fields of South Africa Limited mines was limited to four mines in the Carletonville area. These mines all utilize the services of Leslie Williams Memorial Hospital. The set up is organized in a very different way from those at the Freegold Mines.

Each mine only has one medical station, with resuscitation stations at the shafts, called dressing stations. These dressing stations are manned by enrolled nursing assistants only.

The medical stations at Doornfontein and West-Driefontein were housed in very old buildings, but those at East-Driefontein and Deelkraal in particular are modern and very functional.

All other aspects included in the situational analysis relate to the registered nurse in the mine medical station. An analysis of the data is presented below.

7.2.1.2 The registered nurse in the mine medical station

The registered nurses in the mine medical stations were interviewed in order to establish their learning needs. These interviews elicited demographical data, as well as data concerning the factors that will influence the professional practice of the registered nurse. An analysis of Checklist A,

will elicit the required information regarding the registered nurses in the mine medical stations.

At the time of the situational analysis, the researcher received a list containing information regarding all the registered nurses employed in the Freegold mines from the Department of occupational health, at the Ernest Oppenheimer Hospital (see Annexure K). According to this list the mine employed a total number of 64 registered nurses. The distribution of these nurses amongst the different post structures is given in table 7.1 below.

TABLE 7.1

DISTRIBUTION OF REGISTERED NURSES AMONGST THE DIFFERENT POST STRUCTURES OF THE FREEGOLD MINES

POST STRUCTURE	MALE	FEMALE	TOTAL
SENIOR MEDICAL STATION SUPERINTENDENT	6	0	6
MEDICAL STATION SUPERINTENDENT	12	0	12
SENIOR PROFESSIONAL NURSE	1	2	3
AMBULANCE OFFICER	23	0	23
REGISTERED NURSE	11	9	20
TOTAL	53	11	64

Table 7.1 reveals that these mines employed 53 (83%) males and 9 (17%) females at the time of the situational analysis. The ambulance officers constituted the biggest group employed within one post designation, namely 23 or 36% of the total population. A combined category of senior medical station superintendent and medical station superintendent constitute 18 persons or 28% of the employees. The importance of this lies in the fact that 41 or 64% of the total registered nurse workforce are employed within these three post designations. No female employee was employed in any of these post designations, as female employees

were not allowed to go underground at the time. They managed to obtain permission to go underground at a later stage. During underground mining accidents, the ambulance officers, senior medical station superintendents, and medical station superintendents are expected to oversee the medical aspects of the rescue operations. It is therefore logical that these three post designations contain the largest number of employees. Women are employed to provide nursing care in the mine medical stations.

Although the total population was used, those registered nurses on leave were not included. Fifty two registered nurses were interviewed, with a distribution of 43 males, or 83% of the population, and nine females, or 17% of the population. The distribution was therefore the same as that for the total population. This represents 81% of the total population of the Freegold mines, and can be deemed as representative. All the registered nurses employed by the Gold Fields mines were interviewed.

On completion of the situational analysis in the mine medical stations, the interviewees were categorized into the different post designations. The data was obtained in Question 3 of Checklist A, and is presented in table 7.2.

TABLE 7.2

DISTRIBUTION OF REGISTERED NURSES INTERVIEWED IN THE DIFFERENT POST STRUCTURES OF THE FREEGOLD MINES

POST STRUCTURE	MALE	FEMALE	TOTAL
SENIOR MEDICAL STATION SUPERINTENDENT	6	0	6
MEDICAL STATION SUPERINTENDENT	12	0	12
SENIOR PROFESSIONAL NURSE	1	1	2
AMBULANCE OFFICER	18	0	18
REGISTERED NURSE	6	8	14
TOTAL	43	9	52

The Gold Fields mines did not provide a list with post designations for their employees, but during the situational analysis, the researcher was able to compile such a list. The distribution of the registered nurses between the different post structures of this mining company will be given in table 7.3

TABLE 7.3

DISTRIBUTION OF REGISTERED NURSES AMONGST THE DIFFERENT POST STRUCTURES OF THE GOLD FIELDS MINES

POST STRUCTURE	MALE	FEMALE	TOTAL
SENIOR MEDICAL STATION SUPERINTENDENT	4	0	4
MEDICAL STATION SUPERINTENDENT	2	1	3
SENIOR PROFESSIONAL NURSE	0	1	1
PROFESSIONAL NURSE	1	2	3
TOTAL	7	4	11

The proportion of males employed against females employed is

different in this mining group, namely 64% males and 36% females. The difference is only of importance seen against the fact that 83% of the registered nurses employed by the Freegold mines, were males against 17% females. The Gold Fields mines also employed one female medical station superintendent, who holds a "red" ticket and may go underground, where the female employees of Freegold only held the positions of senior professional nurse and professional nurse.

An analysis of the data related to the registered nurse in the mine medical station can be done by analyzing the data obtained through the use of Checklist A. Although the checklist contained 25 questions, these questions represented different test items. As only the test items will be discussed, these items will not necessarily match the number of the question on the checklist. This was done in order to afford the researcher the opportunity to cross reference the responses in order to determine consistency in the responses made by the respondents.

The researcher divided the data analysis into the following categories:
Category A - biographical data.
Category B - scope of practice.
Category C - job satisfaction.
Category D - need for continuing education programmes.

CATEGORY A - BIOGRAPHICAL DATA

The first 10 items in Checklist A deal with the biographical data of the registered nurses employed in the mine medical stations.

ITEM 1 : AGE DISTRIBUTION

TABLE 7.4

THE AGE DISTRIBUTION OF REGISTERED NURSES EMPLOYED IN THE MINE MEDICAL STATIONS OF FREEGOLD

AGE	FREQUENCY	PERCENTAGE
20 - 24	1	2
25 - 29	2	4
30 - 34	13	25
35 - 39	8	15
40 - 44	12	23
45 - 49	8	15
50 - 54	5	10
55 - 59	1	2
60 - 64	2	4
TOTAL	52	100

Table 7.4 represents Item 1 (question 1), and demonstrates that the age group 30 - 34 years reflects the single largest group of employees, namely 25 %.

The age distribution of the registered nurses in the Gold Fields mines is presented in table 7.5.

TABLE 7.5

THE AGE DISTRIBUTION OF REGISTERED NURSES EMPLOYED IN THE MINE MEDICAL STATIONS OF GOLD FIELDS

AGE	FREQUENCY	PERCENTAGE
30 - 34	4	36
35 - 39	2	18
40 - 44	2	18
45 - 49	1	9
50 - 54	1	9
55 - 59	1	9
TOTAL	11	99

From an analysis of the results of table 7.5, it would appear that the employees of the Gold Fields mines are marginally older than those of the Freegold mines. The first age interval for Gold Fields starts at age 30 - 34 years, with 36% of the employees included in this category, while 6% of the registered nurses at Freegold were younger than this. However, the age category 30 - 34 years is the largest category for both mining companies, with 25% employees in this category at Freegold, and 36% employees in this category at Gold Fields. It is, however, interesting to note that there are no employees in the age category 60 - 64 years at Gold Fields, while 4% of employees at Freegold fall within this category.

ITEM 2 : NURSING QUALIFICATIONS OF REGISTERED NURSES IN THE FREEGOLD AND GOLD FIELDS MINES

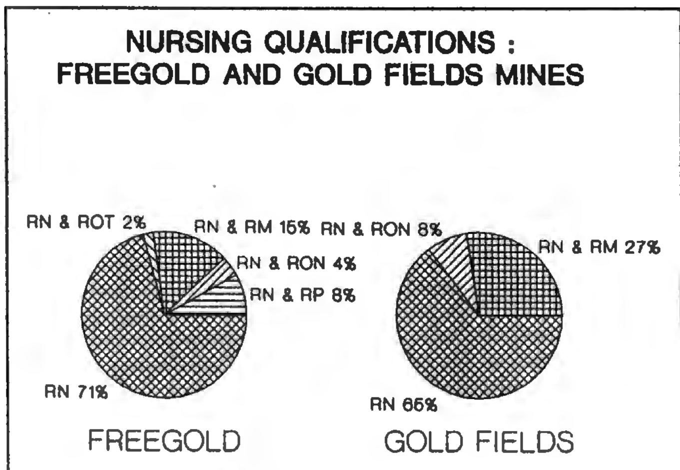
Item 2 describes the information contained in question 6 of the checklist, and an analysis of the responses is demonstrated in figure 7.1.

Figure 7.1 demonstrates the fact that 71% of the registered nurses in the Freegold mines hold the professional qualification

of registered nurse only. A further 15% are registered midwives in addition to being a registered nurse, and 8% are registered psychiatric nurses. Only one respondent held three professional qualifications, namely registered nurse, registered midwife and registered psychiatric nurse. Regarding the Gold Fields mines, figure 7.1 demonstrate the fact that 63% of the registered nurses held the qualification of registered nurse only, while 27% held the qualifications registered nurse and registered midwife. Only one respondent, or 9% of the respondents, held an additional qualification in orthopaedic nursing.

This reveals the fact that all the registered nurses included in the study completed a basic three year diploma programme, and not one completed either the previous comprehensive programmes at universities, or the new four year integrated diploma programme.

FIGURE 7.1



KEY : FIGURE 7.1
RN - REGISTERED NURSE
RM - REGISTERED MIDWIFE
RP - REGISTERED PSYCHIATRIC NURSE
RON - REGISTERED ORTHOPAEDIC NURSE
ROT - REGISTERED THEATRE NURSE

ITEM 3 : PRODUCTIVE YEARS BEFORE RETIREMENT

Item 3 of the checklist can be divided into two parts. The first part established the retirement age of respondents (question 4), and the second part to establish the number of productive years before retirement (question 5). The findings of the first part is of no value other than indicating that the male respondents retire at the age of 62 years, and female respondents, at 55 years of age, as medical stations personnel are classified as "surface" personnel. The retirement age for underground personnel varies. Figures 7.2 and 7.3 give an indication of the number of productive years before the registered nurses can retire from the two mines respectively.

FIGURE 7.2

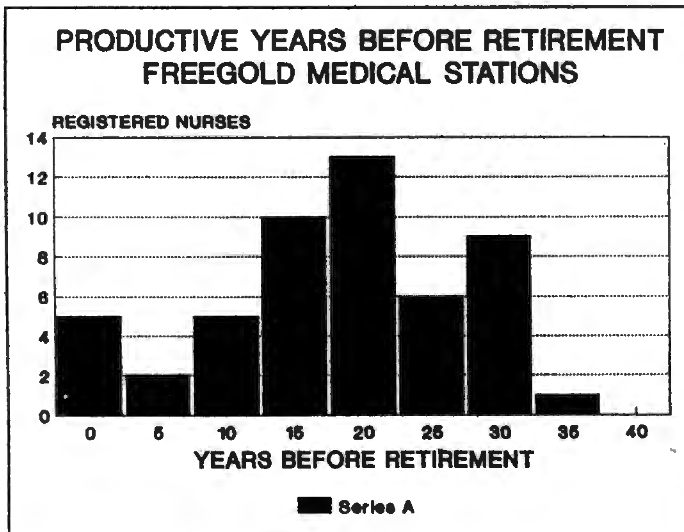
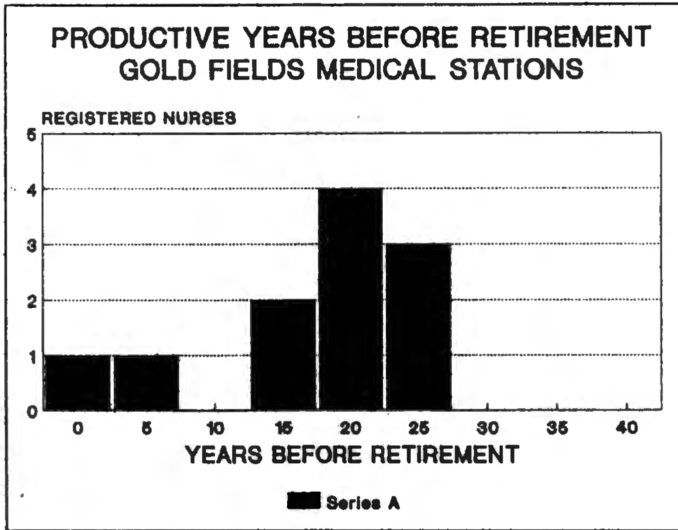


FIGURE 7.3



In figure 7.2 the category best represented is the category 20 - 24 years before retirement, namely 13 or 25%. Cumulatively, 45 (86%) of the respondents for the Freegold mines have a productive life of ten years and more before retirement.

In figure 7.3 the results of the analysis of the responses of the respondents from the Gold Fields mines are given. The category best represented is the category 20 -24 years before retirement, namely four or 36% of the respondents. Cumulatively nine (82%) of the respondents for the Gold Fields mines have a productive life of ten years and more before retirement.

Although all nurses must remain up-to-date and competent regarding their profession and professional practice, this large group (86% and 82% respectively) that will remain in practice for ten years or more will have to attend continuing education programmes in order to keep abreast of the field.

ITEM 4 : NON-NURSING QUALIFICATIONS

A variety of non-nursing courses are available to the registered nurses in the mine medical stations, which enables them to fulfil certain aspects of their functions as required by the mining authorities. These courses include supplementary diagnostic radiography, industrial audiometry and calibration, loss control and emergency medical technician, family planning, tuberculosis, as well as European courses, such as thoracic nursing and venereology technician courses. The information was gathered in question 7 of the checklist. In order to be able to represent this information in a sensible manner, the author grouped it into categories as presented in figure 7.4.

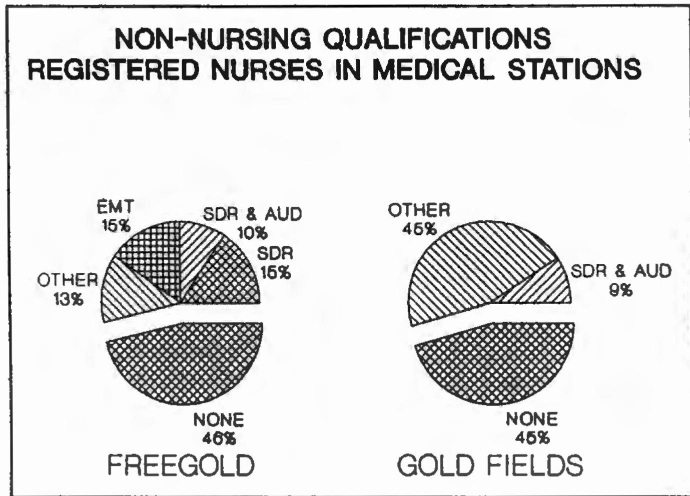
The most prominent feature of figure 7.4, is the fact that 46% of the respondents from the Freegold mines, and 45% of the respondents from the Gold Fields mines, had not entered for any of the non-nursing courses completed by their colleagues.

The Freegold mines deems the emergency medical technician course to be of some importance in enabling the registered nurse to conduct physical assessments, while simultaneously enabling them to render effective trauma care. In a telephonic conversation on 2 December 1991, Dr P Allin, Chief Medical Officer: Department of Occupational Health at the Ernest Oppenheimer Hospital indicated that the registered nurses at the Freegold mines had to attend this course for the reasons mentioned above, until a better alternative could be found. At the time of the situational analysis, 15% of the registered nurses at the Freegold mines completed this course. None of the registered nurses of the Gold Fields mines completed this course.

The supplementary diagnostic radiography course has apparently been phased out. Radiographers are now involved in routine X-ray examinations of employees. Twenty five percent of the registered nurses at the Freegold mines still held a qualification in supplementary diagnostic radiography, and 10% of these also held a qualification in industrial audiometry. At the Gold Fields mines, only one (9%) of the respondents held the

qualification in supplementary diagnostic radiography, and that in combination with industrial audiometry. The radiography aspect of the functions of the registered nurse focused on the technical aspect only. The nurses were responsible for miniature chest X-rays of all employees, but the films were developed and interpreted by the radiographers of the Ernest Oppenheimer Hospital. While this practice was perhaps labour saving, the researcher was informed that for the nurse this involved merely positioning the worker, and pushing the preset button on an X-ray machine, as they are only trained for radiation exposure, and not to interpret the findings.

FIGURE 7.4



KEY : FIGURE 7.4

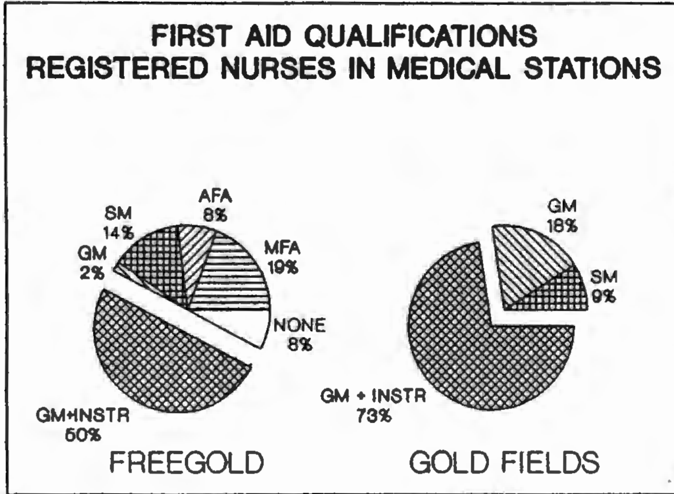
SDR – SUPPLEMENTARY DIAGNOSTIC RADIOGRAPHY
AUD – INDUSTRIAL AUDIOMETRY
EMT – EMERGENCY MEDICAL TECHNICIAN

ITEM 5 : FIRST AID QUALIFICATIONS OF THE REGISTERED NURSES IN MINE MEDICAL STATIONS

An analysis of item 5 reflects the analysis of data obtained in

question 8 of the checklist, and reflects the first aid qualifications of registered nurses in the mine medical stations. These results are presented in figure 7.5.

FIGURE 7.5



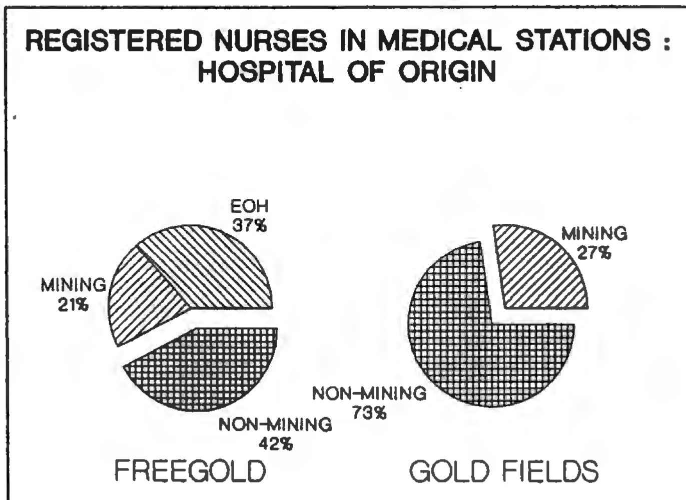
KEY : FIGURE 7.5
MFA – MINE FIRST AID
AFA – ADVANCED FIRST AID
SM – SILVER MEDAL
GM – GOLD MEDAL
INSTR – INSTRUCTOR

If it is kept in mind that fist aid and first aid training is an important aspect of the functions of the registered nurses in all post structures within the mine medical stations, especially the senior and medical station superintendent categories, then the registered nurses are amply qualified for this function. A total of 50% of the registered nurses at the Freegold mines, and 73% at the Gold Fields mines, had obtained gold medals and instructors diplomas. Only 8% of the registered nurses at the Freegold mines had obtained no first aid qualification. At the Gold Fields mines, all registered nurses held either silver, gold, or gold and instructors' diplomas.

ITEM 6 : HOSPITAL WHERE BASIC NURSING EDUCATION PROGRAMME WAS COMPLETED

The results of the analysis of question 9, or item 6 are illustrated in figure 7.6. This item was included in order to establish whether the mining companies manage to retain the registered nurses who complete a nursing education programme at the mining companies' own nursing colleges, or whether they employed registered nurses who complete a nursing education programmes elsewhere.

FIGURE 7.6



At the Freegold mines, 42% of the nurses had completed their education programme in a non-mining hospital. Only 36% of the registered nurses had completed their education at the Ernest Oppenheimer Hospital, and 21% at another mining hospital. At the Gold Fields mines 27% of the registered nurses had completed their education at a mining hospital, while 73% had done so at a non-mining hospital. Any possible differences of accent that could be included by nursing colleges in the nursing education programmes of mining hospitals and non-mining hospitals, will

therefore have no noticeable effect on the professional practice of the registered nurses in the mine medical stations.

ITEM 7 : TIME SPAN SINCE COMPLETION OF BASIC NURSING EDUCATION PROGRAMME

The analysis of this item give an indication of the time span of the registered nurses' professional career. This information was obtained through analysis of the responses to question 10 of the checklist. If taken into account that there was no specific continuing education programme for registered nurses in use in both mines at the time of the situational analysis, and the fact the 71% of the registered nurses at the Freegold mines and 64% of those at the Gold Fields mines hold the professional qualification of registered nurse only, then the need for a continuing education programme for these nurses becomes apparent. The results of the analysis is given in figures 7.7 and 7.8 respectively for the two mining companies.

FIGURE 7.7

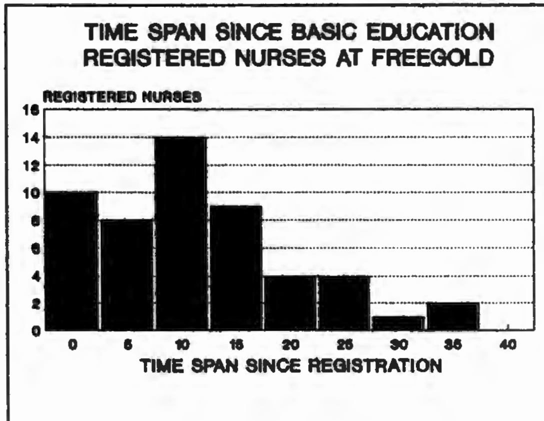
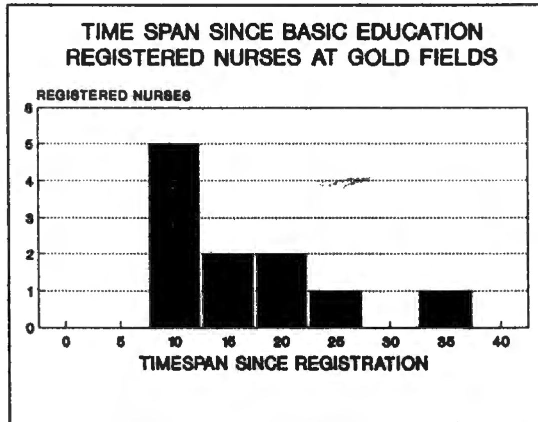


FIGURE 7.8



Tables 7.4 and 7.5 illustrated the fact that the employees of the Gold Fields mines are marginally older than those of the Freegold mines. This fact is further illustrated in figures 7.7 and 7.8, indicating the time span as professional practitioner.

As demonstrated in figure 7.7, 18 (35%) of the respondents at the Freegold mines had practised as a registered nurse for a period less than ten years. The remaining 34 (65%) had practised as registered nurses for a period of between 10 and 39 years, with the largest having done so for 10 - 14 years, namely 14 or 30% of the respondents. In the category 15 - 19 years since completion of the basic nursing education programme, nine (17%) respondents indicated that they were in this category. Two respondents completed their basic nursing education programme 35 - 39 years ago.

Figure 7.8 highlights the fact that the nurses at the Gold Fields mines have been practising as registered nurses for a period of between 10 and 39 years. Five (45%) respondents indicated that between 10 and 14 years had elapsed since their completion of the basic nursing education programme, with two (18%) respondents each in the category 15 - 19 years and 20 - 24 years respectively. There was one respondent who indicated that

he completed the basic nursing education programme 35 - 39 years ago.

CATEGORY B - SCOPE OF PRACTICE

ITEM 8 : ARTICLE 38A OF THE NURSING ACT, NR 50 OF 1978

This item was included to establish whether the respondents perceived their nursing care as being rendered under the auspices of Article 38A of the Nursing Act, Nr 50 of 1978, hereafter referred to as the Nursing Act. The data was obtained in question 21, which required them to classify their service as being offered under the auspices of Article 38A or not, with an option to indicate whether they were unsure about Article 38A, or did not know about it at all. The analysis of the data could be used as an indicator of the currency as far as the scope of practice is concerned. The result of the analysis is demonstrated in table 7.6.

TABLE 7.6

SERVICE OFFERED UNDER THE AUSPICES OF ARTICLE 38A OF THE NURSING ACT

	FREEGOLD		GOLD FIELDS	
RESPONSE	N	%	N	%
YES	0	0	1	9
NO	13	25	2	18
NOT SURE	1	2	0	0
DO NOT KNOW ABOUT IT	38	73	8	73
TOTAL	52	100	11	100

In table 7.6, the most prominent feature is the fact that 38 (73%) of the respondents from both the mining companies did not

even know about Article 38A of the Nursing Act. This should be of concern to their employing bodies, as all the registered nurses in the mine medical stations could present the author with a very neatly bound volume of all the legislature and regulations affecting all nursing categories employed in the mine medical stations, and supplied to them by the mining authorities.

One (9%) of the respondents from the Gold Fields mines indicated that he was under the impression that the services offered at the mine medical stations were rendered under the auspices of Article 38A, but he did not attempt, through the medical practitioner in charge of the service, to obtain authorization from the South African Nursing Council, although he acknowledged that he was performing the duties listed in Article 38A, as clarified in chapter 4, paragraphs 4.2.1, 4.2.2 and 4.2.3, p. 91 - 96.

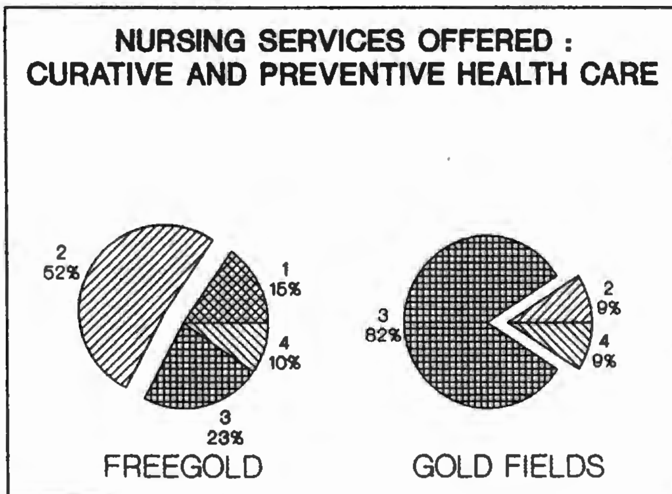
The fact that 73% of the respondents did not know about Article 38A, while a respondent was under the impression that he had to apply for authorization personally highlights the necessity for the inclusion of ethos and the professional practice of nursing in he proposed continuing education programme.

ITEM 9 : CLASSIFICATION OF SERVICES OFFERED BY REGISTERED NURSES IN THE MINE MEDICAL STATIONS

Question 22 of the checklist provides the information for item 9. During the situational analysis, empirical observation in the mine medical stations enabled the researcher to conclude that the preventive and promotive aspects of health care were badly neglected. No health talks or health education programmes were offered during the time of the situational analysis. The senior medical station superintendent of the Free State Saaiplaas mine indicated that a health education programme on the prevention of AIDS was being run at the hostels of this mine at certain times, e.g. after a new intake of recruits. In spite of the video equipment present in the mine medical stations of the Freegold mines, most of the respondents found it difficult

to differentiate between promotive and preventive health care, and the term "preventive health care" was favoured by all. Rehabilitative measures were seen as the task of the person in charge of rehabilitation programmes for workers who incurred spinal injuries, and not as part of their own job description. The categories curative health care and preventive health care are therefore the only categories included in the analysis. The results of the analysis of item 9 is reflected in figure 7.9.

FIGURE 7.9



KEY : FIGURE 7.9
1 = CURATIVE ONLY
2 = CURATIVE WITH PREVENTIVE COMPONENTS
3 = CURATIVE AND PREVENTIVE EQUALLY
4 = MAINLY PREVENTIVE

This figure demonstrates the difference in perception of the types of nursing services offered at the mine medical stations of the Freegold and Gold Fields mines very clearly. Twenty seven (52%) of the respondents of the Freegold mines indicated that the services are mainly curative, with a preventive health care aspect, while only one (9%) of the respondents at the Gold Fields mines preferred this option. In contrast to this, nine (82%) of the respondents from Gold Fields felt that their

service was equally distributed between curative and preventive health care services, with 12 (23%) of the respondents from the Freegold mines responding in this manner. At the Freegold mines, 8 (15%) actually indicated that the service was only curative in nature, a sentiment not expressed at the Gold Fields mines.

At both Freegold and Gold Fields, respondents indicated that the service was mainly preventive in nature, namely five (10%) of the Freegold respondents, and 1 (9%) of the Gold Fields respondents.

ITEM 10 : PHYSICAL ASSESSMENT OF THE HEALTH STATUS OF MINE WORKERS

The information in item 10 is a reflection of the analysis of question 17. The results are reflected in table 7.7.

TABLE 7.7

PHYSICAL ASSESSMENT OF HEALTH STATUS OF MINE WORKERS

	FREEGOLD		GOLD FIELDS	
RESPONSE	N	%	N	%
YES	48	92	8	73
NO	2	4	0	0
CERTAIN EXTENT	2	4	3	27
TOTAL	52	100	11	100

Table 7.7 highlights the fact that 48 (92%) of the respondents from the Freegold mines, and eight (73%) of the respondents from the Gold Fields mines are definitively involved in the physical assessment of the health status of the mine workers. Only two (4%) of the respondents of the Freegold mines indicated that they were not involved in physical assessments at all.

At both the Freegold and Gold Fields mines, respondents indicated that they conducted physical assessments only to a certain extent, viz. two (4%) at Freegold and three (27%) at Gold Fields. On questioning the respondents about the exact extent of these physical assessments, evasive answers were given by all. It would appear that these respondents are prepared to examine the body system where the patient's (mine worker) complaint is seated, if the complaint is serious.

The analysis of item 10 must be read in conjunction with the analysis of item 11, or question 18 of the checklist.

ITEM 11 : PERCEIVED COMPETENCE IN CONDUCTING A PHYSICAL ASSESSMENT OF THE HEALTH STATUS OF MINE WORKERS

The analysis of the data obtained in item 11 is reflected in table 7.8.

TABLE 7.8

PERCEIVED COMPETENCE IN CONDUCTING A PHYSICAL ASSESSMENT OF THE HEALTH STATUS OF MINE WORKERS

	FREEGOLD		GOLD FIELDS	
RESPONSE	N	%	N	%
YES	38	76	8	73
NO	1	2	0	0
CERTAIN EXTENT	11	22	3	27
TOTAL	50*	100	11	100

* TWO RESPONDENTS INDICATED THAT THEY DID NOT CONDUCT PHYSICAL ASSESSMENTS

Table 7.8 highlights an alarming aspect. Only 38 (76%) of the respondents from Freegold indicated that they felt competent to conduct a physical assessment, while 48 (92%) indicated that

they are in actual fact conducting physical assessments. Ten (24%) respondents were obviously conducting physical assessments without perceiving themselves to be competent to do so.

One (2%) of the respondents indicated that he was definitely not competent to perform a physical assessment, and 11 (22%) indicated that they were competent to a certain extent. Without an actual proficiency test, which falls outside the scope of this study, it would be impossible to determine the exact level of competency of any of the respondents.

The responses of the Gold Fields respondents are identical to those presented in table 7.7.

ITEM 12 : HOW WAS THE SKILL TO PERFORM PHYSICAL ASSESSMENTS ACQUIRED?

The data that will be discussed in table 7.9, were obtained by means of question 19.

TABLE 7.9

ATTAINMENT OF SKILL TO PERFORM PHYSICAL ASSESSMENT

	FREEGOLD		GOLD FIELDS	
RESPONSE	N	%	N	%
BASIC EDUCATION	30	60	1	9
CONTINUING EDUCATION	6	12	1	9
PRACTICAL SITUATION	13	26	5	46
DOCTORS	1	2	4	36
TOTAL	50*	100	11	100

* TWO RESPONDENTS INDICATED THAT THEY DO NOT CONDUCT PHYSICAL ASSESSMENTS

In table 7.9, 30 (60%) of the respondents from Freegold, and one (9%) from Gold Fields, indicated that they attained this skill during their basic nursing education programme. A further six (12%) of the respondents from the Freegold mines, and one (9%) from the Gold Fields mines, attained the skill through attending a continuing education programme. In the Freegold mines, 13 (26%) indicated that they attained the skill in the practical situation, with one (2%) indicating that this skill was taught to him by a doctor. In Gold Fields, five (46%) of the respondents indicated that they attained the skill in the practical situation, and four (36%) indicated that they were taught by doctors. It should be kept in mind that the basic nursing education programmes completed by the respondents did not include the physical assessment in their curricula, as highlighted in Chapter 2, paragraph 2.3, p. 16 - 18. The response to this question can therefore be doubted.

ITEM 13 : REGISTERED NURSES AND THE PRESCRIBING OF MEDICINES

In question 20 the respondents were asked whether they prescribed medicines to the mine workers with health problems attending the mine medical stations. The respondent was asked to answer only affirmatively, or negatively. This question can be cross correlated with item 19, where incompetence to conduct a physical assessment should refer to incompetence to prescribe medicines. The results of the data analysis as presented in table 7.10.

TABLE 7.10

REGISTERED NURSES AND THE PRESCRIBING OF MEDICINES

RESPONSE	FREEGOLD		GOLD FIELDS	
	N	%	N	%
YES	52	100	10	91
NO	0	0	1	9
TOTAL	52	100	11	100

In both Freegold and Gold Fields, the majority of respondents indicated that they prescribed medicines to their patients, namely 100% and 91% respectively. It must be kept in mind that certain treatment protocols (standing orders) are in use in both mining companies, and the registered nurses can use these without any in depth knowledge of pharmacology. The treatment protocols were discussed in Chapter 4, paragraph 4.4.3, p. 121 - 122.

However, two respondents from the Freegold mines indicated that they were not involved with physical assessments at all, and did not need any skills for this procedure. They did indicate that they prescribed medicines within the protocols, usually up to schedule 4 medicines. This is highly irregular, and completely outside the Nursing Act, Nr 50 of 1978, and the regulations promulgated following the publication of the Act.

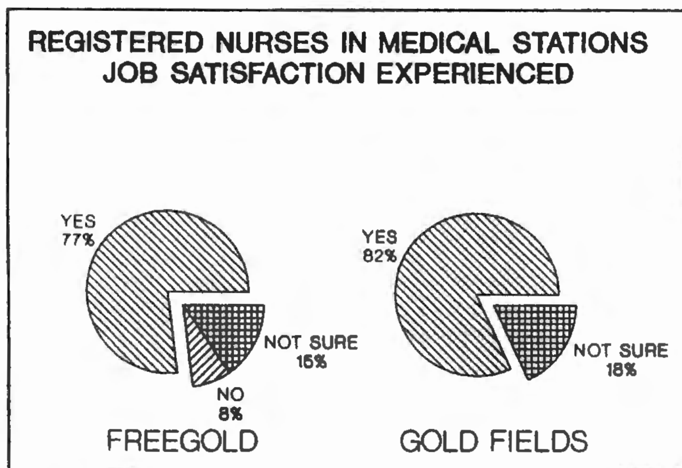
CATEGORY C - JOB SATISFACTION

ITEM 14 : JOB SATISFACTION

During the interviews, the concept "job satisfaction" was not defined, and factors influencing job satisfaction were not discussed either. This aspect has been included because some of the interviewees indicated that promotion and career advancement was blocked in their present positions, which prevented job satisfaction. The analysis of the data of question 25 provides the information for item 14, and is presented in figure 7.10.

It is interesting to note that 40 (77%) of the Freegold respondents, and nine (82%) of the Gold Fields respondents indicated that they job satisfaction. In both mining companies a substantial number also indicated that they were unsure about experiencing job satisfaction, namely eight (15%) and two (18%) respectively.

FIGURE 7.10



The data contained in figure 7.10 is of specific interest if compared to the findings of question 24 dealing with the respondents' feelings about their promotional prospects in their individual mines, as presented in item 15.

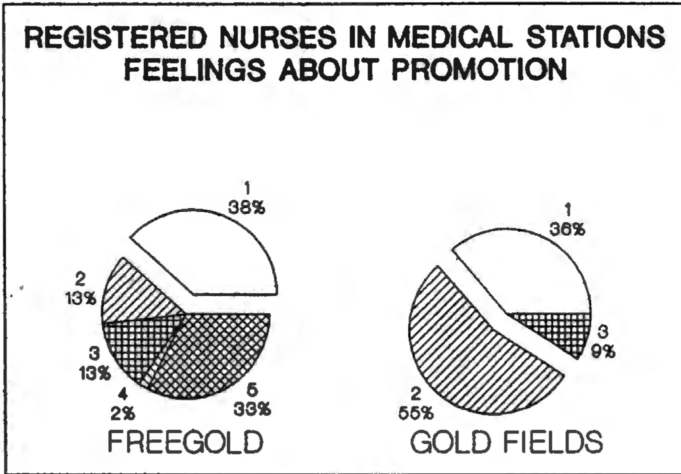
ITEM 15 : FEELINGS ABOUT PROMOTIONAL PROSPECTS IN MEDICAL STATIONS

The data analysis of this question can best be represented in figure 7.11.

In figure 7.11 there is a noticeable difference in the perceptions about promotion as experienced by the respondents from the two mining companies. Most of the Freegold respondents found their promotional prospects acceptable, namely 20 (38%) against the four (36%) from the Gold Fields group. However, six (54%) of the Gold Fields respondents found their promotional prospects to be unacceptable, against seven (13%) of the Freegold mines. Seventeen (33%) of the Freegold respondents expressed the feeling that promotion was limited. A further seven (13%) of the Freegold respondents, and one (9%) of the

Gold Fields respondents, indicated that promotional prospects were completely absent for them, as they already achieved the most senior positions available within their present career structure. One respondent from the Freegold mines mentioned racial discrimination as a block to promotion.

FIGURE 7.11



KEY : FIGURE 7.11
1 - ACCEPTABLE
2 - NOT ACCEPTABLE
3 - PROMOTION ABSENT
4 - RACIAL DISCRIMINATION
5 - PROMOTION LIMITED

CATEGORY D - LEARNING NEEDS

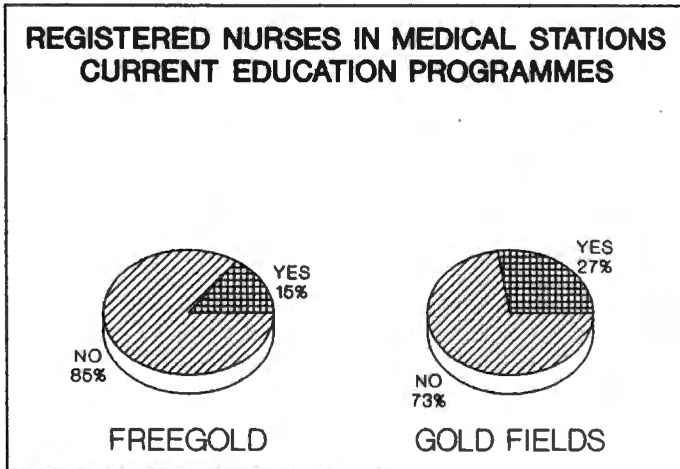
ITEM 16 : CURRENT REGISTRATION FOR EDUCATION PROGRAMMES

Questions 11 and 12 elicited the data contained in item 16 by firstly, asking the respondent whether he is registered for an educational programme at the moment, and secondly, if the answer was affirmative, the respondent was asked to name the programme. The first aspect can be demonstrated by means of figure 7.12.

Figure 7.12 illustrates the fact that eight (15%) of the

respondents from Freegold, and three (27%) of the respondents from Gold Fields were engaged in some education programme at the time of the situational analysis. These are small figures if compared to the fact that 44 or 85%, and eight or 73% of the respondents respectively for the two mining companies were not involved in any educational programme at all, although a total of three (27%) out of 11 respondents registered for an education programme, as is the case with the Gold Fields of South Africa Limited mines, is satisfactory.

FIGURE 7.12



The respondents that answered in the affirmative were then asked to indicate the programme that they were registered for. In table 7.11 an analysis of these programmes is given.

TABLE 7.11

EDUCATION PROGRAMMES

	FREEGOLD		GOLD FIELDS	
RESPONSE	N	%	N	%
BA CUR (UNISA)	5	10	1	9
COMMUNITY NURSING	3	6	1	9
OTHER	0	0	1	9
NOT APPLICABLE	44	85	8	73
TOTAL	52	101	11	100

Table 7.11 highlights the different education programmes for which the registered nurses in the mine medical stations were registered at the time of the situational analysis. Although the percentages are given as a percentage of the total respondent population, one must remember that only 15% of the Freegold respondents, and 28% of the Gold Fields respondents were engaged in some form of study.

Five respondents (10%) from Freegold, and one respondent (9%) from Gold Fields were registered for the BA CUR degree offered by the University of South Africa (UNISA). One respondent from Gold Fields was registered for a B. Admin. degree at UNISA.

ITEM 17 : PERCEPTIONS ABOUT NEED FOR CONTINUING EDUCATION PROGRAMME BY REGISTERED NURSES IN MINE MEDICAL STATIONS

This item is divided into three parts. The first deals with the need for a continuing education programme, the second with willingness to register for such a programme, and the third with reasons for refusal to register for such a programme. Question 13 directly assessed whether the respondent perceived a need for any education programme that would enable him to render better

patient care to the patients in the mine medical stations. The responses were analyzed, and the data is presented in table 7.12.

TABLE 7.12

PERCEIVED NEED FOR CONTINUING EDUCATION BY REGISTERED NURSES IN MINE MEDICAL STATIONS

	FREEGOLD		GOLD FIELDS	
RESPONSE	N	%	N	%
YES	50	96	10	91
NO	2	4	1	9
TOTAL	52	100	11	100

The majority of respondents indicated that a continuing education programme was needed to enable them to render better nursing care to the patients in the mine medical stations, namely 96% and 91% respectively. Only two respondents (4%) from the Freegold mines, and one (9%) from the Gold Fields mines indicated that there was no need for any further education programmes. This is then confirmation of the need for the development of a continuing education programme as perceived by the registered nurses in the mine medical stations.

One respondent from the Freegold mines indicated that basic nursing education programmes should be adequate to prepare the registered nurse to practice for life, and any further qualifications should only be obtained in order to raise the candidates' own prestige in his own community. He did, however, indicate that he was interested in some diploma programme, but was not clear about this.

Identifying the need for continuing education is not enough. It is also necessary to establish whether the registered nurses would be prepared to register for a continuing education programme if it was developed and implemented. Question 14 of

the checklist obtained this information, and it is presented in table 7.13. Although anonymity was guaranteed to the respondents, the interview was used to obtain data from the respondents. This could have had a hampering effect on their responses.

TABLE 7.13

WILLINGNESS TO REGISTER FOR PROPOSED CONTINUING EDUCATION PROGRAMME

	FREEGOLD		GOLD FIELDS	
RESPONSES	N	%	N	%
YES	35	67	10	91
NO	8	15	1	9
YES, BUT	9	17	0	0
TOTAL	52	99	11	100

Again the majority of respondents indicated that they were prepared to register for a continuing education programme if it was presented, namely 35 (67%) and 10 (91%) respectively. The important fact identified here is the fact that, although they perceived a need for continuing education, in the Freegold mines, six (11%) respondents indicated that they were not prepared to register for this programme.

The yes, but ... category was included because quite a few respondents made this response. It was coupled to variables such as the availability of replacement personnel in the medical station, the availability of study leave, the willingness of the employing authorities to pay all expenses, and household responsibilities. It is important to mention that the professional nurse is primarily responsible for his own professional development, and that the employer may only be held responsible for providing opportunities for continuing education. The need for further education in professional practice and conduct is thus demonstrated in this response.

Based on these responses, the researcher decided to include this category, and nine (17%) of the respondents made this response.

The group that indicated that they were unwilling to register for a continuing education programme was then asked to motivate their decision. The responses were analyzed, and the result is presented in table 7.14.

TABLE 7.14

REASONS FOR REFUSAL TO REGISTER FOR A CONTINUING EDUCATION PROGRAMME

	FREEGOLD		GOLD FIELDS	
RESPONSE	N	%	N	%
RETIRING SOON	1	2	0	0
EARLY RETIREMENT	2	4	0	0
INTERFERE WITH CURRENT STUDIES	2	4	0	0
NO FINANCIAL BENEFIT	1	2	0	0
STAFF SITUATION MAY NOT PERMIT IT	1	2	0	0
OTHER	1	2	1	9
NOT APPLICABLE	44	85	10	91
TOTAL	52	101	11	100

In table 7.14, ten (91%) of the respondents from the gold Fields mines indicated that this question was not applicable, as they are willing to register for a continuing education programme. The one respondent that preferred to respond negatively to question 14, indicated a lack of interest as the reason for being unwilling to register.

The respondents from the Freegold mines who responded negatively to question 14, offered a variety of reasons for doing so, such as no financial gain on completion of the programme, lack of interest, and no career advancement possible on completion of the programme. This again demonstrates the necessity for continuing education programmes, especially in ethos and professional practice of nursing. It is interesting to note that two respondents (4%) indicated that they were opting for early retirement, and offered that as the reason why they were not willing to register for a continuing education programme. One respondent were actually past his retirement age, and did not want to register for any educational programme.

The findings of questions 13 and 14 can be cross referenced in order to establish consistency in the answering pattern to these two questions. An analysis of this cross referencing is presented in tables 7.15 and 7.16 representing the two mining companies respectively.

TABLE 7.15

CROSS REFERENCE OF RESPONSES MADE BY FREEGOLD RESPONDENTS TO QUESTIONS 13 AND 14

	YES	NO	NOT SURE	TOTAL
YES	40	1	0	41
NO	8	1	0	9
YES, BUT	2	0	0	2
TOTAL	50	2	0	52

KEY : TABLE 7.15
COLUMNS = RESPONSES TO QUESTION 13
ROWS = RESPONSES TO QUESTION 14

In both table 7.15 and 7.16, the respondents responding affirmatively to question 13 also consistently answered affirmatively to question 14, thereby eliminating doubt about possible inconsistency in the answering pattern. This can be

seen as a further confirmation of the need for a continuing education programme for registered nurses in the mine medical stations of both mining companies.

TABLE 7.16

CROSS REFERENCE OF RESPONSES MADE BY GOLD FIELDS RESPONDENTS TO QUESTIONS 13 AND 14

	YES	NO	NOT SURE	TOTAL
YES	9	1	0	10
NO	1	0	0	1
YES, BUT	0	0	0	0
TOTAL	10	1	0	11

KEY : TABLE 7.16
COLUMNS - RESPONSES TO QUESTION 13
ROWS - RESPONSES TO QUESTION 14

The need for continuing education can also be based on the perceptions of the registered nurses in the mine medical stations of the two mining companies respectively, about their own competency regarding physical assessment of the health status of the mine worker. Although the majority of registered nurses indicated that they were competent, they also indicated that they were in need of a continuing education programme to render more effective nursing care to the mine workers. The analysis of the cross referencing of questions 13 and 18 is presented in tables 7.17 and 7.18.

TABLE 7.17

CROSS REFERENCE OF RESPONSES MADE BY FREEGOLD RESPONDENTS TO QUESTIONS 13 AND 18

	YES	NO	TO A CERTAIN EXTENT	TOTAL
YES	36	1	10	47
NO	2	0	1	3
NOT SURE	0	0	0	0
TOTAL	38	1	11	50

* TWO RESPONDENTS INDICATED THAT THEY WERE NOT INVOLVED IN PHYSICAL ASSESSMENTS AT ALL.

KEY : TABLE 7.17
COLUMNS - RESPONSES TO QUESTION 18
ROWS - RESPONSES TO QUESTION 13

Table 7.17 demonstrates the fact that 36 (72%) of the respondents felt competent to perform a physical assessment, but also perceived a need for a continuing education programme. A further ten (20%) indicated that they were only partially competent, and perceived the need for a continuing education programme. Two (4%) felt competent to perform the physical assessment and did not perceive the need for further education, while one (2%) indicated that he was partially competent, and did not need further education programmes. The consistency in the answering pattern for the Freegold respondents is then established for questions 13 and 18.

TABLE 7.18

CROSS REFERENCE OF RESPONSES MADE BY GOLD FIELDS RESPONDENTS TO QUESTIONS 13 AND 18

	YES	NO	TO A CERTAIN EXTENT	TOTAL
YES	7	0	3	10
NO	1	0	0	1
NOT SURE	0	0	0	0
TOTAL	8	0	3	11

KEY : TABLE 7.18
COLUMNS - RESPONSES TO QUESTION 18
ROWS - RESPONSES TO QUESTION 13

In table 7.18, seven (64%) respondents perceived the need for a continuing education programme, and also felt competent to conduct physical assessments. A further three (27%) perceived themselves to be partially competent, and identified the need for further education programmes. Only one (9%) respondent did not perceive the need for a continuing education programme. The consistency of the answering pattern for questions 13 and 18, is therefore established for the Gold Fields respondents.

ITEM 18 : FEELINGS ABOUT CONTINUING EDUCATION PROGRAMME BEING MADE COMPULSORY

Question 16 was asked in order to establish the feeling of the respondents regarding the development of a compulsory continuing education programme for registered nurses in mine medical stations. The results of the analysis is portrayed in table 7.19.

TABLE 7.19

FEELINGS ABOUT CONTINUING EDUCATION PROGRAMME BEING MADE COMPULSORY

	FREEGOLD		GOLD FIELDS	
RESPONSE	N	%	N	%
WILL REGISTER	39	75	9	82
WILL NOT REGISTER	3	6	0	0
SHOULD NOT BE COMPULSORY	10	19	2	18
TOTAL	52	100	11	100

Table 7.19 demonstrates the fact that some people inherently want to make their own decisions. Although 75% and 82% of the respective respondents indicated that they would still register for a continuing education programme, 19% and 18% respectively indicated that the programme should not be made compulsory. Only three respondents (6%) of the Freegold respondents persisted with the response that they would not register for such a programme.

This concludes the checklist aspect of the situational analysis. The analysis of the empirical observations in the mine medical stations will now be discussed.

7.2.1.3 Empirical observations in the mine medical stations

The nursing services offered at a mine medical station are vastly different from any hospital or clinic based nursing services. A mine medical station is more complicated, because of the trauma aspect, while simultaneously it provides occupational health services, primary health care, has a big administrative aspect, and deals with large numbers of patients. Although these services were offered for many years without obvious attempts to improve the skills of the registered nurses

through continuing education programmes, the need for such a programme was identified, which served as motivation for this research.

There were some disturbing findings. In interviews with Dr P Allin (4 July 1989), the senior medical officer at the Free State Geduld mine at the time, Dr B A Brink (29 June 1989), the medical superintendent of the Ernest Oppenheimer Hospital at the time, and Dr J B Davies (27 June 1989) who was the senior medical officer in charge of occupational health and primary health care at the time, the perception was expressed that the registered nurses themselves did not identify any need for continuing education programmes. This was a doctor initiated drive for continuing education. Their specific responses can be summarized as follow:

- Dr P Allin has been working in the mines for 6 years. During this time he became concerned with the inefficiencies of the medical station personnel, even while he was still working at the Ernest Oppenheimer Hospital.
- He felt that the examinations performed on the patients can be improved, and that the treatment of these patients can also be improved.
- He felt that medical station personnel were placed in the medical stations without much chance for further development. However, medical station personnel could also not be developed at the expense of the mine.
- At that stage he felt that registered nurses were employed at the mine medical stations without in-service education. He had tried to establish discussion groups, but the attendance was poor.
- Dr B A Brink indicated that the doctors at the Ernest Oppenheimer Hospital, and the medical staff of the mining industry at Freegold, were not satisfied with the services offered by the mine medical station personnel.
- He felt that enrolled nurses could provide the services necessary under the supervision of the registered personnel, but agreed that there could be problems during the hours that there were only enrolled nurses on duty - eg between 16:00 and 07:00.

- Dr J B Davies felt that the senior medical station superintendents and the medical station superintendents were very negative about any courses offered. He offered various in-service education courses himself, but they were very poorly accepted and attended by the registered nurses.
- He indicated that the senior personnel felt that they were professionally in dead end jobs, yet they did not study. The staff could therefore not expect to be promoted, and the dead end was their own fault.
- He felt that the senior categories of registered nurse were not competent administrators, and incompetent to a large extent in any case. In addition to this, the workers did not regard the senior medical station superintendents / medical station superintendents as their friends, especially the whites, and had little confidence in their capabilities.
- Dr J B Davies felt that there would be difficulties in lecturing to the medical station personnel, as doctors are busy. Therefore the initiative for the in-service education must come from the nurses themselves.

These are serious allegations, especially since the doctors did not perceive the registered nurses as having the initiative in the drive for continuing education themselves. It was therefore necessary to investigate the actual services at the medical stations.

In an interview with Dr E Petschel on 26 March 1990, he indicated that he was quite satisfied with the services rendered at the mine medical stations of the Gold Fields mines included in the study. He indicated that he had weekly meetings with the senior registered nurses, and managed to solve any minor problems that occurred in this manner.

A: Organization of nursing services at medical stations.

There was one major, and very obvious problem regarding the organization of the services, namely that very few registered nurses were on duty after 16:00 (Only two at the Free state

Geduld mine). This meant that enrolled nurses and enrolled nursing assistants were in charge of these medical stations between 16:00 and 07:00. In case of accidents, the registered personnel are called out, but there will be a time lapse before the registered nurse gets to the medical stations. This meant that enrolled nurses and enrolled nursing assistants provide services way beyond their scope of training or practice. This situation was also in practice at the Gold Fields of South Africa mines in Carletonville.

B: Services offered by the registered nurses.

It must be remembered that the registered nurses in the mine medical stations are offering a very important service to their patients. However, some problem areas were identified during the time spent in the medical stations. These can be summarized as follow:

- At the Freegold mines, not one of the medical station superintendents was observed while actually performing a physical assessment on, or providing treatment for any patient. In all observation situations, a few problem patients were shown to the senior medical station superintendent on duty, whereafter he referred the patients to the Ernest Oppenheimer Hospital, or booked them off for a further period of time.
- At the Gold Fields of South Africa Limited mines, a senior medical station superintendent was observed while he examined patients with injuries, in order to decide whether they were fit to report back for duty. This man had a total lack of knowledge about surgical asepsis and aseptic techniques or the basic principles of the prevention of cross infection. Most of the patients had lacerations that were sutured, and some of these wounds turned septic. The senior medical station superintendent examined these wounds with his bare hands, without so much as spraying his hands with an antiseptic solution in between patients.
- At the Freegold mines, enrolled nurses were observed while they were performing "physical assessments" on, and even treating, patients. One of these enrolled nurses was

observed while he examined a patient complaining about a foreign body in his eye. The enrolled nurse instilled a local anaesthetic and fluorescine drops into the patient's eye. In both instances he contaminated the containers by actually touching the patient's eyelids with them. Then, using the light of an ordinary torch this enrolled nurse was scraping something from the eye of this patient, yet admitting that he saw nothing! The patient was then discharged without covering his eye, or any other treatment. Shortly thereafter, another patient came in, complaining of "pink eyes". The same container with local anaesthetic was used to instill a local anaesthetic into the eye of the patient, again contaminating the container. The patient was discharged with no further prescription.

- Basic principles of communication were blatantly ignored in both mining companies. At one of the Gold Fields of South Africa Limited mines, the senior medical station superintendent received a telephone call. He left the medical station running, while indicating that he had to go somewhere urgently, but would be back in five minutes time. Shortly afterwards there was another telephone call, taken by the senior charge nurse (senior professional nurse). She indicated that there was an accident at shaft number 1. She wanted to know were the senior medical station superintendent was. She was informed that his whereabouts was unknown to anybody, but that he had left in a hurry. She then assumed that he had left for shaft number 1. However, after a further telephone call, she decided that she would go to the shaft herself, as the accident involved a severely traumatized patient. Just after she left, the senior medical station superintendent returned to the medical station in a different vehicle than that in which he had left. He then informed the personnel that he had had to go home as he was laying cement at his house. This had serious implications, as the traumatized patient could have been dead by the time the senior charge nurse discovered that the senior medical station superintendent had not gone to the shaft. Between the time the senior charge nurse left for the shaft, and the return of the senior medical station superintendent, the

medical station was left unmanned, except for a few enrolled nursing assistants. Scores of patients were sitting around waiting to be tended to.

At the Freegold mines, a medical station superintendent left his medical station at 08:00 indicating that he was going to another medical station. Yet, at 11:30 no other medical station knew were he was, or anything about his impending visit.

- Statistics were a problem at both mining companies. The statistics were not uniformly kept at the Freegold mines, and it was very difficult to actually detect what the exact nature of the injuries or conditions seen were. Some of the statistics that were available were obtained, but they were virtually all of a different nature. At one of the mines statistics could only be obtained with great difficulty and perseverance, and covering a period of one month only.

  Statistics at the Gold Fields of South Africa Limited mines were also not readily available, and only after much persuasion very confusingly put together figures, not reflecting the number of specific conditions, or the types of occupational injuries or conditions at all could be obtained. However, the Chamber of Mines was in the process of introducing new prescribed forms for keeping statistics, which will reflect much more usable statistics in future. Unfortunately, at the time of situational analysis, these were not yet in use. However, the medical superintendent of the Leslie Williams Memorial Hospital, Dr E Petschel, provided very ably put together statistics to the researcher. It is possible that the registered nurses mistrusted the author, or were unaware that permission had been granted to get access to the statistics.
- The white personnel generally had a very negative picture about their lines for promotion, yet they all were quite under-qualified for their current posts. Very few of them had completed any nursing education programmes other than general nursing, and that usually more than ten years ago. They were unsatisfied with the post-structure as implemented

by the Anglo American Corporation of South Africa Limited, yet in a civil servants' post structure their qualifications would enable very few of them to be appointed in any post other than professional nurse. None of them had studied traumatology, yet first aid only is not enough for the type of patients that they provided nursing care for. A few admitted that they could perform a physical assessment only to a certain extent, while nobody was seen actually performing a comprehensive assessment of any patient. The registered nurses also indicated that they were taught to do physical assessments as part of their basic training, but this was never part of basic nursing education programmes.

- Irrespective of the responses given in the checklist part of the interview, the more senior personnel at the Freegold mines were actually not very positive about a continuing education programme. If such a programme is not made compulsory, it is doubtful if any of them will register for it.

Most of the registered nurses at the Gold Fields of South Africa Limited mines were also not keen on furthering their education, and only the senior medical station superintendent of one mine was really keen on registering for the proposed course. At two other mines the senior personnel indicated reluctantly that they would register, and at one mine all the personnel indicated that they were not keen on registering at all. The feeling was expressed that nobody could teach the senior medial station superintendent anything at all.

- A very alarming tendency amongst the senior medical station superintendents at the Freegold mines, was their expressed desire for early retirement. At least two of them had definite plans for early retirement, the one at age 47 and the other at age 52. This may be an indication of the seriousness of their discontent, although if people are retiring at this age they may have serious problems at a later stage. This is also a loss of economically viable people at too early an age.
- The emergency procedures and evacuation procedures of the Freegold mines did not include the personnel from the mine

medical stations, as they were deemed to be non-nursing procedures. These procedures were drawn up and executed by the safety department. In the event of an accident, the underground supervisors, who must have first aid certificates if they are under the age of 50 years, will phone the medical station and inform the personnel about the underground accident. If the accident is severe, the medical station will send an ambulance officer down in the shaft with emergency equipment - oxygen, drips, analgesics, bandages. If the injuries encountered are outside the experience of the ambulance officer, then the senior medical station superintendent / medical station superintendent will also go down the shaft, with or without a doctor. As soon as the patient is stabilized, the medical personnel will bring him to the surface. The patient will then be stabilized further in the medical station, or depending on his injuries, be sent to Ernest Oppenheimer Hospital.

There are many more examples of inadequacies that were observed in the nursing services, but the researcher felt that these examples provide ample motivation for the development of a continuing education programme for the registered nurses in mine medical stations in the gold mining industry, as identified in the problem statement in Chapter 1, paragraph 1.3, p. 1.

7.2.1.4 New developments in mine medical stations

On 30 March 1992, the researcher visited the Freegold mines on request of Dr P Allin, Chief Medical Officer : Department of Occupational Health. During this visit, the researcher was informed that:

- The nursing staff at the mine medical stations are functioning under the jurisdiction of the Senior Nursing Services Administrator of the Ernest Oppenheimer Hospital as from 1 April 1992.
- A new post structure is currently under discussion, but this will be implemented as soon as consensus is reached. The new post structure can be graphically illustrated as follow:

PNSA
↓
(SNSA) [HOSPITAL AND MINES]

SNSA [MINES] | SNSA [HOSPITAL]

SNSA [MINES]
↓
NURSING SERVICES ADMINISTRATOR (Old senior medical station superintendent)
↓
CHIEF PROFESSIONAL NURSE (Old medical station superintendent)
↓
SENIOR PROFESSIONAL NURSE (Old ambulance officer)
↓
SPECIALIST PROFESSIONAL NURSE (Holding an appropriate nursing qualification)
↓
PROFESSIONAL NURSE
↓
SUB-PROFESSIONAL GROUPS

KEY
PNSA - Principal nursing service administrator
SNSA - Senior nursing service administrator

- New treatment protocols were developed by Dr P Allin, and were implemented.
- A nursing standards committee was established. The registered nurses in the mine medical stations develop standard procedures in order to ensure quality nursing care (See Annexure L for standard procedure on environmental hygiene).
- Monthly meetings between Dr Allin and the registered nurses have been set up, where treatment protocols and standard procedures are discussed.
- In-service education programmes on topics of importance have been developed, that are offered on a monthly basis.

- The old emergency medical technician programme has been replaced with a primary emergency care programme, and approximately thirty registered nurses have already attended this programme.
- The registered nurses now rotate through casualties and the outpatient department of the Ernest Oppenheimer Hospital, in an attempt to limit unnecessary referrals to hospital.
- Enrolled nurses and enrolled nursing auxiliaries in the mine medical stations are now replaced with registered nurses as the sub-professional categories vacate their posts. This is in agreement with aspects of primary nursing as discussed Chapter 4, paragraph 4.3.2.2, p. 110.
- The registered nurses are currently busy preparing new job descriptions that will suit the suggested new post structures.
- At the Gold Fields of South Africa Limited mines, four registered nurses completed an occupational health nursing programme during 1991.
- In a telephonic conversation on 8 April 1992 with Mrs O Venter, Principal of the Gold Fields Nursing College, the researcher was informed that Prof J P Lowe managed to obtain authorization for the registered nurses in the mine medical stations, to function under the auspices of Article 38A of the Nursing Act, No 50 of 1978. The authorization was obtained from the Director-general, Department of National Health and Population development. The service is currently authorized, and individuals suitable for authorization is presently being selected.

This concludes the analysis of all aspects of the medical stations. The analysis of the data obtained from the Ernest Oppenheimer Nursing College and Gold Fields Nursing College, will now be discussed.

7.2.2 The nursing colleges

The situational analysis was conducted at the Ernest Oppenheimer Nursing College (EONC) and the Gold Fields Nursing College (GFNC) in order to determine the viability of a continuing

education programme for registered nurses in mine medical stations of the gold mining industry being offered at any of these colleges.

The checklist to the personnel of the Ernest Oppenheimer Nursing College (Checklist B) contained 21 questions, but only 16 of these questions will contribute positively towards this research. In a follow-up analysis at the Gold Fields Nursing College on 31 March 1992, a checklist with 12 questions were used (Checklist C), as the teaching staff were not available for interviewing. The information was obtained from Mrs O Venter, principal of the Gold Fields Nursing college. All these questions were included in the analysis. The analyses of both checklists will be discussed simultaneously.

The infrastructure of both colleges was analyzed. However, since the situational analysis, the EONC has decided to discontinue their nursing education programmes, which will become reality in 1993. This college will probably cease to exist once all current students complete their education. At the time of the situational analysis, the EONC was situated in en empty ward at the Ernest Oppenheimer Hospital. The private rooms of the ward were used as offices for the teaching staff, although some areas of the big ward were also used as offices. Not all the offices of the teaching staff were situated on one floor of the hospital building.

There were three lecture rooms, each seating about fifteen students. There was a clinical room as well. In the clinical room was a resuscitation trainer, an old training doll and a few surgical instruments. It was also partly used as a book store.

There were very few teaching aids, such as one overhead projector, one epidiascope, one film projector and one slide projector could be borrowed from the hospital.

A relatively large area, semicircular in shape, and situated furthest from the entrance, was used as the library, which was not suitable for educational purposes. There were few

magazines, and the books were also relatively old, with some very old books (there were medical surgical books dating back to 1955). No community nursing science or midwifery books could be shown to the researcher. The library was manned by an enrolled nurse, who also delivered mail, typed and ran errands for the college personnel.

The EONC was offering four nursing education programmes at the time of the situational analysis, namely:

- The four year integrated diploma course (In affiliation with the PU for CHE);
- the three year diploma programme of the South African Nursing Council;
- a programme for nursing auxiliaries; and
- a bridging course for enrolled nurses.

The Gold Fields Nursing College (GFNC) is situated at the Gold Fields Training Centre, at the Kloof Mines. The teaching staff share office space with all the other personnel at the Training Centre. Although the centre has nineteen lecture rooms, only one is permanently allocated to the GFNC. If more lecture rooms are needed, they can be obtained by means of a booking system, and depending on the availability of lecture rooms. The GFNC has a very small library, which is primarily for the use of teaching staff, and the media centre, shared with the rest of the training centre staff, is also for the teaching staff only.

GFNC currently offers the four year integrated diploma course, and has a student intake of ten students per year group. The college also offers a bridging course for enrolled nurses, with a student intake of ten per year group. A post registration diploma in community nursing science is also offered at the moment, with a total of fifteen students registered for this programme. This means that GFNC has a student population of seventy five.

There are seven teaching staff, including the principal, all offering combinations of subject matter. It may be of value to analyze the data pertaining to the teaching staff of both

colleges as follows.

The distribution of the teaching staff of the two colleges between the different post structures within the nursing colleges can be explained in table 7.20.

TABLE 7.20

POST STRUCTURE OF TEACHING STAFF IN NURSING COLLEGES

	EONC		GFNC		TOTAL
RESPONSE	N	%	N	%	
PRINCIPAL	1	14	1	14	2
TUTOR	2	29	6	86	8
SPECIALIST PROFESSIONAL NURSE	4	57	0	0	4
TOTAL	7	100	7	100	14

Each college had one principal, and the EONC only employed two tutors, who constitute 29% of the teaching staff. The bulk (4 or 57%) is made up of the category called specialist professional nurses, commonly known as "tutoring sisters" in other institutions.

The GFNC employed one principal, and six tutors, which constitute 86% of the personnel. No tutoring sisters are employed.

The remaining information on the checklist can be analyzed according to the following categories:

Category A - Biographical data.

Category B - Teaching experience.

Category C - Perceived need for a continuing education programme for registered nurses in the mine medical stations (EONC only).

CATEGORY A - BIOGRAPHICAL DATA

The first 11 questions in the checklist that needs to be analyzed, deals with the biographical data of the teaching staff on the nursing colleges.

ITEM 1 : AGE DISTRIBUTION

TABLE 7.21

THE AGE DISTRIBUTION OF TEACHING STAFF AT THE NURSING COLLEGES

	EONC		GFNC		
RESPONSE	N	%	N	%	TOTAL
30 - 34	1	14	0	0	1
35 - 39	2	29	0	0	2
40 - 44	0	0	5	72	5
45 - 49	2	29	1	14	3
50 - 54	2	29	1	14	3
TOTAL	7	101	7	100	14

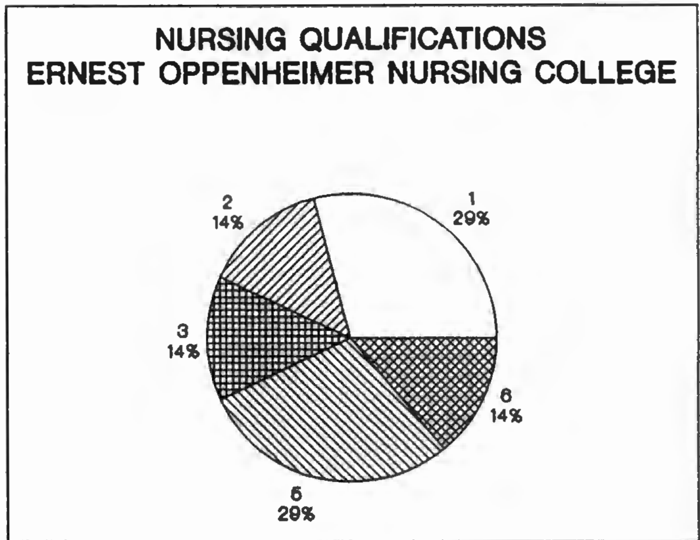
The information for item 1 was obtained in question 1 of both checklists, and is presented in table 7.21. According to the data presented in table 7.21, the age group 40 - 44 years is best represented, with 72% of the respondents falling within this category. Only one (7%) of the combined respondents was younger than 35 years, a total of two (14%) being younger than 40 years of age. This means that the teaching staff is generally older than the registered nurses in the mine medical stations, as 48% of the combined respondents in the mine medical stations are younger than 40 years of age.

ITEM 2 : NURSING QUALIFICATIONS OF THE TEACHING STAFF

The data for this item was obtained in question 4 of Checklist

B and question 3 of Checklist C. An analysis of the data is presented in figures 7.13 and 7.14.

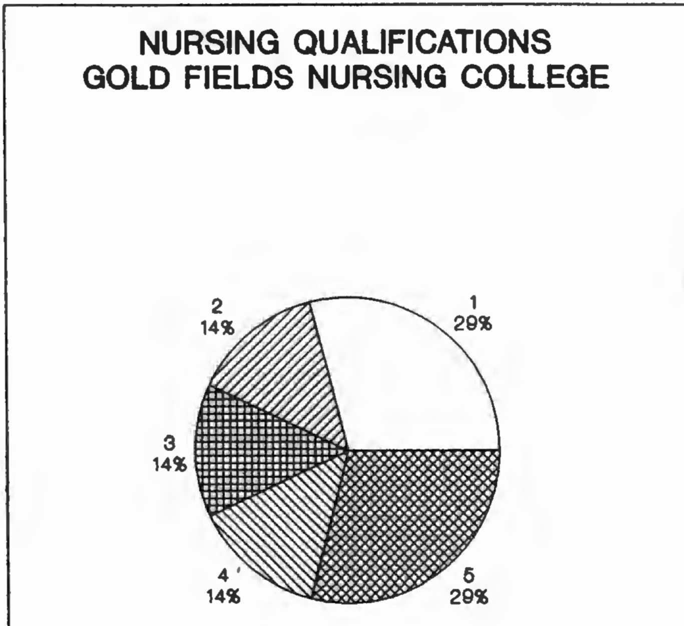
FIGURE 7.13



KEY : FIGURE 7.13
1 – REGISTERED NURSE
2 – REGISTERED NURSE AND MIDWIFE
3 – REGISTERED NURSE, MIDWIFE, REGISTERED PSYCHIATRIC NURSE, REGISTERED COMMUNITY NURSE AND REGISTERED NURSE EDUCATOR
4 – REGISTERED NURSE, MIDWIFE, REGISTERED PSYCHIATRIC NURSE, REGISTERED COMMUNITY NURSE, REGISTERED NURSE EDUCATOR AND NURSE ADMINISTRATOR
5 – REGISTERED NURSE AND REGISTERED NURSE EDUCATOR
6 – OTHER

According to figure 7.13 three of the teaching staff at the EONC are qualified as registered nurse or registered nurse and midwife only. One respondent holds the registrations registered nurse and registered nurse educator only, and another held the qualifications registered nurse, registered nurse educator and registered nurse administrator. Apart from the qualifications in nursing education and nursing administration, six (86%) of the respondents held relatively basic nursing qualifications, making them unsuitable to offer a continuing education programme for registered nurses working in mine medical stations.

FIGURE 7.14



KEY : FIGURE 7.14

1 - REGISTERED NURSE, REGISTERED COMMUNITY NURSE, REGISTERED NURSE EDUCATOR & REGISTERED NURSE ADMINISTRATOR

2 - REGISTERED NURSE, REGISTERED PSYCHIATRIC NURSE & REGISTERED MIDWIFE

3 - REGISTERED NURSE, REGISTERED MIDWIFE, REGISTERED COMMUNITY NURSE & REGISTERED NURSE EDUCATOR

4 - REGISTERED NURSE, REGISTERED MIDWIFE, REGISTERED COMMUNITY NURSE, REGISTERED PSYCHIATRIC NURSE & REGISTERED NURSE EDUCATOR

5 - REGISTERED NURSE, REGISTERED MIDWIFE, REGISTERED COMMUNITY NURSE, REGISTERED NURSE EDUCATOR & REGISTERED NURSE ADMINISTRATOR

The teaching staff of the GFNC are well qualified, with only one respondent (14%) holding three qualifications, without being a registered nurse educator, as demonstrated in figure 7.14. The teaching staff of the GFNC were eligible to present a continuing education programme for registered nurses working in mine medical stations, not taking their workload into account.

ITEM 3 : NON-NURSING QUALIFICATIONS

This item was included as question 5 in Checklist B, and question 4 in Checklist C. It was presented to the teaching staff in order to establish whether the respondents would be able to associate themselves with the medical station personnel. However, none of the GFNC respondents held any of these qualifications, while one (14%) of the respondents of the EONC held the supplementary diagnostic radiography qualification, and one other respondent (14%) held a qualification in personnel administration. Therefore, this aspect warrants no further discussion.

ITEM 4 : FIRST AID QUALIFICATIONS HELD BY TEACHING STAFF OF NURSING COLLEGES

This item was also included as question 6 of Checklist B, and question 5 of Checklist C. This was done for the same reason that item 3 was included in the checklists. At the GFNC, one respondent (14%) held a gold medal in first aid, and two respondents (29%) held gold medals and instructors qualifications. The following first aid qualifications were held by one respondent (14%) each from the EONC:

- Silver medal.
- Gold medal.
- Gold medal with instructor.

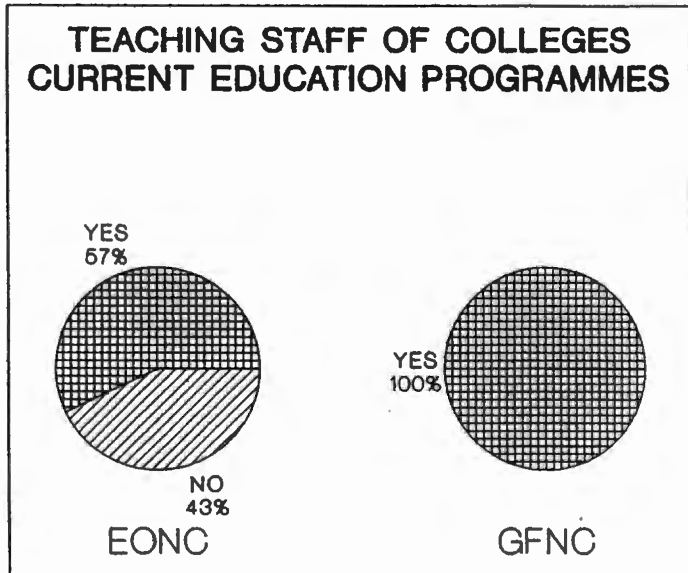
ITEM 5 : CURRENT REGISTRATION FOR FURTHER EDUCATIONAL PROGRAMMES

Item 5 is divided into two aspects, namely an enquiry whether the respondent is currently registered for an educational programme, and if answered affirmatively, what programme. Questions 8 and 9 of Checklist B and questions 7 and 8 of Checklist C, elicited the data contained in item 5. The analysis of the data obtained in question 8 is presented in figure 7.14.

Figure 7.15 demonstrates the fact that most of the teaching staff are registered for an educational programme, with 57% of

the respondents from the EONC, and 100% of the respondents from the GFNC being registered for further education programmes.

FIGURE 7.15

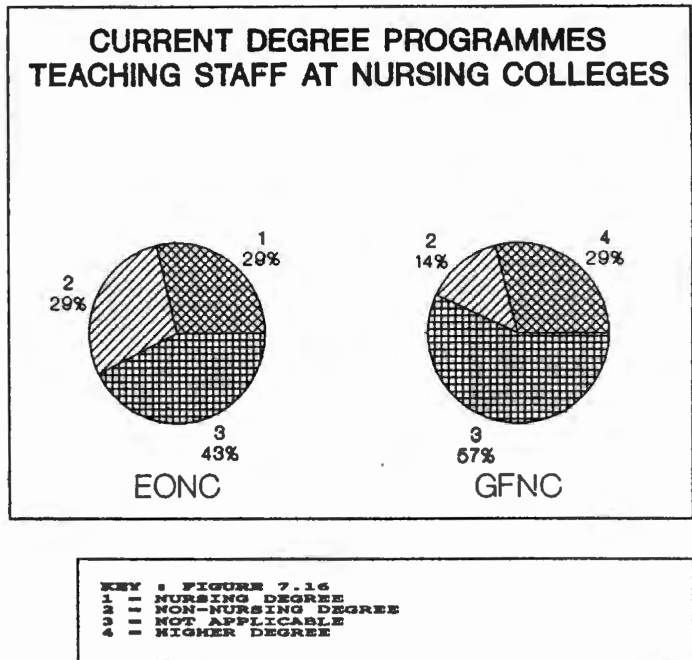


The data analysis for question 9 of Checklist B and question 8 of Checklist C identified whether the respondents were registered for a nursing degree, non-nursing degree or diploma, and the results are presented in figure 7.16.

At the EONC four respondents (57%) were registered for a nursing degree.

At the GFNC two (29%) of the teaching staff are currently registered for nursing degrees, namely one respondent (14%) is registered for a doctorate in nursing, and one (14%) registered for a masters degree. One respondent (14%) is registered for a non-nursing degree.

FIGURE 7.16



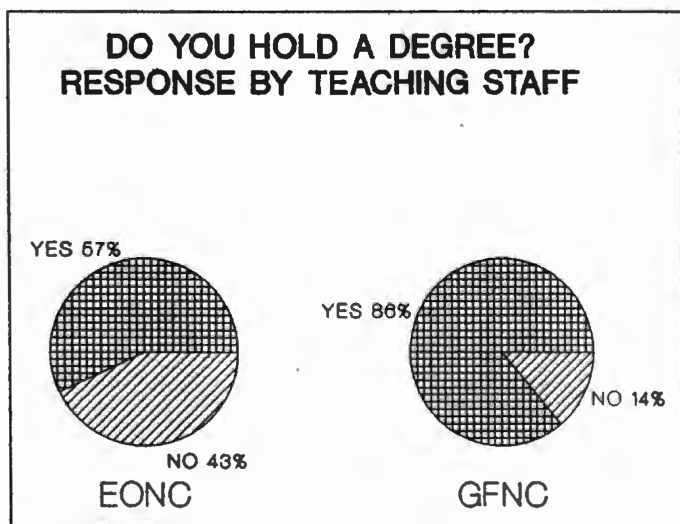
ITEM 6 : DEGREES OBTAINED BY TEACHING STAFF IN NURSING COLLEGES

This item was included in order to determine the number of graduand teaching staff at both nursing colleges. This gives an impression of the willingness of teaching staff to engage in educational programmes themselves. As highlighted in item 2, the teaching staff particularly of the EONC were not highly qualified. A current registration for an educational programme might not indicate a desire to study, but a desire to secure a post. It was therefore necessary to include this question, because a high number of graduand teaching staff can be an indication of a willingness to engage in education programmes themselves. An analysis of the responses to questions 10 and 11 of Checklist B and questions 9 and 10 of Checklist C, were used to compile item 6. The results of the analysis of question 10

of Checklist B and question 9 of Checklist C is presented in figure 7.17.

The majority of the respondents at both colleges held degrees, with four (57%) and six (86%) respectively. This can possibly be seen as a willingness to engage in educational programmes themselves, which will lead to the development of a positive attitude towards continuing education programmes in the teaching staff themselves.

FIGURE 7.17

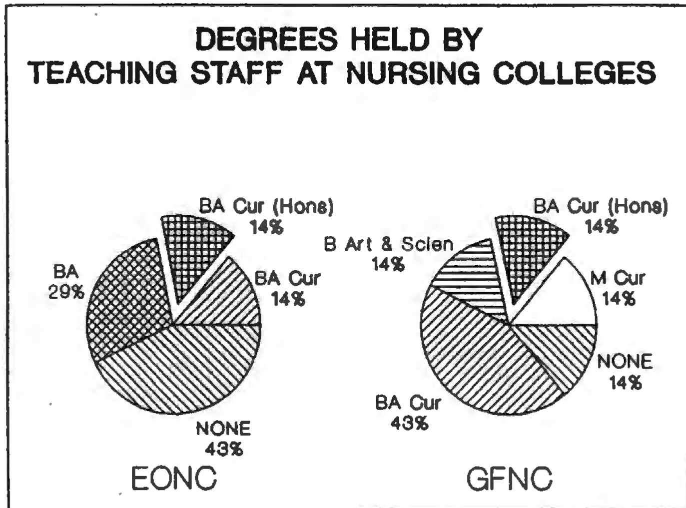


Question 11 of Checklist B and question 10 of Checklist C identified the degrees obtained by the teaching staff, and an analysis of the results is presented in figure 7.18. According to the data presented in figure 7.18, six (86%) of the respondents from the GFNC and four (57%) from the EONC held nursing degrees. At the GFNC, a further breakdown revealed that one respondent (14%) holds a masters degree in nursing, one respondent (14%) holds a B. Art et Scien degree in nursing, one respondent (14%) holds a BA Cur (Hons) degree, and two respondents (19%) hold BA Cur degrees. Only one respondent held

no degree, but is currently registered for a degree programme.

There are two (29%) respondents from the EONC that hold BA degrees of a non-nursing nature. One respondent (14%) held a BA Cur degree, and another (14%) a BA Cur (Hons) degree. The importance of this lies in the fact that although eight (57%) of the combined respondents hold nursing degrees, two of the respondents (29%) held BA degrees. The respondents holding these degrees were responsible for teaching social science subjects.

FIGURE 7.18



CATEGORY B —TEACHING EXPERIENCE

ITEM 7 : TOTAL TEACHING EXPERIENCE

An attempt was made to establish the total teaching experience of each registered nurse teaching at the nursing colleges. Questions 12 and 13 of Checklist B and questions 11 and 12 of Checklist C, obtained this information. An analysis of question 12 of Checklist B and question 11 of Checklist C is presented in

figures 7.19 and 7.20.

FIGURE 7.19

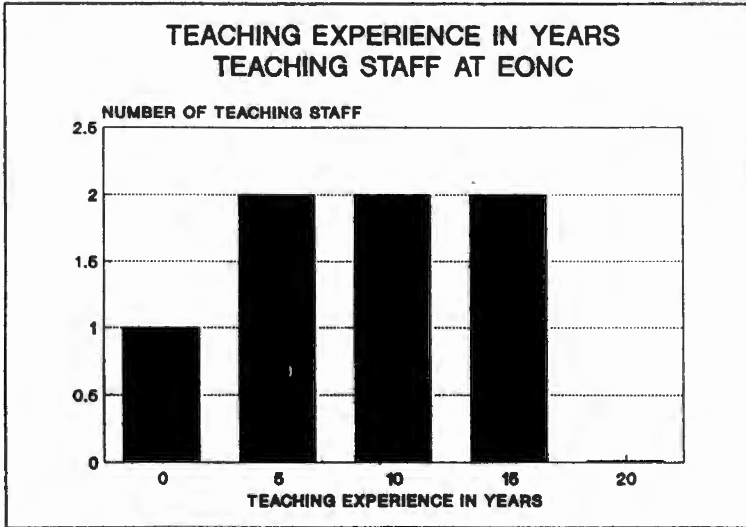
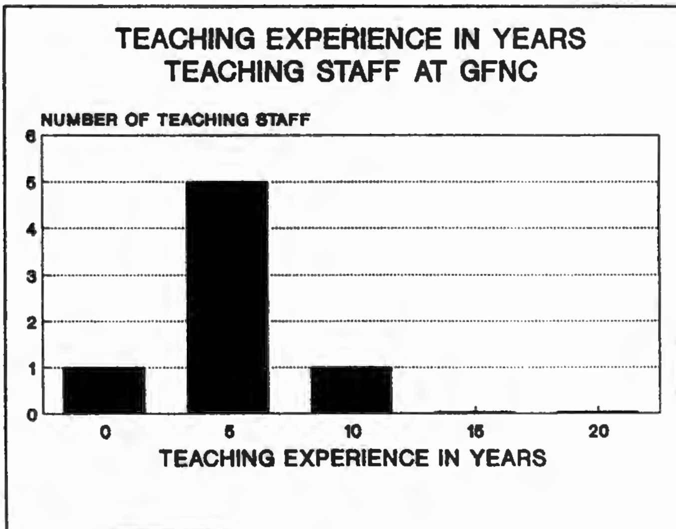
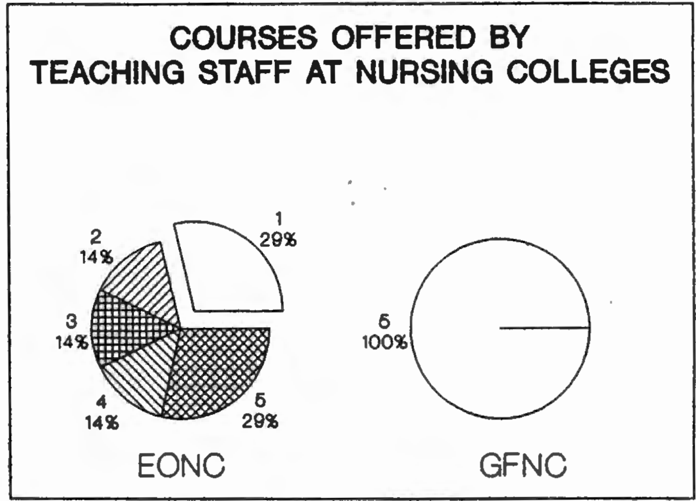


FIGURE 7.20



According to the data reflected in figures 7.19 and 7.20, four (57%) of the EONC respondents were involved in teaching for longer than 10 years, and only one (14%) of the GFNC respondents was involved in teaching for longer than 10 years. This means that one (14%) from EONC and one (14%) from GFNC have been teaching for a period of less than five years. The majority of the teaching staff are well experienced.

FIGURE 7.21



KEY : FIGURE 7.21
1 - GENERAL NURSING SCIENCE
2 - COMMUNITY NURSING SCIENCE
3 - SOCIAL SCIENCES
4 - PURE SCIENCE SUBJECTS
5 - COMBINATIONS OF THE ABOVE

The results of the analysis of question 13 of Checklist B and question 12 of Checklist C are presented in figure 7.21. In this figure, only two (29%) of the respondents from the EONC are involved with the teaching general nursing science. All the teaching staff of the GFNC are involved in teaching combinations of subjects. This has the implication that these respondents may be unable to undertake a further educational programme as they are already offering more than one course. Preparation for

a combination of subjects takes time, and adding further subjects in the format of a continuing education programme can be to the detriment of the teaching personnel and the students. Two (29%) of the EONC respondents were also involved in teaching combinations of subjects.

CATEGORY C - PERCEIVED NEED FOR A CONTINUING EDUCATION PROGRAMME FOR REGISTERED NURSES IN THE MINE MEDICAL STATIONS

Due to the fact that the teaching staff of the Gold Fields Nursing College were not available for interviewing on 31 March 1992, this category only applies to the Ernest Oppenheimer Nursing College personnel.

ITEM 8 : KNOWLEDGE ABOUT MINE MEDICAL STATIONS

The responses of questions 14 and 15 provide the information contained in item 8.

An analysis of question 14 indicated that all the teaching staff at the EONC have been to a mine medical station and the majority of teaching staff are therefore acquainted with the situation in medical stations.

An analysis of the responses to question 15 is reflected in table 7.16.

TABLE 7.22

IMPRESSIONS ABOUT NURSING CARE RENDERED IN MEDICAL STATIONS

	EONC	
RESPONSE	N	%
NURSING CARE GOOD	2	29
NURSING CARE LIMITED	1	14
RELAXED COMPARED TO HOSPITAL	1	14
MAINLY CURATIVE	1	14
NO REGISTERED NURSES DURING CERTAIN TIMES	1	14
NURSES NOT TRAINED FOR THE JOB	0	0
NO NURSING CARE	1	14
NOT APPLICABLE	0	0
TOTAL	7	99

Table 7.22 illustrates the fact that virtually every respondent had a different impression of the nursing care rendered at medical stations. Two (29%) of the EONC respondents had the impression that the nursing care was good, one of the respondents (14%) indicated that the nursing care was not up to standard, and mainly curative in nature. Another respondent (14%) had the impression that the nursing care was non existent.

Although only one of the respondents had worked in a mine medical station prior to teaching, the other respondents had been to the mine medical stations on visit. This enabled them to form an opinion about the quality of the nursing care in the mine medical stations. The diversity in responses is therefore

of importance, because the registered nurses in the mine medical stations are subjectively involved with their own situation, and a peer group review of their services will be of help in identifying short-comings in the service rendered to the mine workers.

ITEM 9 : PERCEPTIONS ABOUT NEED FOR CONTINUING EDUCATION PROGRAMME FOR REGISTERED NURSES IN MINE MEDICAL STATIONS AS PERCEIVED BY PEER GROUP

The last item is based on the analysis of the data obtained in question 20. The question established whether other groups of registered nurses perceived a need for a continuing education programme for registered nurses in mine medical stations. The results need no graphic display as the majority of respondents perceived a need for a continuing education programme for registered nurses in mine medical stations, namely 6 (86%) of the respondents. Only one respondent was uncertain about the need for such a programme. This correlates with the findings of question 13 of Checklist A, as presented in table 7.12, where 96% and 91%, respectively, of the respondents indicated that they themselves perceived a need for a continuing education programme.

An analysis of the data obtained in question 21 highlights the fact that there is no uniformity about the specific disciplines in nursing to be included in a continuing education programme. Three of the respondents (43%) favoured a combination of disciplines, such as occupational health nursing, primary health nursing science, traumatology and administrative skills. Two respondents (29%) preferred community nursing science, while another (14%) perceived occupational health nursing science to be of importance. A diversity of responses was given, such as a need for a primary health care programme with psychology and rehabilitation as important subjects, a community nursing science programme, an emergency medical assistant programme, an occupational health nursing science programme, traumatology and epidemiology. Where these recommendations were applicable, they were incorporated in the proposed continuing education programme

for registered nurses working in the medical stations of the gold mining industry.

This concludes the situational analysis of the mine medical stations and the nursing colleges that were included in the research.

7.3 PILOT IMPLEMENTATION OF THE CONTINUING EDUCATION PROGRAMME

This aspect can be divided into three separate components, namely, the planning phase, the implementation phase and the evaluation phase. this will be discussed as follow.

7.3.1 Planning a curriculum for a continuing education programme

On completion of the situational analysis, the results were analyzed, and the need for a continuing education programme for registered nurses in mine medical stations became clear. Based on the findings of the checklist, and an analysis of the empirical observations in the mine medical stations, a curriculum for continuing eduction for registered nurses in the medical stations of the gold mining industry was developed.

The curriculum was developed using the following documents obtained from the South African Nursing Council:

1) Council policy in respect of post-basic programmes, dated 17 February 1989, and numbered 83/M89.
2) Draft regulations for the minimum requirements for registration of an additional qualification in a clinical nursing science field, dated 21 March 1989, and numbered 82/M89.
3) Post-basic clinical programmes : Teaching guide for compulsory subject: Nursing dynamics, dated 17 February 1989, and numbered 84/M89.
4) Teaching guide for post-basic elective programme in occupational health nursing science, dated 21 February 1989, but not numbered.

5) Teaching guide for post-basic elective programme in community nursing science, dated 21 February 1989, and numbered 85/M89.
6) Teaching guide for post-basic elective programme in primary health nursing science, dated 24 August 1989, and numbered 2/M90.
7) Teaching guide for post-basic elective programme in medical and surgical nursing science, dated 21 February 1989, and numbered 62/M89.
8) Directive for the diploma in clinical nursing science, health assessment, treatment and care, Regulation R. 48 of 22 January 1982, as amended in Regulation R. 2563 of 15 November 1985.
9) Regulations for the diploma in clinical nursing science, health assessment, treatment and care, Regulation R. 48 of 22 January 1982, as amended in Regulation R. 2563 of 15 November 1985.

A curriculum for continuing education was developed. This curriculum contained the following subjects:
- Ethos and professional practice, 25 periods of 40 minutes each.
- Primary health nursing science, 25 periods of 40 minutes each.
- Trauma nursing science, 25 periods of 40 minutes each.
- Occupational health nursing science, 25 periods of 40 minutes each.
- Pharmacology, 10 periods of 40 minutes each
- Clinical nursing science, health assessment, treatment and care, 45 periods (including practica) of 40 minutes each.

7.3.2 The pilot implementation of the continuing education programme

The pilot implementation was planned for the period 7 - 25 January 1991. The venue was the Auditorium of the Leslie Williams Memorial Hospital in Carletonville.

The preparation for this implementation phase involved the following:

a) In a letter dated 20 August 1990, the curriculum was presented to Prof F M J de Villiers for approval before the pilot presentation of the programme. Tentative dates for this presentation were given, and permission asked to involve the academic staff of the Department of Nursing Sciences of the Potchefstroom University for Christian Higher Education.
b) Dr E Petschel, Medical superintendent of the Leslie Williams Memorial Hospital was asked for permission to utilize the services of the medical officers at this hospital to present lectures on occupational medicine (See Annexure M).
c) Thereafter Dr E Petschel was provided with a copy of the relevant sections of the curriculum to be presented by the medical officers (See Annexure N).
d) Dr C P Kahl of the Department of Nursing Sciences of the Potchefstroom University for Christian Higher Education, was asked to assist with the teaching of certain aspects of the curriculum (See Annexure O).
e) Mrs B van den Heever of the Department of Nursing Sciences of the Potchefstroom University for Christian Higher Education, was asked to assist with lectures on traumatology and shock (See Annexure P).
f) Dr P Allin, Chief Medical Officer of the Department of Occupational Health at the Ernest Oppenheimer Hospital, was given a summary of the curriculum, and asked to select candidates from amongst the medical station personnel to attend the pilot presentation of this programme (See Annexure Q).
g) Prof J P Lowe, consulting Medical Officer of the Gold Fields of South Africa Limited gold mining company, was given copies of the proposed programme, and asked to assist with the selection of candidates to attend the presentation of the pilot programme (See Annexure R).

Ultimately, the programme was presented in the period 7 - 25 January 1992 at the Auditorium of the Leslie Williams Memorial Hospital. Copies of the lecture programme are attached as Annexure S. Lectures were presented during the morning sessions, and students were involved in practica and preparation for seminar work during the afternoons. There were two

occasions when lectures were offered during the afternoons as well.

The following persons were involved in the teaching of the programme, as given below:

OCCUPATIONAL HEALTH NURSING SCIENCE

Prof J P Lowe.

Mr J J Keogh

TRAUMA NURSING SCIENCE

Prof J P Lowe.

Dr S Shearer.

Dr J G van A. Munro.

Dr E Petschel.

Dr P Oberholtzer.

Dr Duvenhage.

Dr S Hagen.

Mrs B van den Heever.

PRIMARY HEALTH NURSING SCIENCE

Dr C P Kahl.

Mr J J Keogh.

CLINICAL NURSING SCIENCE, HEALTH ASSESSMENT, TREATMENT AND CARE

Dr C P Kahl.

Mr J J Keogh.

Miss E L Brand (Pharmacology).

ETHOS AND PROFESSIONAL PRACTICE

Mr J J Keogh.

7.3.3 Attendance of the pilot implementation of the continuing education programme

A total of seven registered nurses attended the continuing education programme. Representation from the two mining companies was as follow:

- Two candidates from the Freegold mines.

- Five candidates from the Gold Fields of South Africa Limited gold mining company. These candidates were subdivided into three candidates from the mines included in the study, and two candidates from another area.

The lectures were given in the auditorium of the Leslie Williams Memorial Hospital, and the practica was done in the hospital itself. Lectures were presented, discussion groups held, slides shown where relevant, and the MAST suit was demonstrated by Dr E Petschel.

On completion of the programme, an evaluation was done, which will be discussed below.

7.3.4 Evaluation of the pilot presentation

On 25 January 1990, the candidates wrote a three hour examination (See Annexure T for a copy of the question paper). On completion of the examination, the candidates were asked to write an evaluation of the programme, and they were informed that their evaluation and recommendations would be utilized to improve the curriculum, thus finalizing it.

The written evaluation was unsuccessful. Only one candidate (14%) passed the examination. There might be a multitude of reasons for this, but it would be pure speculation. However, the fact that this course was offered over a three week period was a definite contributing factor, and the candidates had to cover vast quantities of study material. Although they were familiar with the mine medical stations, the material presented to them was, in most cases, a new experience.

The personal evaluation of the programme as given by the candidates, can be given as follow:

<u>Need for the programme</u>

1: Registered nurses left in medical stations with resultant deterioration of standard of nursing care - 1 candidate
2: Many aspects of nursing care needed in continuing education

in order to render quality nursing care - 1 candidate.

3: Identifies the role and functions of the medical station superintendents, and can prevent these functions being taken away from them by other departments in the mining industry - 1 candidate.

4: Will help the medical station personnel to see the patient as a human being, and not merely a patient - 1 candidate.

Positive aspects of programme

1: Learnt aspects previously unknown to the candidate - 1 candidate.

2: Well organized - 2 candidates.

Areas lacking in programme

1: Information needed on medical emergencies - 2 candidates.

2: Female employees necessitate a family planning programme - 1 candidate

3: Industrial psychology could be added - 1 candidate.

4: Greater emphasis on health education - 1 candidate.

5: More information needed on disaster planning - 1 candidate.

6: Ethos and professional practice not necessary - 2 candidates.

7: More assignments can eliminate the need for an examination - 1 candidate.

8: More pharmacology needed - 1 candidate.

9: More information about medical station administration and procedures needed - 1 candidate.

Personal remarks

1: Smoking should not be allowed in the class room - 1 candidate.

2: Time span of the programme was too short - 2 candidates.

3: It can only be effectively implemented if made compulsory for all medical station superintendents - 1 candidate.

4: Doctors in the hospital must be involved, in order to eliminate ignorance on their part - 1 candidate.

There was a racial incident, and one candidate reacted to that in the evaluation of the programme.

7.4 CONCLUSION

This concludes the analysis of the results of the situational analysis, where the needs of the potential student population were established. The nursing colleges that could possibly offer a continuing education programme to the registered nurses in the mine medical stations were also included in the situational analysis, and an analysis of the data was also presented.

Based on these findings, a pilot presentation of the programme was presented at the Leslie Williams Memorial Hospital in Carletonville, and an analysis of the evaluation of this pilot presentation was discussed.

In chapter 8 the conclusions, recommendation and a concluding remark on this research will be given.

CHAPTER 8

SUMMARY, CONCLUSION AND RECOMMENDATIONS

OVERVIEW OF THE CHAPTER

The aim of this chapter is to summarize the complete study, make certain conclusions and recommendations, before ending the chapter with a conclusive remark.

8.1 SUMMARY

8.1.1 Objectives of the study

The objectives for this research were given in Chapter 1,, paragraph 1.5, p. 4 - 5. On completion of this research, it is clear that these objectives have been reached. The analyzed data enables one to determine the nature of the services offered to the mine workers including the specific health problems encountered at the mine medical stations, the educational level, and, to a lesser extent, the skills of the registered nurses in the mine medical stations. An analysis of the empirical observation of the services offered in the mine medical stations, combined with the analysis of the information obtained from the respondents and the statistics regarding services rendered, provides the information for a synthesis of the exact learning needs of the registered nurses in the mine medical stations. These learning needs were utilized in the development of a curriculum for continuing education for registered nurses working in mine medical stations within the gold mining industry.

A pilot presentation of this programme was done at the Leslie Williams Memorial Hospital. On completion of the programme, the students were subjected to a written evaluation of the programme, and they were also asked to evaluate the programme offered to them. This evaluation was used in finalizing the curriculum.

8.1.2 The need for continuing education

The available literature studied in this research highlighted the fact that continuing education is viewed as a very important component of the professional life of the registered nurse, this on a global basis. The South African Nursing Council (1987:4) states the importance of continuing education for the registered nurse to keep abreast of developments in nursing after the initial registration. This was in agreement with the findings of the research where 96,2% of the respondents from the Freegold

mines, and 90,9% of the respondents from the Gold Fields of South Africa Limited mines also acknowledged the need for continuing education.

There were also certain problems encountered in the research. Sixty five percent of the respondents from the Freegold mines, and 100% of the respondents at the Gold Fields of South Africa Limited mines completed their basic nursing education programmes more than ten years ago. Sixty percent of the respondents from the Freegold mines and one respondent from the Gold Fields of South Africa Limited mines, indicated that they learned the skill to conduct a physical assessment during their basic nursing education programme. However, this could not have been the case, as the shortcomings in regarding this particular aspect of the nursing education programmes prior to 1986 are already highlighted in Chapter 2, paragraph 2.3, p. 16 - 18. Taking into account the role and functions of the registered nurse in the mine medical stations, as described in Chapter 3, paragraph 3.5, p. 75 - 89, these registered nurses had not registered for an educational programme that would adequately prepare them for their task.

At both mines the respondents indicated that they would not mind if a continuing education programme was developed, and implemented in a compulsory format. Seventy five percent of the Freegold respondents, and 81% of the Gold Fields respondents, indicated that they would be willing to register for such a programme. Implementing a continuing education programme is, however, very expensive, as is highlighted by Lowe (1992:1) and Allin (1992:1).

8.1.3 Nursing services offered at the mine medical stations

Conditions in underground mines are similar world wide, as demonstrated by Frost (1986:169). These conditions include the fast descent into the shaft, which can cause barotrauma, the heat inside the shaft, which can cause heat exhaustion, the narrow and

uncomfortable work place, which can cause muscle injuries, as well as other traumas, and the danger of explosions or inhalation of dangerous gases. These dangers can be encountered in most of the mines in South Africa.

From the empirical observation, it was clear that the registered nurses in the mine medical stations were rendering mainly three services, namely:

1) An occupational health service, albeit a superficial service, as they are not involved in prevention programmes for diseases such as pneumoconiosis or heat illnesses, the pre-placement examinations of new recruits, or the disaster planning of the mine;
2) a health assessment, diagnosis, treatment and care service, although they were unaware of the legal requirements for such a service. This was demonstrated in question 21 of Questionnaire A, when, incidentally, 73% of the respondents from both gold mining companies indicated that they were unaware of Article 38A of the Nursing Act, Nr 50 of 1978, and
3) a trauma nursing service. Excellent first aid qualifications are held by the registered nurses at both mining companies: 50 % and 73% of the respective respondents held a gold medal and instructor diploma. Although this could not be a substitute for trauma nursing science, this should enable them to render a satisfactory service in this regard.

No literature supporting the combination of these specific nursing disciplines in nursing as applied in the gold mining industry was found. However, literature highlighting important aspects of these three nursing disciplines is contained in Chapter 4, paragraph 4.3, p. 105 - 115.

Although occupational health nursing science in the Republic of South Africa came into being as a result of the gold mining industry, not one of the respondents held a qualification in

occupational health nursing science. During 1991, four of the registered nurses from the Gold Fields of South Africa Limited mines registered for an occupational health nursing science programme.

As a result of the situational analyses, some areas of concern were identified. The most important concern was the fact that the doctors at the Freegold mines had the perception that the registered nurses themselves did not identify the need for continuing education. Although the respondents were positive in their responses, as already pointed out, they portrayed an attitude of not being really keen to pursue such a programme. The respondents created the feeling that they provided responses in order to set the minds of the doctors at rest. This was of concern, as 92% of the Freegold respondents, and 73% of the Gold Fields respondents indicated that they were conducting physical assessments on patients, but they were not aware of the legal implications. Added to this was the fact that only 76% of the Freegold respondents indicated that they were competent to conduct such a physical assessment. This concurs with the literature discussing the reluctance to embark on continuing education programmes in Chapter 2, paragraph 2.2, p. 12.

Forty two percent of the Freegold respondents, and 73% of the Gold Fields respondents, had completed their basic nursing education programmes in non-mining hospitals. They were employed in mine medical stations without any continuing education programme, while the health care setting was totally alien to them. This necessitates a continuing education programme for these employees when they are employed in a mine medical station.

When discussing job satisfaction and retirement, 77% and 82% of the respective respondents indicated that they experienced job satisfaction, which is an acceptable number. However, two of the Freegold respondents indicated that they were opting for early retirement, as they did not experience any job satisfaction. One of these respondents was only 47 years old.

8.1.4 The nursing colleges

The situational analyses at the Ernest Oppenheimer Nursing College and Gold Fields Nursing College, enabled the author to determine that the Ernest Oppenheimer Nursing College would not be suitable for offering a continuing education programme to the registered nurses in the mine medical stations. The library was outdated and 29% of the teaching personnel held the qualification of registered nurse only. However, since completion of the situational analysis, it has been decided that this college would phase out their current students, and then dissolve.

The teaching personnel of the Gold Fields Nursing College, were well qualified and capable of presenting such a programme. The author was concerned with the fact that the personnel were presenting combinations of subjects, which could be an indication of a staff shortage. In this case, this college would also be incapable of presenting the programme. However, in the event of teaching staff becoming available, even in the format of guest lecturers from the Potchefstroom University for Christian Higher Education, combined with medical doctors employed by the Gold Fields of South Africa Limited mines, this programme could be presented at the Gold Fields Nursing College.

8.2 CONCLUSIONS

As a result of this research, the following conclusions were reached:

- There is an urgent need for a continuing education programme for registered nurses in the mine medical stations of the gold mining industry.
- This need was experienced in both the mining companies included in the research, and may therefore be experienced in all the gold mining companies of South Africa.
- The specific aspects to be included in the programme should include aspects of occupational health nursing, primary health care and primary nursing care, including health

assessment, diagnosis, treatment and care and pharmacology, trauma nursing care, and ethos and professional practice of nursing.

- That registered nurses in the mine medical stations are rendering services in the mine medical stations without acknowledging the legal constraints of their scope of practice.
- That there is an urgent need for the administrators of the health services of the mining companies to consult with the South African Nursing Council regarding the legal status of the registered nurses in the mine medical stations. These nurses are using treatment protocols, and are unaware of the legal implications of doing so. Although the service of the Gold Fields of South Africa Limited mines are now authorized by the Director-General of the Department of National Health and Population Development, the fact that 73% of the respondents from both mines did not know about Article 38A of the Nursing Act, No 50 of 1978, may lead to the development of medico-legal risks. This also serves as a motivation for the urgency for a continuing education programme for the registered nurses in the mine medical stations.
- That an nursing education programme approved by the South African Nursing Council be offered, instead of non-nursing programmes such as the emergency medical technician programme, as the registered nurses are ultimately responsible for their actions, and accountable to the South African Nursing Council in malpractice situations.
- Although the registered nurses hold excellent first aid qualifications, this should not be deemed more important than a programme in trauma nursing science. First aid programmes were run for years by the same medical station personnel, and may need revision.
- A large percentage of the respondents completed their basic nursing education programmes outside the gold mining industry, and are appointed, without continuing education programmes available to them, in a nursing service

completely unfamiliar to them.

- A substantial number of respondents from both mines completed their basic education programmes more than ten years ago, and without continuing education programmes, these nurses should now have specific learning needs in order to keep up with developments in the nursing profession.
- Registered nurses should become involved in preventive and promotive health programmes of the mining industry, as well as the development of disaster plans, and not concentrate on curative aspects only, as demonstrated in their job descriptions.
- That their job descriptions are not according to acceptable standards, and reflecting functions outside their scope of practice.
- The respondents did not perceive their promotional chances as being favourable, which led to dissatisfaction.
- The registered nurses in the mine medical stations did not perceive a compulsory continuing education programme as unacceptable.
- That Gold Fields Nursing College is a suitable venue for a continuing education programme.

8.3 RECOMMENDATIONS

8.3.1 The registered nurses in the mine medical stations

The recommendations regarding the registered nurses in the mine medical stations stem from the findings in this research.

A task analysis should be done regarding all the functions contained in the job descriptions of registered nurses. This can be used as a basis for determining the need for a different post structure that could be used in the mining industry, while simultaneously it will enable the person doing the task analysis to develop job descriptions that will suit the requirements of nursing practice as spelled out in the Regulations relating to

the scope of Practice of persons who are registered or enrolled under the Nursing Act 1978, Regulation R. 2598 of 30 November 1984.

It is also recommended that the registered nurses themselves approach the South African Nursing Council for clarification on their functions to assess the health status of the patients, to diagnose (it is doubted that these diagnoses as contained in the job descriptions refer to nursing diagnoses), and to treat the patients, whether a treatment protocol is used or not. This is clearly spelled out in Article 38A of the Nursing Act, No 50 of 1978, but some mis-interpretations still exist. If treatment protocols are used, the guidelines for them being used should be studied by all concerned. The registered nurses of the Gold Fields of South Africa Limited mines may now function within an authorized service, but their lack of knowledge, as demonstrated in Chapter 7, item 8, table 7.6, p. 201, necessitates further investigation. This table highlighted the fact the 73% of the respondents from both mining companies did not even know about Article 38A of the Nursing Act, Act No 50 of 1978. The Freegold mines are not yet authorized, and are using treatment protocols. The legal status of the nurse within this system also needs to be spelled out to the registered nurses.

The continuing education programme as developed in this study should be seriously considered for implementation in both mining companies. The companies can approach the Department of Nursing at the Potchefstroom University for Christian Higher Education for this curriculum, and submit it to the South African Nursing Council for approval. Implementation of this programme will have numerous advantages, as it will satisfy the need for a continuing education programme as identified by the registered nurses themselves, while simultaneously it will enable the successful candidates to be authorized by the South African Nursing Council to practice under the auspices of Article 38A of the Nursing Act, Nr 50 of 1978. This will prevent all future problems regarding the legality of their practice.

A very important recommendation is that the registered nurses in the mine medical stations should become involved in both prevention programmes, eg preventive programmes for tuberculosis, AIDS, pneumoconiosis, and other occupational related diseases, and the planning of disaster plans within the mining context. Health education is a very important aspect of preventive health care, but was lacking during the empirical observations in all the medical stations. The impression was created that the Loss Control Department of each mine was responsible for preventive health care, but because of their medical background, these nurses should be excellent resources for information regarding the above aspects. The implementation of the said continuing education programme will further equip them for this task.

Because of their occupational health function, these nurses should also become involved in the pre-employment or pre-placement examinations of new recruits. Although this aspect is mentioned in some of the job descriptions, the impression was also created that they were not involved in these tasks at all. The impression was again created that the Loss Control Department of each mine was responsible for this task.

It is also recommended that all registered nurses in the mine medical stations use a standardised format to report the necessary statistics. This will prevent individual nurses developing extensive and totally unnecessary reporting formats of no use to anybody. At the time of the situational analyses, uniform reporting systems were in the process of being implemented, but still some of the registered nurses indicated that they would report the statistics in their own ways, as the new formats were deemed to be useless. The importance of adequate statistics was lost on most of the respondents.

It is recommended that the registered nurses in the mine medical stations develop standard nursing care plans for all the conditions regularly encountered in the medical stations. This will ensure scientific nursing care to the patient, while also

ensuring safe nursing practice. These standard nursing care plans can then be used for quality assurance programmes, or the evaluation of nursing care rendered.

The practice of all registered nurses going off duty at 16:00 is unacceptable. There is a "sick parade" during the period 16:00 - 07:00, and the enrolled nurse responsible for this is acting outside his scope of practice. This should be conducted by a registered nurse. To accept that the nurse can travel to the mine if required, is unacceptable, as it may take up to twenty minutes to get to the shaft, and people can die during that time through lack of adequate nursing care.

Trans-cultural nursing is very important in the mine medical stations, as already highlighted in the section on migrant workers contained in Chapter 3, paragraph 3.2.4, p. 40 - 41. It is therefore recommended that the registered nurses in the mine medical stations make a concerted effort to render their nursing care using a trans-cultural approach. Acknowledgement for the cultural differences encountered in the migrant workers is of the utmost importance.

The last recommendation regarding the medical stations is about the service itself. In both mining companies, the registered nurses spent a considerable time in dispensing prescription medicines to the workers. This is a waste of manpower, and takes away the responsibility of the individual to care for his own health care. Medicines should be given to the patient, and he must be made responsible for his own medicines.

8.3.2 The nursing colleges

As far as the nursing colleges are concerned, recommendations can only be made for the Gold Fields Nursing College, as the Ernest Oppenheimer Nursing College is in the process of closing down.

It is recommended that this college be considered as a venue for

the proposed continuing education programme. The personnel are amply qualified to present the programme.

The Freegold mines could approach this college to present the programme to their personnel, and arrangements be made to present the programme in such a manner that the services of the Freegold mines will not be halted, eg the programme may be offered on a part-time basis, using a modular teaching approach. This will afford the student the opportunity to assimilate the information, and apply it in practice, before the next session. In this manner, both the student and the service will benefit from the programme, while the teaching personnel of the nursing college will not be unduly overloaded. This can be done under the auspices of the Department of Nursing of the Potchefstroom University for Christian Higher Education. Alternatively, this nursing department may be contracted to present this continuing education programme on behalf of the mining companies. Agreements to this effect would have to be investigated.

The teaching staff responsible for developing the micro-curriculum, must pay specific attention to the development of the "Hidden" curriculum. The transfer of professional values and norms is equally important to the transfer of knowledge about nursing procedures, and must receive adequate attention.

8.3.4 Further research

It is recommended that the problems regarding the nursing service in the medical stations be used as a basis for further research in order to conduct a task analysis of each category of registered nurse in the mine medical station. This can be a doctoral study for a student in nursing administration, as the logical outflow of this study would be the development of proper job descriptions for all categories of registered nurse in the mine medical stations.

It is also recommended that the completed curriculum for

continuing education be implemented and evaluated. This should be done by determining the skills of the registered nurses before and after the implementation of the programme, and it could form the basis for experimental research in this field. It is recommended that this be done after completion of the task analysis. This should provide ample research opportunities for a doctoral study in nursing education.

Lastly, a magister study in community nursing science is possible in the field of the development of preventive programmes for conditions such as tuberculosis, AIDS and pneumoconiosis, which can be implemented in the gold mining industry.

8.4 CLOSING REMARK

Leedy (1989:4 - 5) states that research is not the mere gathering of facts, or the transportation of information from one point to the next, or a mere rummaging for information or a means of getting attention. It is an attempt to find the answer to a question in a systematic way by means of a demonstrable fact. This research aimed at just that. An attempt was made to find the answer to the question of necessity for a continuing education for registered nurses in the mine medical stations, and it has produced the answer, namely a definitively positive need for continuing education.

At the same time, it has opened the possibility for further research in the gold mining industry. Occupational health nursing, especially in the gold mining industry, is a field where research is lacking, and an opening has been created whereby other researchers can enter this field. The contribution of this research coupled to the valuable contributions of future research will only contribute to a health care service that will again be, as it once was in the time of Dr A J Ornstein, second to none in the world.

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ANNEXURE A

MEDICAL STATIONS

MASS CASUALTY PLAN

Ernest Oppenheimer Hospital

DEPT. OF OCCUPATIONAL HEALTH

FILE : C20

PROTOCOL : : MEDICAL STATIONS MASS CASUALTY PLAN

DATE : : 9 JANUARY 1992

This plan is intended as a guideline and the action taken can be according to the circumstances that prevail. This plan may be integrated with the mine's emergency preparedness plans (ISRS Element 7).

DEFINITION OF MASS CASUALTIES : 4 stretcher cases, or 10 walking wounded, arriving at once provides the earliest indication of mass casualties. (There can also be medical mass casualties).

		RESPONSIBILITY
1.	ATTEMPT TO FIND OUT DETAILS OF THE INCIDENT.	
2.	NOTIFICATION : AIM : TO INFORM RELEVANT MEDICAL STAFF	
	NOTIFY - DUTY PROFESSIONAL NURSE	DUTY NURSE
	- SENIOR MEDICAL STATION SUPERINTENDENT	DUTY PROF. NURSE
	- MEDICAL STATION SUPERINTENDENTS	DUTY PROF. NURSE
	- ALL PROFESSIONAL NURSES	DUTY PROF. NURSE
	- MINE MEDICAL OFFICER	DUTY PROF. NURSE
	- ERNEST OPPENHEIMER HOSPITAL (Leave contact phone number)	DUTY PROF. NURSE
	EOH WILL SET UP A CONTROL AND WILL ADVISE ITS PHONE NUMBER.	
3.	TRIAGE : AIM : PRIMARY EMERGENCY CARE : PREVENT UNNECESSARY REFERRAL TO EOH	
	SERIOUS CASES TO RESUSCITATION ROOM	MMO
	MINOR CASES TO WAITING AREA	PROF. NURSES
	FURTHER TRIAGE WILL BE DONE AT EOH	
4.	TRANSPORT :	
	AIM : ARRANGE THAT ADEQUATE NUMBER OF AMBULANCES ARE AVAILABLE	SMSS
	- LOCAL MINE - OTHER MINES - EOH - PROVINCIAL AMBULANCE SERVICE	
5.	GENERAL :	
	- REGULAR UPDATES TO EOH	MMO
	- SECURITY TO KEEP MEDICAL STATION CLEAR AND PROTECT MEDICAL STAFF	SMSS / MMO
	- ENSURE ADEQUATE MEDICAL SUPPLIES ARE AVAILABLE	MSS
	- CLERK TO RECORD COMPANY NUMBERS AND DIAGNOSES OF INJURED. (Copy sent to Chief Medical Officer, Department of Occupational Health)	CLERK
	- NO INFORMATION TO BE GIVEN TO NON MINE PERSONNEL OR THE PRESS	ALL
	- IF NECESSARY, A PLACE OF REFUGE FOR THE UN-INJURED SHOULD BE OBTAINED AWAY FROM THE MEDICAL STATION	PERSONNEL DEPT.
6.	THE DECEASED :	
	- TO BE PLACED IN A SECURE PRIVATE AREA	MSS
	- UNIDENTIFIED BODIES TO BE LABELLED AND NUMBERED	MSS
	- CERTIFICATION OF DEATH TO BE DONE AT THE MINE	MMO
7.	POST EVENT DISCUSSION :	
	TO BE ORGANISED AS SOON AS PRACTICAL	SMSS

P. W. ALLIN - C.M.O.

(a:C-20)

ANNEXURE B

EXAMPLE OF NURSING CARE PLAN

(Hunt *et al.*, 1986:127 - 132)

An example of a District Nursing Care Plan format.
(Reproduced by courtesy of City & Hackney Health Authority.)

CITY AND HACKNEY HEALTH AUTHORITY - DISTRICT NURSING

NURSING HISTORY

PATIENT'S DETAILS

Surname ______ Title ______
Other names ______
Marital status ______
Date of birth ______ Age ______
Address ______
Telephone number ______
Religion ______
Religious/Cultural needs ______

HOUSEHOLD DETAILS

Does patient live alone? ______
Other household members ______
Housing Conditions ______
Any visiting problems ______
Person to be contacted ______
Relationship ______
Address ______
Telephone numbers -
Home ______ Work ______
Any children ______
Any other dependents ______
Other contacts ______
Address ______
Telephone number ______

MEDICAL DETAILS

Diagnoses ______
Operation(s) ______
Allergies ______
Relevant medical history ______
Previous relevant hospital attendances ______
Current hospital attendances ______
Patient's understanding of illness ______
Family's understanding of illness ______

SOCIAL DETAILS

Present/previous occupation ______
Effect of illness on occupation ______
Source of income ______
Who deals with income/finances ______
Hobbies/Interests ______

COMMUNITY DETAILS

Sister/Charge Nurse ______
Date of referral ______
Referred by whom ______
Reason for referral ______
G.P. ______
Address ______
Telephone number ______
Shared cared with:-
Twilight ______
MacMillan ______
Community psychiatric nurse ______
Other ______

COMMUNITY DISCHARGE

Date of discharge ______
Reason for discharge ______

NAME: ADDRESS. CENTRE:

DATE	No.	PROBLEM	AIM OF CARE	NURSING ACTION	SIGNATURE	REVIEW DATE

THE CITY AND HACKNEY HEALTH AUTHORITY
COMMUNITY NURSING DIVISION

TO BE RETAINED IN PATIENT'S HOME AND COMPLETED AT EACH VISIT

DATE COMMENCED:

DATE COMPLETED:

NAME:		PERSON TO BE CONTACTED:
ADDRESS:		RELATIONSHIP:
TELE. No.:		ADDRESS:
RELIGION:	D.O.B.	TEL. No.:

DISTRICT NURSE

G.P.

TEL. No.:

NURSING BASE:

HEALTH VISITOR

SOCIAL WORKER

SERVICES	SUN	MON	TUES	WED	THURS	FRI	SAT
HOME HELP							
MEALS ON WHEELS							
LAUNDRY a) House-bound b) Incon-tinent							
DAY CENTRE							
DAY HOSPITAL							
TWILIGHT SERVICE							
OTHERS							

CHIROPODY

INITIAL ASSESSMENT

DATE				NURSE'S SIGNATURE
	TPR		B/P	
	URINALYSIS		WEIGHT	

	PROBLEM/NEED	NURSING ACTION	EVALUATION	

ACTIVITIES OF DAILY LIVING

NUTRITION

Normal meal pattern ______

Special diet ______

Alcohol intake ______

*Cooking facilities ______

Who does the shopping? ______

Any problems with eating ______

ELIMINATION

Normal bowel pattern ______

Any aperients ______

Any bowel problems ______

Any urinary problems ______

Special appliances ______

HYGIENE

Description of skin/mouth condition ______

MOBILITY

Type of help (including aids) required for:- ______

Walking ______

Dressing ______

Washing ______

Toiletting ______

Feeding ______

Other ______

BREATHING ______

Smoking habits ______

SLEEP

Normal sleep pattern ______

Aids to sleep ______

Naps during day ______

Any difficulties ______

SENSES

Vision (including aids) ______

Hearing (including aids) ______

Speech (including any language difficulty) ______

Balance ______

Co-ordination ______

Pain ______

Methods of pain relief ______

EMOTIONAL STATE

DRUG INFORMATION

NAME OF DRUG	DOSAGE	FREQUENCY	DATE STARTED	DATE STOPPED	SIDE EFFECTS NOTICED

COMMUNITY SERVICES

SERVICES INVOLVED			EQUIPMENT ON LOAN (STATE ITEMS)	
	EXISTING	REQUESTED	HEALTH AUTHORITY	SOCIAL SERVICES
HEALTH VISITOR				
CLINIC NURSE				
CHIROPODIST				
PHYSIOTHERAPIST				
OCCUPATIONAL THERAPIST				
SOCIAL WORKER				
HOME HELP				
MEALS ON WHEELS				
DAY CENTRE/LUNCHEON CENTRE				
DAY HOSPITAL				
VOLUNTARY SERVICES				
BATHING SERVICE				
LAUNDRY SERVICE.				
(a) HOUSEBOUND				
(b) INCONTINENT				

ANNEXURE C

NANDA APPROVED NURSING DIAGNOSES

(Annexure to Kim *et al.*, 1991)

NANDA—Approved Nursing Diagnoses

Activity intolerance
Activity intolerance, potential
Adjustment, impaired
Airway clearance, ineffective
Anxiety
Aspiration, potential for
Body image disturbance
Body temperature, altered, potential
Bowel incontinence
Breastfeeding, effective
Breastfeeding, ineffective
Breathing pattern, ineffective
Cardiac output, decreased
Communication, impaired verbal
Constipation
Constipation, colonic
Constipation, perceived
Coping, defensive
Coping, family: potential for growth
Coping, ineffective family: compromised
Coping, ineffective family: disabling
Coping, ineffective individual
Decisional conflict (specify)
Denial, ineffective
Diarrhea
Disuse syndrome, potential for
Diversional activity deficit
Dysreflexia
Family processes, altered
Fatigue
Fear
Fluid volume deficit (1)
Fluid volume deficit (2)
Fluid volume deficit, potential
Fluid volume excess
Gas exchange, impaired
Grieving, anticipatory
Grieving, dysfunctional
Growth and development, altered
Health maintenance, altered
Health-seeking behaviors (specify)
Home maintenance management, impaired
Hopelessness
Hyperthermia
Hypothermia
Incontinence, functional
Incontinence, reflex
Incontinence, stress
Incontinence, total
Incontinence, urge
Infection, potential for
Injury, potential for
Knowledge deficit (specify)
Mobility, impaired physical
Noncompliance (specify)
Nutrition, altered: less than body requirements
Nutrition, altered: more than body requirements
Nutrition, altered: potential for more than body requirements
Oral mucous membrane, altered
Pain
Pain, chronic
Parental role conflict
Parenting, altered
Parenting, altered, potential
Personal identity disturbance
Poisoning, potential for
Post-trauma response
Powerlessness
Protection, altered
Rape-trauma syndrome
Rape-trauma syndrome: compound reaction
Rape-trauma syndrome: silent reaction
Role performance, altered
Self-care deficit, bathing/hygiene
Self-care deficit, dressing/grooming
Self-care deficit, feeding
Self-care deficit, toileting
Self-esteem disturbance
Self-esteem, chronic low
Self-esteem, situational low
Sensory/perceptual alterations (specify) (visual, auditory, kinesthetic, gustatory, tactile, olfactory)
Sexual dysfunction
Sexuality patterns, altered
Skin integrity, impaired
Skin integrity, impaired, potential
Sleep pattern disturbance
Social interaction, impaired
Social isolation
Spiritual distress (distress of the human spirit)
Suffocation, potential for
Swallowing, impaired
Thermoregulation, ineffective
Thought processes, altered
Tissue integrity, impaired
Tissue perfusion, altered (specify type) (renal, cerebral, cardiopulmonary, gastrointestinal, peripheral)
Trauma, potential for
Unilateral neglect
Urinary elimination, altered patterns
Urinary retention
Violence, potential for: self-directed or directed at others

ANNEXURE D

INDEX TO TREATMENT PROTOCOLS

Ernest Oppenheimer Hospital

Department of Occupational Health

INDEX TO PROTOCOLS

FILE NO.	TITLE	DATE
C1	Treatment of sexually transmitted diseases (1st revision)	21. 10. 91
C2	Medical examination of "gassing" cases (1st revision)	18. 09. 91
C3	Treatment of tonsillitis	05. 12. 88
C4	Treatment of common ear disorders	06. 12. 88
C5	Treatment of anaphylactic shock	23. 01. 89
C6	Rescue training service - medical examination rules and regulations (Chamber of Mines)	08. 02. 89
C7	The diagnosis and prehospital management of heat exhaustion.	09. 12. 91
C8	The diagnosis and prehospital management of heat stroke.	09. 12. 91
C9	Emergency equipment carried by professional nurses who may be called underground	05. 11. 91
C10	Mine medical station formulary (2nd revision)	24. 10. 91
C11	Examination of food handlers	11. 02. 91
C12	Medical laboratory requests	30. 04. 91
C13	Paraplegic care (1st revision)	11. 09. 91
C14	Treatment of a patient with a suspected myocardial infarction	03. 06. 91
C15	The emergency treatment of asthma	03. 06. 91
C16	The management of diabetic coma	03. 06. 91
C17	Emergency equipment trolley	06. 06. 91
C18	The emergency treatment of cyanide poisoning (1st revision)	23. 10. 91
C19	The Management of Common Eye Disorders	15. 01. 92
C20	Medical Stations Mass Casualty Plan	09. 01. 92
A1	Medical record cards (1st revision)	09. 12. 91
A2	Nurses dress code	09. 01. 92

15 January 1992
PWA / nb (a:index)

ANNEXURE E

PROPOSED CONTINUING EDUCATION PROGRAMME

DIPLOMA IN OCCUPATIONAL HEALTH NURSING SCIENCE

PROPOSED CONTINUING EDUCATION PROGRAMME
DIPLOMA IN OCCUPATIONAL HEALTH NURSING SCIENCE

PREFACE

The content of this document (curriculum) is based on the South African Nursing Council regulations and draft regulations for selected post-basic programmes.

There will be no philosophy contained in the document as the course will be offered by either the Department of Nursing - Potchefstroom University of Christian Higher Education, the Ernest Oppenheimer Nursing College, or the Gold Fields Nursing College. The relevant philosophy will have to be added depending on the specific institution.

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1 GENERAL

This programme will be offered to registered nurses employed in the gold mining industry. After successful completion of the programme, the qualification will be registered with the South African Nursing Council against the name of the candidate.

2 DURATION OF THE COURSE

The course will be offered over a period of 1 academic year.

3 ENTRY REQUIREMENTS

The student must prove current registration with the South African Nursing Council, as well as membership of the South African Nursing Association.

The student must be employed in the gold mining industry as a professional nurse.

4 CURRICULUM

SUBJECT	PERIODS (45 minutes)
CURRICULUM A: NURSING DYNAMICS	90
Ethos and professional practice	
Health service dynamics	
Management	
Communication and teaching	
Research	
CURRICULUM B: OCCUPATIONAL HEALTH CARE	90
CURRICULUM C: OCCUPATIONAL HEALTH NURSING SCIENCE	180
Occupational health nursing science	
Primary health nursing	
Clinical nursing science, health assessment, treatment and care	
Trauma nursing	

5 TEACHING STRATEGY

The programme will be offered as a full-time course in the form of lectures, group discussions, seminars and include active participation by the students in clinical learning opportunities. There will be self-study packages in certain components of the work with periodic student/educator contact.

The programme can be offered on a one day per week basis, or in a block system, as suitable to the gold mining company. A lecture day consists of a total of 9 periods, with a total of 396 periods in a 44 week academic year, thus leaving surplus periods for tests, revision and examinations. Lecture time will include theoretical teaching, as well as self-study time. Students will be given seminar work and assignments to prepare before the next lecture, as well as practical assignments.

NOTE: Students will be accompanied by the lecturers to ensure clinical competence.

6 EVALUATION

Evaluation will be done using two approaches, namely:

i) Formative evaluation. This evaluation involves continuous evaluation of the student's progress, both in theory and in practice.

ii) Summative evaluation. This evaluation involves the final evaluation in the examination.

7 PROGRAMME OBJECTIVES

7.1 Macro curriculum

7.1.1 Curriculum A

The curriculum must be designed in a manner that will enable the student to:

- Obtain perspective concerning the philosophy of nursing, in relation to:
    * the fundamentals of nursing
    * a personal professional orientation
    * factors currently influencing the development of the nursing profession
- Demonstrate an understanding of the position and the contribution of the nurse practitioner in the national health system and the factors which have an influence thereon
- Demonstrate assertiveness
- Demonstrate empathy
- Demonstrate skills in respect of:
    * handling conflict and stress
    * accompaniment
    * appropriate and creative teaching
    * written communication
    * first level management
    * patient advocacy
- Obtain perspective concerning research (South African

Nursing Council, 1988:1).

7.1.2 Curriculum B

The curriculum for the study programme must be compiled in a manner which will allow the student to:

- Analyze and interpret the population health profile
- Analyze and evaluate the demographic and ecological profile of an urban and a rural community and the factors which have an influence thereon
- Analyze and evaluate the community health status of a rural or urban community and the factors which have an influence thereon
- Develop and implement standards for quality assurance
- Utilize and/or establish referral resources (South African Nursing Council (a), 1989:1).

7.1.3 Curriculum C

The curriculum must be developed in a manner which will enable the student to:

- Analyze and interpret the health profiles on a national basis, and compare with those of the gold mining industry
- Evaluate the occupational health services on a national basis, and compare with those in the gold mining industry
- Identify and evaluate the factors which promote or threaten the health of man in his occupational environment
- Identify the high risk persons in the occupational

environment according to international criteria

- Identify and evaluate the appropriateness of interventions and of diagnostic and treatment methods that may apply to occupational health
- Analyze different viewpoints and justify a personal viewpoint regarding occupational health nursing science and primary health nursing science.
- Recognize and appreciate the pivotal role the occupational health nurse plays in relation to both the worker and management
- Practise occupational health nursing and primary health nursing science according to a scientific approach within the scope of:
  * professional ethical norms
  * legal provision
  * and in remote areas and emergency and disaster situations
- Utilize and/or establish referral resources (South African Nursing Council (b), 1989:1).
- Analyze and evaluate the demographic and ecological profile of an urban and a rural community, with mine workers as an identifiable multi-cultural community, and the factors which have an influence thereon
- Evaluate the community health services in a rural or urban context, as well as those within the gold mining industry, and analyze the factors which have an influence thereon
- Develop and implement standards for quality assurance (South African Nursing Council (a), 1989:1).

7.2 Meso curriculum

7.2.1 Curriculum A

The meso curriculum for this study programme shall be compiled in a manner which allows the student to achieve all the macro curriculum objectives. The student must be able to:

1. show respect for the dignity and uniqueness of man in his social, cultural and religious context, by treating each patient (as individual and also as employee within the gold mining industry) as a unique human being irrespective of cultural, religious or language differences;
2. approach and understand man as a psychological, physical, spiritual and social being within the context of employment in the gold mining industry by rendering nursing care using a holistic approach;
3. demonstrate an empathic approach in providing nursing care to the mine worker as patient;
4. maintain the ethical and moral codes of the profession;
5. practise nursing science within the parameters of the relevant laws;
6. demonstrate an enquiring and scientific approach to the problems of practice;
7. participate in, or undertake independent research;
8. participate in nursing education programmes by teaching the student nurse within the mine medical station;
9. demonstrate the necessary management skills required in the medical station;

10. initiate and/or to accept change, and
11. demonstrate assertiveness in his/her supervisory role.

Curriculum B

The meso curriculum for this study programme shall be compiled in a manner which allows the student to achieve all the macro curriculum objectives, and thus be able to:

1. endorse the principle that a comprehensive health service is essential to raise the standard of health of the workers in the gold mining industry;
2. contribute in practice to the promotion of such a service, bearing in mind factors from within and outside the borders of the country which are a threat to health within the gold mining industry;
3. evaluate personal practice continuously and accept responsibility for continuing professional and personal development and enrichment, and
4. evaluate the practice of the registered nurse in the mine medical station from a primary, secondary and tertiary health care perspective.

Curriculum C

Registered nurses are employed in all the health disciplines offered by the gold mining industry. However, the mine medical station is the one service rendering area where the nurse works without the medical practitioner being immediately available for

24 hours per day. The objectives for curriculum C are therefore specifically developed to enable the registered nurse to function in a mine medical station.

The meso curriculum for this study programme shall be compiled in a manner which allows the student to achieve all the macro curriculum objectives. The student must be able to:

1. skilfully obtain a health history from each patient while conducting a medical and nursing examination of the individual client as well as groups of clients, diagnosing the physical, psychological and social problems encountered by the client, who is an employee of the gold mining industry;
2. plan, implement and evaluate therapeutic action and nursing care for these clients at any point along the health/illness continuum, in all stages of their productive lives as employees within the gold mining industry (including care of the dying);
3. direct and control the interaction with clients in such a way that sympathetic and empathic interaction takes place;
4. delineate personal practice according to personal knowledge and skill, practice it independently and accept responsibility and accountability therefore within the multi-disciplinary team;
5. delineate personal practice within the nursing disciplines
    - occupational health nursing science,
    - primary health nursing science,
    - trauma nursing science, and

- clinical nursing science, health assessment, treatment, and care;

6. demonstrate the cognitive, psychomotor and affective skills to serve as a basis for effective practice and for continuing education, and
7. act as a professional role model within the mine medical station and mine medical health care system.

8 ORGANIZATION OF THE CONTENT

8.1 Curriculum A: Nursing dynamics

8.1.1 Ethos and professional practice

8.1.1.1 Objectives

The registered nurse in the mine medical station, must be able to:

1. demonstrate an understanding of the professional task of the registered nurse in the gold mining industry;
2. demonstrate the influence of modern development in the profession on the professional conduct of the registered nurse in the mine medical station;
3. evaluate the influence of different nursing theories on the practice of the registered nurse working in the mine medical station;
4. evaluate own scope of practice against guidelines contained in different nursing theories;

5. analyze own scope of practice against the guidelines contained in the legislature of the country;
6. demonstrate skills necessary in implementing the scientific approach in nursing in own practice within the mine medical station;
7. demonstrate the ability to function as a member of the multi professional team rendering health care to the employee in the gold mining industry;

8.1.1.2 Content

- Professional task:
  * professionalization of colleagues within the mine medical station through lectures, availability of journals, books and articles, continuing education programmes, and other means necessary
  * being a role model as registered nurse in the mine medical station
  * evaluation of own role and function within the mine medical station against the challenges of the future development of nursing as a science
  * the nurse as independent professional practitioner within the mine medical station
  * the nurse as independent professional practitioner within a team context, as applicable in all the different health services offered by the gold mining industry.
- Factors currently influencing the development of the

nursing profession, eg. the knowledge explosion and the Nursing Association versus trade unionism, which is particularly demonstrable in the gold mining industry.

- The fundamentals of nursing:
  Evaluate own role and function in mine medical station against:
  * fundamentals of professional practice
  * ethical and legal provision for contemporary professional practice.

8.1.1.3 Practical guideline

Learning opportunities should be provided to enable the student to practice leading the nursing team in the mine medical station, in the following situations:

* as the representative of a particular viewpoint regarding health care to the mine worker
* patient advocacy, with the patient being a mine worker subscribing to a different culture
* debating ethical principles and contemporary situations such as providing care to a mine worker who may suffer from AIDS, in an environment conducive to the transmission of the disease
* the registered nurse as a team leader and independent practitioner within the context of a multi-professional team, either in the mine medical station, or the larger health care service of the gold mining industry.

* Exposure to disciplinary hearings, actual and/or simulated, as a means of providing opportunity for professional growth in an area of practice where the nurse may become vulnerable due to the nature of his/her practice.

8.1.2 Health service dynamics

8.1.2.1 Objectives

The registered nurse in the mine medical station must be able to:

1. Demonstrate an understanding of the position and contribution of the nurse practitioner in the national health system at macro level, and in the gold mining industry at large.
2. Demonstrate the influence of the following factors on the nurse practitioner mentioned above:
   * national health profiles, as well as health profiles in the gold mining industry
   * the socio-economic status of the population, as well as within the gold mining industry
   * trans-cultural nursing
   * the health policies of the national health services and the gold mining industry
   * accessibility to health care for the population, as well as in the gold mining industry
   * the educational background of the registered nurse.
3. Demonstrate professional and personal development during

the course of the educational programme by applying common or statutory law governing the practice of nursing and midwifery, as well as those pertaining to the rendering of health and welfare services within a gold mining industry.

8.1.2.2 Content

- contemporary factors influencing the contribution of the nurse practitioner on health care at national level, as well as in the gold mining industry.
- The influence of the following factors on health care and ultimately on nursing care:
    * Health profiles : necessity and usage
    * influence of socio-economic status of patients
    * influence of current political factors on the rendering of health care
    * influence of the patient's cultural background on the acceptance and utilization of health care
    * influence of health policies of the government, employing body and gold mining industry on the planning, implementation and evaluation of health services
    * accessibility to health care services
    * educational background of the nurse employed in the gold mining industry.

8.1.2.3 Practical guideline

Learning opportunities should be provided to enable the student to:

- collect data in order to compile health profiles;
- interpret data and plan health services accordingly, and
- participate in policy making procedures.

8.1.3 Communication and teaching

8.1.3.1 Objectives

The registered nurse in the mine medical station must be able to:

1. Implement effective communication strategies within the different health service areas within the gold mining industry, by means of the following:
   * written communication
   * verbal communication, eg telephonic communication
   * handling of conflict and stress.
2. demonstrate assertiveness while supervising all lower incumbents, whether registered or enrolled, and
3. Implement effective teaching strategies within the different health service areas within the gold mining industry, by means of the following:
   * accompaniment of incumbents of lower rank as well as students
   * teaching, both formal and informal
   * health education to all employees of the gold mining

industry

* continuing education programmes
* individual and group teaching within the family set-up.

8.1.3.2 Content

- Communication:
  * Principles of effective communication
  * critical evaluation, interpretation and handling of information.
- Interpersonal skills and methods:
  * assertiveness
  * empathy
  * handling conflict with individuals, groups and mobs
    . confrontation
    . support
    . negotiation
    . conformity
    . withdrawal
- Teaching:
  * develop appropriate principles of teaching
  * health education
  * accompaniment of lower incumbents and students
- Appropriate principles of teaching, health education and patient teaching
- Cultural influences on the methods and or interpretation of information presented

8.1.3.3 Practical guidelines

It is important that the student personally reflect a healthy life-style, by being a role-model to his patient

Learning opportunities should be provided to enable the student to practise the following:

- Communication:
  * assertiveness
  * empathy and accompaniment
  * handling conflict by means of:
    . confrontation
    . support
    . negotiation
    . conformity
    . withdrawal
  * management of groups
- Teaching:
  * teaching strategies and skills for clinical practice
  * group project of health education for any group of gold mining industry employees
  * Accompaniment of any group of students, both collegial and otherwise
  * plan, implement and evaluate a continuing education programme for a given group of registered nurses.

8.1.4 Management

8.1.4.1 Objectives

The registered nurse in the mine medical station must be able to:

1. Implement the management process in the health care settings of the gold mining industry within the framework of the wider national health service.
2. Demonstrate management skills fitting the specific post structure within the mine medical station regarding the following:
   * management principles
   * personnel management
   * setting standards for nursing practice within the gold mining industry
   * develop and implement a grievance procedure for all the categories of nurses employed within the gold mining industry
   * control resources
     - financial
       develop and motivate a budget for the department;
       control expenditure
     - stock
       motivate for all stock required;
       substantiate request with statistical data thus identifying needs for stock
     - human resources, by motivating for existing and required nursing posts

* implement medical station safety plan
* participate in the loss control programme of the mining company.

8.1.4.2 Content

- The management process within the framework of current health service policy, as well as the health service policy of the gold mining industry.
- Implications of the South African Nursing Council regulations regulating the practice of registered and enrolled nurses and enrolled nursing assistants working in the gold mining industry.
- Methods for assessment of requirements, allocation and utilization of personnel
- First level management:
  * supervision
  * assertiveness
  * conflict and stress management
  * communication skills
- Personnel development:
  * induction/orientation
  * career planning
  * continuing education
  * identification and development of leadership potential
  * personnel appraisal
- Standards for nursing practice:
  * Planning, implementation and evaluation of nursing

care

* safety measures

approaches to staff utilization in the provision of patient care

* decision making
* approaches to effective functioning within the multidisciplinary team, regarding
  . occupational hazards, such as acquiring hepatitis B and HIV infection
  . work related hazards, such as radiation

- principles of financial management:
  * financial control systems
  * financial estimates
  * cost-effectiveness
  * utilization of resources
  * stock control
  * nursing care as a means of preventing illness leading to effective utilization of human resources.

8.1.4.3 Practical guideline

Learning opportunities must be provided within the mine medical station for the student to practise the following:

- supervision
- problem management
- assessing the needs and establishing priorities in order to provide financial estimates
- applying strategies for utilizing personnel and facilities

in a to cost effective manner

- applying decision-making strategies
- providing personal orientation to new personnel
- writing motivations, personal appraisals, memoranda and reports
- developing and implementing an evaluation tool
- designing a disaster management plan
- committee procedure.

8.1.5 Research

8.1.5.1 Objectives

The registered nurse in the mine medical station must be able to:

1. Develop a perspective regarding nursing research.

8.1.5.2 Content

- Discuss the principles involved in nursing research.
- Debate the ethical issues involved in clinical research, especially within the gold mining industry.

8.1.5.3 Practical guideline

Learning opportunities should be provided to enhance the student's skills in research.

- Participate in a nursing research project within the gold mining industry.

8.2 Curriculum B : Occupational health care

8.2.1 Objectives

The registered nurse in the mine medical station must be able to:

1. Evaluate the health profiles within the gold mining industry, in relation to health services rendered in the mine medical station.
2. Evaluate the demographic and ecologic profiles within the gold mining industry related to the health care rendered by the registered nurse in the mine medical station.
3. Evaluate the role of the registered nurse regarding policy-making in the health services of the gold mining industry.
4. Evaluate the role of the registered nurse in assessing the health status of the mine worker as client, in making a nursing diagnosis, and planning, implementing and evaluating nursing intervention.
5. Demonstrate an understanding of the primary, secondary and tertiary health care systems within which these disease conditions are treated.
6. Function effectively as an independent nurse within a health care setting within the gold mining industry, and an interdependent member of the multi-professional health team in secondary prevention and, where necessary, as leader in the team context within mine medical health services.

8.2.2 Content

In order to reach the objectives for curriculum B, the content must include the following:

8.2.2.1 Health profiles

- Population and health profiles of employees within the gold mining industry, with special reference to the compilation of monthly statistics and annual trends in the mine medical station.
- Demographic and ecologic factors influencing nursing care in the mine medical station, eg. multi-cultural background of patients, ecological impact of waste products produced in the gold mining industry, etc.

8.2.2.2 Policy making procedure

- Policy:
  * the national health policy
  * the policy-making structure in the gold mining industry
  * the health policy of the gold mining industry.
  * evaluate the influence of all relevant legislation in the gold mining industry, eg. The Mines and Works Act, no. 27 of 1957, as amended, The Occupational Diseases in Mines and Works Act, no. 78 of 1973, as amended, etc., on the nursing care in the mine medical station.

8.2.2.3 Current issues in occupational health nursing

- Contemporary factors (including labour relations) which influence health and the rendering of occupational health services in the gold mining industry.
- identify the role of the occupational health nurse in the mine medical station from within the context of any given contemporary health issue.

8.2.2.4 Implementation of the nursing process in the mine medical station

- The necessity of accurate record keeping regarding patient care in particular.
- Interpretation of the findings of patient assessment, and making a diagnosis. (Both nursing and medical diagnoses. The latter is of importance in the abscence of a doctor.)

8.2.2.5 Administration of an occupational health nursing service

- Develop and implement standards for quality assurance in nursing practice, specifically in the gold mining industry.
- Establish and utilise referral resources as provided within the health services provided by the gold mining industry.
- Reporting of mining or non-mining accidents, fatal or otherwise.

8.2.3 Practical guideline

Learning opportunities should be provided to enhance the student's skills in occupational health care.

8.2.3.1 Health profiles

- compilation of accurate monthly statistics, interpretation thereof, and the necessity for this;
- develop health profiles within the mine medical stations

8.2.3.2 Policy making procedure

- participate in policy decision making process;

8.2.3.3 Implementation of the nursing process in the mine medical station

- obtain a health history from any given patient;
- do a physical examination of any given patient;
- interpret the data obtained;
- interpretation of patient diagnoses;
- implement nursing care;
- evaluate nursing care;
- accurate record keeping;

8.2.3.4 Administration of an occupational health nursing service

- develop quality assurance programmes for the nursing care in mine medical stations;
- identification and utilization of referral systems, and
- legal requirements regarding reporting of mining and non-mining accidents.

8.3 Curriculum C : Occupational health nursing science

8.3.1 Occupational health nursing science

8.3.1.1 Objectives

The registered nurse in the mine medical station must be able to:

1. Demonstrate an understanding of the influence of the work environment on the health of the worker as well as his family, with special reference to the specific circumstances of the gold mining industry.
2. Demonstrate an understanding of the influence of the work environment on the health the family of the mine worker, with special reference to the specific circumstances of the gold mining industry.
3. Demonstrate the role of the occupational health nurse regarding health supervision and rehabilitation for the mine worker.
4. Demonstrate the role of the occupational health nurse

regarding health education and counselling to the mine workers as a multi-cultural group.

5. Evaluate the necessity for cooperation between the occupational health nurse and the management of the gold mining company as employing body.
6. Demonstrate the role of the occupational health nurse regarding environmental control and accident prevention.
7. Demonstrate the role of the occupational health nurse in the prevention and treatment of occupational diseases, with special reference to the occupational diseases encountered in the gold mining industry.

8.3.1.2 Content

- Viewpoints and approaches in occupational health nursing science, a national and international perspective.
- The dynamics of nursing practice in occupational health.
- Work and the worker, and overview of the influence of specific jobs in the gold mining industry of the worker and his family.
- Health supervision:
    * placing and maintaining people in suitable work
    * providing treatment at work
    * controlling recognised hazards and identifying unrecognized hazards
    * avoiding potential risks
    * screening for early evidence of occupational and non-occupational diseases

* supervision of vulnerable groups
* planning, implementation and evaluation of health education programmes for mine workers in the gold mining industry. Special attention must be paid to the utilization of audio-visual aids in health education
* counselling
* surveillance of sanitary, catering and welfare amenities
* teaching, and
* environmental control outside the workplace.

- Etiology of occupational disorders and disabilities, with special reference to:
  * the prevention of back injuries
  * heat illness (heat exhaustion and heat stroke)
  * noise induced deafness
  * contact dermatitis, including cement burns of the eyes, ears and skin
  * pneumoconiosis
  * occupationally induced abscesses of the hands, knees and feet
  * exposure to nitrous fumes and other noxious gases such as carbon monoxide, methane and carbon dioxide
  * barotrauma
  * accidental poisoning such as cyanide, sulphuric acid and lead poisoning.
- Primary, secondary and tertiary prevention in occupational health with special reference to the gold mining industry.

8.3.1.3 Practical guideline

The programme should make provision for the student to practise the following:

- Applying a systematic approach to the health assessment of the following groups of mine workers which shall be monitored for evaluation purposes in each group:
    * pre-placement health assessments with a view to placement in different work situations within the gold mining industry
    * health assessments for special groups, e.g. persons with chronic diseases <u>not</u> particularly of occupational origin
    * health assessments for specifically identified groups, i.e. food handlers, workers exposed to lead, chemicals, heat, dust, humidity, and noise.
- Analyzing and describing incidents relevant to occupational health for inclusion in an instructional manual in a mine medical station, e.g. injury on duty, patient referrals and evacuation during emergency situations.
- Designing and presenting health education sessions for large or small groups and for individuals e.g. on hygiene, pollution, specific infectious diseases, cancer and executive health.
- Acting as a primary practitioner in a multi-professional team within a gold mining industry.

8.3.2 Primary health nursing science

8.3.2.1 Objectives

The registered nurse in the mine medical station must be able to:

1. Demonstrate the role of the registered nurse rendering primary health care.
2. Analyze the applicability of primary health care within the mine medical station.
3. Demonstrate the role of the registered nurse rendering primary health care within the gold mining industry.

8.3.2.2 Content

- Analyze the concepts:
  * primary health care
  * primary nursing
  * primary care
  * primary health nursing
- Characteristics of primary care as rendered by the primary health nurse
  * directed at conditions which are work related
  * treatment of self limiting or chronic non-occupational diseases
  * curative in nature, thus enabling the worker to retain his job
  * recognizes the role of the environmentalist, and necessity for referral sources.

- Dynamics of primary health nursing for safe practice in remote areas and in emergency and disaster situations in the gold mining industry:
  * legislature of the country
  * scope of practice of the registered nurse
  * relationship with the doctor
    . treatment protocols
    . the nursing process.
- Analyze the role of the registered nurse in the mine medical station rendering primary nursing.

8.3.2.3 Practical guideline

The programme should make provision for the student to practise the following:

- applying a systematic approach to the management of clients in a primary health care setting, including appropriate referral within the boundaries of the health services provided by the gold mining industry
- acting as a primary practitioner in the multidisciplinary health team of the gold mining industry.
- Utilizing treatment protocols correctly, while considering patient safety ultimately.
- Developing nursing care plans for selected patients, thereby analyzing the applicability of the use of the nursing process.

8.3.3 Clinical nursing science, health assessment, treatment and care

7.3.3.1 Objectives

The registered nurse in the mine medical station must be able to:

1. Demonstrate an understanding of the nature, pathology, aetiology, epidemiology, diagnosis and therapy (including pharmacology) of the most important disease conditions commonly found amongst the mining population of the gold mining industry, for all economically active age groups and in all circumstances.
2. Demonstrate the necessary diagnostic, therapeutic, interpersonal, psychomotor and specific managerial skills to enable the nurse, to provide, prescribe and apply therapy for the patient (mine worker).
3. Demonstrate the ability to keep the necessary written records and statistics regarding the patient (mine worker) within the health care setting of the gold mining industry.
4. Demonstrate knowledge about the use of pharmacological agents in treating a patient within the necessary legal parameters.

7.3.3.2 Content

- Complete systematic assessment of the patient's health status.
- Skills in diagnostic and therapeutic techniques, such as

interpretation of laboratory results or X-ray results, relevant to disease conditions encountered within the gold mining industry.

- Homeostasis in the human body, and the factors influencing it (the physiology of homeostasis).
- Record keeping of all the actions regarding the care of the patient.
- Diagnose the disease condition (nursing diagnosis).
- Identify specific, measurable and valid objectives in writing for intervention in respect of each patient's problem, and prescribe treatment.
- Draw up realistic time schedules to achieve these objectives and include regular times for checking.
- Identify and prescribe scientifically-based nursing and other therapeutic actions including pharmacological prescriptions.
- Identify criteria for discharge (terminal and long term objectives).
- Implement <u>all</u> planned actions.
- Adjust the plan to suit the current situation.
- Deal with crisis situations as they arise.
- Check and record the patient's condition regularly according to the time schedules and checking time in the plan.
- Adjust the plan to suit the changed circumstances.
- Evaluate the effectiveness of the intervention and implement changes as needed.
- General diseases encountered in the gold mining industry,

with specific reference to the following conditions:

- upper respiratory conditions
- cardiovascular diseases, with special reference to hypertension
- neurological disorders, with special reference to epilepsy
- endocrine disorders, with special reference to diabetes mellitus
- sexually transmitted diseases, including AIDS
- tuberculosis
- enteric conditions, including helminths
- common skin conditions, including scabies.

- The influence of modern development in nursing on the practice of the registered nurse as primary practitioner within the gold mining industry.
- Discuss the relevant drugs under the following headings:
    - Mechanisms of drug interaction
    - Indicators for usage
    - Practical and potential difficulties associated with drug usage
    - Therapeutic effects
    - Side effects
    - Toxic effects
    - Drug interactions
    - Precautions and warnings regarding usage.

8.3.3.3. Practical guideline

This shall provide experience in

- Obtaining a health history from the patient;
- conduct a physical assessment on the patient;
- making a nursing and medical diagnosis;
- plan nursing and medical intervention for the patient;
- implement this intervention;
- evaluate the effectiveness of the intervention;
- the student must be:
  - a member of a health team that engages in drug discussions that lead to a choice of medications for clients needing them;
  - a member of a health team that is involved with therapeutic drug monitoring with an aim of optimizing drug treatment;
  - able to explain pharmacologically the therapeutic effects observed in patients that utilize the drugs; and
  - able to councel clients on the drugs about likely side effects to be experienced, and the importance of full compliance.

8.3.4 Trauma nursing science

8.3.4.1 Objectives

The registered nurse in the mine medical station must be able to:

1. Demonstrate an understanding of the nature, pathology, aetiology, epidemiology, diagnosis and therapy (including pharmacology) of the most important conditions commonly encountered during trauma and disaster situations in the mining population of the gold mining industry, for all economically active age groups.
2. Demonstrate and understanding for the effects of trauma on the economic life of the worker, such as the effects of becoming a quadroplegic on the economic life of the breadwinner, his family and ultimately, society.
3. Identify and evaluate the factors which promote or threaten the health of gold mine workers, or which can cause different tupes of trauma within the gold mining industry.
4. Develop a disaster plan for the gold mining industry.
5. Implement effective trauma nursing procedures in nursing the traumatized patient.
6. Evaluate the appropriateness of interventions and of diagnostic and treatment methods in trauma cases.
7. Utilize a trauma score tool to evaluate the physical condition of a traumatised patient.
8. Utilize and/or establish referral resources.
9. Evaluate the effectiveness of first aid in trauma and disaster situations.

8.3.4.2 Content

- Classification, nursing assessment, diagnosis and management of trauma, with special reference to:

* head injuries, with or without neurological complications
* spinal injuries
* crush syndrome
* hand and foot injuries
* urological injuries
* eye injuries
* burns
* fractures
* shock
* multiple injuries.

- A systematic approach in the assessment of the traumatized patient, with the use of a trauma scale, especially immediately following a mining accident.
- Stabilization and/or resuscitation of the traumatized patient after a mining accident.
- Disaster nursing and the use of triage within the gold mining industry.
- Rehabilitation of the traumatized patient.

8.3.4.3 Practical guideline

The programme should make provision for the student to practise the following:

- Simulation of the examination and stabilization of the traumatized patient, with special attention to the different body systems spelled out in the content.
- Commencement of an intravenous infusion, and other invasive

techniques, such as intubation or the management of the patient with a pneumothorax.

- Specific observations and observation techniques for the different types of trauma.

ANNEXURE F

CHECKLIST A

MINE MEDICAL STATION PERSONNEL

CHECKLIST A

MINE MEDICAL STATION PERSONNEL

QUESTION	RESPONSE	CODE
.: What is your age	20 - 24	1
	25 - 29	2
	30 - 34	3
	35 - 39	4
	40 - 44	5
	45 - 49	6
	50 - 54	7
	55 - 59	8
	60 - 64	9
2: Sex	Male	1
	Female	2
3: What is your current post designation	Senior medical station superintendent	1
	Medical station superintendent	2
	Ambulance officer	3
	Senior professional nurse	4
	Professional nurse	5
	Other	6
4: What is your retirement age	55	1
	62	2

5: How many years before your retirement	0 - 4 5 - 9 10 - 14 15 - 19 20 - 24 25 - 29 30 - 34
6: What are your nursing qualifications	RN RN + RM RN + RP RN, RP + RM OTHER (SPECIFY)
7: What are your non-nursing qualifications	SDR SDR + AUDIOMETRY OTHER (SPECIFY) NONE
8: What are your first aid qualifications	Mine first aid Advanced first aid Silver medal Gold medal Gold medal + instructor None
9: Where did you complete your basic nursing education programme	Ernest Oppenheimer Hospital A mining industry hospital A non-mining industry hospital

Question	Response	Code
10: How many years since completion of your basic nursing education programme	0 - 4	1
	5 - 9	2
	10 - 14	3
	15 - 19	4
	20 - 24	5
	25 - 29	6
	30 - 34	7
	35 - 39	8
11: Are you currently studying	Yes	1
	No	2
12: If YES: What programme are you registered for	BA Cur (UNISA)	1
	Community nursing science	2
	Other	3
	Not applicable	4
13: Do you feel that you need a continuing education programme that will enable you to render more effective nursing care to the mine workers	Yes	1
	No	2
	Not sure	3
14: If such a programme was developed and implemented, would you register for it	Yes	1
	No	2
	Yes, but...	3

15: If NO: Give a motivation	Not interested Too near retirement Opted for early retirement May interfere with current study programme No financial benefit after completion No time (family or other commitments) Other Not applicable
16: How will you feel if such a programme was made compulsory	Will still register for programme Will not register for the programme Should not be made compulsory
17: Are you involved in the physical assessment of mine workers in order to determine their health status	Yes No To a certain extent
18: Do you feel competent to conduct these assessments	Yes No To a certain extent
19: Who taught you to conduct physical assessments	Basic nursing education programme Continuing education Practical situation Doctors

Question	Response	Code
20: Do you prescribe medicine to your patients	Yes	1
	No	2
21: Are you functioning under the auspices of Article 38A of the Nursing Act, Nr. 50 of 1978	Yes	1
	No	2
	Not sure	3
	Do not know about this section	4
22: Would you describe your service as. . .	A curative only service	1
	A curative service with preventive health measures	2
	Curative and preventive health care on equal basis	3
	Mainly preventive in nature	4
23: If I developed a continuing education programme for registered nurses in mine medical stations, what components do you feel should be included	Primary nursing, including primary health care	1
	Occupational health nursing	2
	A combination of the above	3
	Traumatology	4
	Community nursing science	5
	Other (Specify)	6

24: How do you feel about the promotional prospects within the mine medical stations	Acceptable	1
	Not acceptable	2
	Absent	3
	Racial discrimination	4
	Limited	5
25: Do you experience job satisfaction	Yes	1
	No	2
	Not sure	3

ANNEXURE G

CHECKLIST B

TEACHING STAFF - ERNEST OPPENHEIMER NURSING COLLEGE

CHECKLIST B
TEACHING STAFF
ERNEST OPPENHEIMER NURSING COLLEGE

QUESTION	RESPONSE	COI
1: What is your age	20 - 24	1
	25 - 29	2
	30 - 34	3
	35 - 39	4
	40 - 44	5
	45 - 49	6
	50 - 54	7
	55 - 59	8
2: Sex	Male	1
	Female	2
3: What is your current post designation	Principal	1
	Tutor	2
	Specialist professional nurse	3
4: What are your nursing qualifications	RN	1
	RN + RM	2
	RN, RP + RM	3
	RN, RM, RP + RCN	4
	RN, RM, RP, RCN + RNE	5
	RN, RM, RP, RCN, RNE + RNA	6
	RN + RNE	7
5: What are your non-nursing qualifications	SDR	1
	SDR + Audiometry	2
	EMT	3
	Other	4

Question	Response	Code
6: What are your first aid qualifications	Mine first aid	1
	Advanced first aid	2
	Silver medal	3
	Gold medal	4
	Gold medal + instructor	5
	None	6
7: Where did you complete your basic nursing education programme	Ernest Oppenheimer Hospital	1
	A mining industry hospital	2
	A non-mining industry hospital.	3
8: Are you currently studying	Yes	1
	No	2
9: If YES: What programme are you registered for	A nursing degree	1
	A non-nursing degree	2
	A diploma	3
	Not applicable	4
10: Do you hold a degree	Yes	1
	No	2
11: If YES: What degree	BA	[illegible]
	BA Cur	[illegible]
	Other	[illegible]
	None	[illegible]
12: How long have you been lecturing	0 - 4 years	[illegible]
	5 - 9 years	
	10 - 14 years	
	15 - 19 years	
	20 - 24 years	

Question	Response	Code
13: What subjects are you teaching	General nursing	1
	Midwifery	2
	Psychiatric nursing	3
	Community nursing	4
	Ethos of nursing	5
	Science subjects	6
	Social sciences	7
	Other	8
	Combinations of the above	9
14: Have you been to a mine medical station	Yes	1
	No	2
15: If YES: What were your impressions of the nursing care offered	Nursing care good	1
	Nursing care limited	2
	Relaxed if compared to the hospital situation	3
	Not up to standard - mainly curative	4
	No real nursing care	5
	No registered nurses during certain hours	6
	Nurses not trained for the job	7
	Other	8
	Not applicable	9
16: Do you prepare nurses for the open market, or mainly for the mining industry	Open market only	1
	Open market with mining slant	2
	More mining industry oriented	3

Question	Response	Code
17: Do you think that the nurses who completed your programme will be able to function under Section 38A of te Nursing Act, Nr. 50 of 1978	Yes	1
	No	2
	Not sure	3
	Do not know about this section of the Act	4
18: Can you conduct a physical assessment	Yes	1
	No	2
	Not sure	3
	To a certain extent	4
19: If YES: Who taught you to conduct a physical assessment	Basic education	1
	Continuing education	2
	Practical situation	3
	Doctors	4
20: Do you think that the registered nurses at the mine medical stations could benefit from a continuing education programme	Yes	1
	No	2
	Uncertain	3
21: What components of nursing should be included in a continuing education programme, that will be of benefit to registered nurses in mine medical stations	Primary health care	1
	Occupational health nursing science	2
	Traumatology	3
	Community nursing science	4
	Other	5
	A combination of the above	6
	Not sure	7

ANNEXURE H

CHECKLIST C

TEACHING STAFF - GOLD FIELDS NURSING COLLEGE

CHECKLIST C

TEACHING STAFF - GOLD FIELDS NURSING COLLEGE

QUESTION	RESPONSE	CODE
1: What is your age	20 - 24	1
	25 - 29	2
	30 - 34	3
	35 - 39	4
	40 - 44	5
	45 - 49	6
	50 - 54	7
	55 - 59	8
2: What is your current post designation	Principal	1
	Tutor	2
	Specialist professional nurse	3
3: What are your nursing qualifications	RN, RCN, RNE + RNA	1
	RN, RP + RM	2
	RN, RM, RCN + RNE	3
	RN, RM, RP, RCN + RNE	4
	RN, RM, RCN, RNE + RNA	5
4: What are your non-sing qualifications	SDR	1
	SDR + Audiometry	2
	EMT	3
	Other	4
5: What are your first aid qualifications	Mine first aid	1
	Advanced first aid	2
	Silver medal	3
	Gold medal	4
	Gold medal + instructor	5

Question	Response	Code
	None	6
6: Are you currently studying	Yes	1
	No	2
7: If YES: What programme are you registered for	A nursing degree	1
	A non-nursing degree	2
	A diploma	3
	Not applicable	4
8: Do you hold a degree	Yes	1
	No	2
9: If YES: What degree	M Cur	1
	BA Cur	2
	B Art & Scien	3
	BA Cur (Hons)	4
	None	5
10: How long have you been lecturing	0 - 4 years	1
	5 - 9 years	2
	10 - 14 years	3
	15 - 19 years	4
	20 - 24 years	5
11: What subjects are you teaching	General nursing	1
	Midwifery	2
	Psychiatric nursing	3
	Community nursing	4
	Ethos of nursing	5
	Science subjects	6
	Social sciences	7
	Other	8
	Combinations of the above	9

ANNEXURE I

PERMISSION TO UNDERTAKE STUDY

ANGLO AMERICAN CORPORATION OF SOUTH AFRICA

Anglo American Corporation of South Africa Limited

Incorporated in the Republic of South Africa · Registration No 01/05309/06

Ref. IP/cw

13 March 1989

44 Main Street, Johannesburg 2001
PO Box 61587 Marshalltown 2107
Telex 4-87167 SA Telegraph Anmercosa
Facsimile 638-3221
Telephones
Switchboard 638-9111
Direct line 638-

MEDICAL DEPARTMENT

Mr. J. Keogh
11 Pentlands Place
BEACONBAY
5241

Dear Mr. Keogh

PERMISSION TO UNDERTAKE STUDY

Your letter of 7 March 1989 refers.

Professor F.M.J. De Villiers of Potchefstroom University has discussed the need to undertake a situational analysis for establishing an in-service training course for registered nurses working at medical stations on Freegold mines.

I have much pleasure in giving you permission to undertake this study in the medical stations of the Freegold mines. You should liaise with the Assistant Medical Consultant at the Ernest Oppenheimer Hospital, Dr. B.A. Brink and also with the Senior Medical Officer in charge of Occupational Health and Primary Health Care in the Region, Dr. J.B. Davies, who will direct you to appropriate sources for the necessary statistics.

Please keep these doctors and this Department fully in the picture regarding your findings and recommendations.

Yours sincerely

I. Potgieter
Medical Consultant

Directors: [illegible]

ANNEXURE J

LETTER FROM PROF J P LOWE

DATED 22 JANUARY 1992

GOLD FIELDS
OF SOUTH AFRICA LIMITED

Registration No. 05/04181/06

75 Fox Street, Johannesburg, 2001
1167, Johannesburg, 2000
Fax. (011) 639-2101/2
(011) 639-9111
(9) 450044

MR J KEOGH
14 KIAAT ROAD
BEACON BAY
5241

22 January 1992

Dear Mr Keogh

Thank you for your letter of 9 January 1992 and I would be delighted to receive a copy of your thesis.

In reply to your question:

1. We strongly advise all nurses to undertake further studies. In fact a requirement for promotion to a senior position is a post basic diploma.

2. Three nurses are sponsored each year from Leslie Williams Hospital and Gold Fields West Hospital to undertake long term studies. At Leslie Williams Hospital last year, nurses undertook studies in operating theatre technique and intensive care nursing (2). During the study period Gold Fields funds all expenses including course fees, accommodation, salary and books.

   Part-time courses are also funded by Gold Fields of South Africa. Mr Mplane is studying community medicine and Sister van Lede a B.Cur at Unisa. Both work at Leslie Williams Hospital.

3. Emergency (Disaster) plans are in place at both major hospitals.

4. Protocols relating to emergency treatment are available.

5. The trauma scoring techniques are practised at Leslie Williams Hospital, not at the Dressing Station. Most cases are transported from the shafts directly to the hospital and are not seen at the Dressing Station.

Regards

PROF J.P. LOWE
CONSULTING MEDICAL OFFICER

keogh.let

Directors. *R A. Plumbridge (Chairman), *C.T. Fenton (Deputy Chairman), L.G. Abrahamse, H P. de Villiers, P.H. Fleck, *M.R. Forsyth, *A H. Munro, I.A. Stegmann, *R R. van Rensburg, F. van Wyk, *A.J. Wright.

ANNEXURE K

LIST OF REGISTERED NURSES EMPLOYED

FREEGOLD

THE ERNEST OPPENHEIMER HOSPITAL

DEPARTMENT OF OCCUPATIONAL HEALTH

Registered Nurses at the Freegold Mine Medical Stations on 26 June 1989

RANK	TITLE	NAME	FAMILIAR	BIRTHDAY	AGE	MINE	SHAFT	TELEPHONE
SMSS	Mr	F X J Ziegler	Xavier	18/09/28	60	F S Geduld	1	904-2300
SMSS	Mr	J M Coetzee	Buddy	13/04/38	51	Pres Steyn	2	52561 exch
SMSS	Mr	D P Jooste	Daantjie	14/03/39	50	Pres Brand	2	911-2518
SMSS	Mr	J M Borlase	John	11/03/41	48	W Holdings	1	902-3589
SMSS	Mr	C G J Neuhoff	Carel	17/09/41	47	Freddies	5	904-2218
SMSS	Mr	P M van Rensburg	Philip	07/12/44	44	F S Saaiplaas	4	941711 exch
MSS	Mr	F Fourie	Frank	26/11/26	62	F S Saaiplaas	2	01722-74871 exch
MSS	Mr	H G Richards	Harry	14/02/35	54	F S Geduld	1	904-2123
MSS	Mr	C R Botha	Chris	02/09/38	50	W Holdings	6	901-2143/46
MSS	Mr	H N Mbuli	Hubert	03/03/40	49	Pres Brand	4	911-3428
MSS	Mr	T Mtshakaza	Tembinkosi	24/11/45	43	Freddies	5	904-2218
MSS	Mr	M P Rampai	Peter	25/11/46	42	Pres Steyn	1	52561 exch
MSS	Mr	S P Rheeder	Stan	13/09/47	41	Pres Brand	3	911-3333
MSS	Mr	M Mohlomi	Michael	16/08/48	40	F S Geduld	2	904-2234
MSS	Mr	C S Engelbrecht	Corrie	20/10/48	40	W Holdings	2	902-3631
MSS	Mr	T L Maarman	Maarman	23/07/51	37	F S Saaiplaas	3	01722-74871 exch
MSS	Mr	M J Lazenby	Martin	18/03/57	32	Pres Steyn	4	52561 exch
MSS	Mr	P Lazenby	Philip	14/06/59	30	Pres Brand	5	911-2478
SPN	Sr	M P P Peacock	Pierrette	05/02/32	57	F S Geduld	1	904-2123
SPN	Mr	W T Olova	William	24/05/39	50	F S Geduld	4	904-2221
SPN	Sr	E H Holmes	Eliza	07/01/55	34	Pres Steyn	2	52561 exch
AO	Mr	T J Ralefume	Joseph	10/10/42	46	F S Geduld	1	904-2123
AO	Mr	M B Ngobeni	Bishop	22/01/43	46	Freddies	5	904-2218
AO	Mr	A X Mpambani	Anthony	17/07/43	45	W Holdings	1	902-3589
AO	Mr	L Z Dyum	Lennox	06/07/45	43	W Holdings	2	902-3631
AO	Mr	A T Olifant	Aloysius	21/06/46	43	F S Geduld	7	901-2158
AO	Mr	V Hlongwane	Vincent	01/07/46	42	Pres Brand	4	911-3428
AO	Mr	C Ntombeni	Chandler	06/08/47	41	Pres Steyn	1	52561 exch
AO	Mr	M W Soqaka	William	14/10/47	41	Pres Steyn	2	52561 exch
AO	Mr	B L Khumalo	Leonard	30/10/47	41	Pres Brand	1	911-2332
AO	Mr	M T Lesibo	Michael	21/02/48	41	Pres Brand	3	911-3333
AO	Mr	B Lekezwa	Boyce	10/12/49	39	W Holdings	2	902-3631
AO	Mr	S Mokhele	Sicelo	17/12/49	39	Pres Steyn	2	52561 exch
AO	Mr	M M Tuta	Michael	15/05/50	39	Pres Steyn	4	52561 exch
AO	Mr	V Zondani	Victor	16/05/50	39	Freddies	9	906-2063
AO	Mr	F L Jonas	Farrington	03/12/50	38	Pres Brand	2	911-2367
AO	Mr	T I Masiloane	Ignatius	07/10/51	37	Pres Brand	5	911-2478
AO	Mr	N V Simondile	Nelson	11/03/53	36	F S Saaiplaas	2	01722-74871 exch
AO	Mr	A M Monnye	Andrew	04/01/55	34	W Holdings	5	901-2146
AO	Mr	P M Tshabalala	Paul	05/10/55	33	W Holdings	6	901-2143
AO	Mr	T C Kujoana	Kujoana	19/01/58	31	F S Saaiplaas	3	01722-74871 exch
AO	Mr	P L Kgosimore	Philip	17/01/59	30	F S Saaiplaas	4	941711 exch
AO	Mr	A A Vika	Andile	01/11/59	29	W Holdings	5	901-2146
AO	Mr	I N Tsehisi	Ishmael	19/02/62	27	Freddies	7	906-2045
RN	Sr	G M Nhlapo	Gladys	19/03/41	48	Freddies	7	906-2045
RN	Sr	D A Mbakaza	Agnes	06/10/46	42	F S Geduld	4	904-2221
RN	Mr	E Mema	Elijah	06/06/48	41	F S Saaiplaas	4	941711 exch
RN	Sr	N M Mahlatsi	Nellie	30/03/49	40	F S Geduld	7	901-2158
RN	Sr	M P Lebata	Margaret	27/05/49	40	Freddies	5	904-2218
RN	Sr	G N N Soqaka	Gladys	18/07/49	39	Pres Brand	4	911-3428
RN	Mr	B Zondi	Bethuel	01/11/50	38	W Holdings	6	901-2143
RN	Mr	P Fobo	Patrick	15/03/51	38	Freddies	5	904-2218
RN	Sr	V M Kgosimore	Victoria	12/12/54	34	F S Saaiplaas	3	01722-74871 exch
RN	Mr	N T Mafole	Nicodemus	16/03/56	33	Pres Brand	1	911-2332
RN	Mr	S T Mkhwanazi	Stephen	06/06/56	33	F S Geduld	1	904-2123
RN	Mr	Z Botipe	Zach	22/11/56	32	Freddies	5	904-2218
RN	Sr	P M Sentsho	Portia	16/05/57	32	F S Geduld	7	901-2158
RN	Sr	F M Gaborone	Freda	15/12/57	31	W Holdings	5	901-2146
RN	Mr	C Mokokotlela	Cornelius	05/11/58	30	F S Saaiplaas	4	941711 exch
RN	Mr	E T Makhalemele	Eric	23/05/59	30	F S Saaiplaas	4	941711 exch
RN	Mr	T Phoka	Catiline	26/02/60	29	Freddies	5	904-2218
RN	Sr	M J Seatlanyane	Joyce	01/01/63	26	F S Geduld	2	904-2234
RN	Mr	M C Mothata	Charles	23/03/65	24	F S Geduld	2	904-2234
RN	Mr	A Suping	Andrew	30/06/65	24	F S Geduld	4	904-2221

ANNEXURE L

STANDARD PROCEDURE

ENVIRONMENTAL HYGIENE OF MEDICAL STATIONS

Ernest Oppenheimer Hospital

NPS 1

Department of Occupational Health

SECTION : NURSING

STANDARD PROCEDURE : PROTOCOL FOR ENVIRONMENTAL HYGIENE OF MEDICAL STATIONS

1. **OBJECTIVE : TO PREVENT CROSS-INFECTION**

2. **GENERAL CLEANING : WALLS, FLOORS, SURFACES**

MATERIAL : Recommended product Germotol Qac Disinfectant
I M S Stock Code No 817-431 036

METHOD : Dilute to 1 : 100 parts in water. Apply as per directions. All applicators to be thoroughly washed after use and sun dried.

Where cleaning agencies are employed, chemicals must be checked to see that they are suitable for medical stations. Specifications kept at the respective places.

3. BLOOD SPILLS

MATERIAL : Recommended product Biocide D sachets obtainable from Ernest Oppenheimer Hospital Dispensary.

METHOD : Dilute 1 sachet in 10 litres of water. Apply as per directions. All applicators to be thoroughly washed after use and sun dried.

4. Swabs taken 6 monthly or as required in dressing, suturing and resuscitation rooms.

5. HYGIENE INSPECTIONS

The Medical Station Superintendent is responsible for making sure that regular inspections are carried out by check lists.

NURSING STANDARDS COMMITTEE SIGNATURE : [signature]

SENIOR MEDICAL STATION SUPERINTENDENT SIGNATURE : [signature]

MINE : F.S.G. REVIEW DATE: ____________

DATE : 13. 02. 92

OCC-HEAL.MED/
1992.01.23

ANNEXURE M

LETTER TO DR E PETSCHEL

DATED 22 OCTOBER 1990

11 Pentlands Place
Beacon Bay
5241
22 October 1990

Dr. E Petschel
Medical Superintendent
Lesley Williams Memorial Hospital
Private Bag X2011
Carletonville
2500

Dear Sir

RE: COURSE FOR MEDICAL STATION SUPERINTENDENTS

The course is now ready to be implemented. At this stage, the course will be offered from Monday 7 January 1991, at the Potchefstroom University for Christian Higher Education.

I therefore have to ask you the following:

1: Can you provide medical practitioners to offer approximately 15 lectures of 40 minutes each on the following topics:
   - traumatology, with special reference to the trauma generally encountered in the gold mining industry,
   - occupational health, with again special reference to the conditions encountered in the gold mining industry.

2: Two mine medical station personnel to attend the course.

I still have your annual report, and will return it in due course.
Hoping to hear from you soon.
Kind regards,
....
Johann Keogh

ANNEXURE N

LETTER TO DR E PETSCHEL

DATED 11 DECEMBER 1990

11 Pentlands Place
Beacon Bay
5241
11 December 1990

Dr. E Petschel
Medical Superintendent
Lesley Williams Memorial Hospital
Private Bag X2011
Carletonville
2500

Dear Sir

RE: COURSE FOR MEDICAL STATION SUPERINTENDENTS

Enclosed, please find copies of the following documents.

1: The original letter addressed to you, dated 22 October 1990.
2: All correspondence received by me from dr. JP Lowe.
3: My letter to dr JP Lowe dated 11 December 1991.
4: Time tables for the course offered to registered nurses working in mine medical stations.
5: Relevant sections from the curriculum.

I also want to confirm that the course will run from 7 January 1991 to 25 January 1991, and the venue will be the Department of Nursing of the Potchefstroom University for Christian Higher Education. All practica that cannot be simulated will be done at the Deelkraal mine medical station, and will be supervised by Mrs. CP Kahl and myself. There will be people from Freegold attending the course, but their accommodation and transport will be their own affair.

I hope that all problems are clarified, and apologize for any inconvenience.
I hope that you will enjoy a joyous festive season, and a prosperous new year.
Kind regards

....
Johann Keogh

ANNEXURE O

LETTER TO DR C P KAHL

DATED 22 OCTOBER 1990

Pentlands Oord 11
Beaconbaai
5241
22 October 1990

Mev. C P Kahl
Departement Verpleegkunde
PU vir CHO
Potchefstroom

Geagte Petra

INSAKE KURSUS VIR MYN VERPLEEGKUNDIGES

Soos met jou bespreek, is ek besig om te reël vir die aanbieding van die eerste kursus, en wel vanaf 7 Januarie 1991. Ek hoop dat die datum jou steeds sal pas.

Ek sluit vir jou 'n kopie van die hele kurrikulum in, en glo dat jy daarop sal kommentaar lewer, en ook sal kan besluit wat jy wil aanbied. Ek voel dat die kursus deur die Departement Verpleegkunde in samewerking met die Buro vir Voortgesette Onderwys aangebied gaan word, en wil daarom nie betrokke raak by die aanbieding daarvan nie. Indien nodig, is ek bereid om te help.

Graag verneem ek van jou.

Vriendelike groete,

....
Johann Keogh

ANNEXURE P

LETTER TO MRS B VAN DEN HEEVER

DATED 22 OCTOBER 1990

Pentlands Oord 11
Beaconbaai
5241
22 October 1990

Mev. B van den Heever
Departement Verpleegkunde
PU vir CHO
Potchefstroom

Geagte Mev. Van Den Heever

INSAKE KURSUS VIR MYN VERPLEEGKUNDIGES

Soos met u bespreek, is ek besig om te reël vir die aanbieding van die eerste kursus, en wel vanaf 7 Januarie 1991. Ek hoop dat die datum u sal pas.

Ek sluit vir u 'n kopie van die kurrikulum in, en glo dat u daaruit sal kan aflei wat aangebied moet word.

Wat spesifieke trauma aanbetref, kan ek net aandui dat dit wissel van skraapwonde tot vergruisings. Volgens die jaarverslag van Leslie Williams Hospitaal, wil dit voorkom dat die noodhulp wat deur die mediese stasie personeel verleen word wel lei tot 'n laer sterftesyfer. Syfers van die totale aantal beserings wat nie by die myn mediese stasies geheg kon word nie, is beskikbaar, en beloop maar 211 vir alle ledemate gedurende 1989 vir die Wes Driefontein myn (die grootste aantal kom vanaf hier).

Ek sal dit dus waardeer indien u kan konsentreer op die verpleegaksies in enige trauma situasie, met spesifieke verwysing na die voorkoming van infeksie in oop wonde.

Graag verneem ek van u.
Vriendelike groete,

....

Johann Keogh

ANNEXURE Q

LETTER TO DR P ALLIN

DATED 19 NOVEMBER 1990

11 Pentlands Place
Beacon Bay
5241
19 November 1990

Dr. P Allin
Senior Medical Officer
Free State Geduld Mine
P O Box 80
Welkom
9460

Dear Dr. Allin

RE : COURSE FOR REGISTERED NURSES WORKING IN MINE MEDICAL STATIONS

Your letter dated 2 November 1990 refers.

Thank you for your prompt response to my letter. I have to apologize for not contacting you again. During 1990 I decided to include the mine medical stations of Gold Fields South Africa Limited, in Carletonville, in my study. During May 1990, we offered a course in physical assessment as a part of the course, and I invited two of the personnel of Freegold to attend. As nobody from Welkom attended the course, I assumed that the registered nurses of Freegold were not interested in the course any more.

The course has been developed along the problems and needs that I identified during my situational analyses at both institutions, and comprise the following:

1: Ethos and Professional Practice: This section deals with professional issues regarding nursing, such as the scope of practice, acts and omissions, conflict and stress management, etc. 20 Periods.

2: Clinical nursing science, health assessment, treatment and care, including pharmacology: This speaks for itself,

although I can mention that Dr. S Javett developed a computer aided diagnosis program, that is currently in use at the Gold Fields of South Africa Limited mine medical stations. This programme will also be demonstrated.

60 Periods.

3: Primary health nursing: The difference between primary health care and primary health nursing will be demonstrated. Primary health nursing deals, inter alia, with the assessment of the health status of a group (community such as mine workers), as well as appropriate intervention. Primary, secondary and tertiary prevention will be clarified, as well as the dynamics of primary health nursing for safe practice.

20 Periods.

4: Occupational health nursing science: Specific attention is given to the prevention (primary, secondary and tertiary) of specific occupational diseases. The specific diseases were given to me by yourself at an earlier stage.20 Periods.

5: Medical and surgical nursing: In this section, specific attention will be paid to traumatology. 20 Periods.

Practical involvement for all these areas is essential, and falls outside the 20 theoretical periods.

The first trial course will be offered from 7 January 1991, and it is envisaged that it will be offered over a period of three weeks at the Potchefstroom University for Christian Higher Education. Study material will be made available to students in the library of the University, and students can use the photocopier to obtain these.

Accommodation is available at the University guest house, but due to the very limited number of rooms available, I suggest that you contact them as soon as possible. The tariff is R25 per day, meals excluded, and it is non-racial.

No financial arrangements were made at this stage, and I would

assume that the course will be offered free of charge.

The course will be offered by lecturers from the PU for CHE, as well as doctors from Leslie Williams Memorial Hospital. This hospital might also provide a pharmacologist for the pharmacology lectures.

I asked for permission to utilize the Deelkraal mine medical station for the practical component, and is waiting for this. The course content will be divided into three section, which will be offered over the three weeks. Evaluation will be in the form of a three hour paper at the end of each week, and practical follow up will also be done. A possible practical assessment might be done either at the end of the course, or at a later stage.

Dr. JP Lowe, Consulting Medical Officer of Gold Fields of South Africa Ltd., indicated that he would prefer to send four nurses to the first course.

I hope that I solved all your queries, but if you have any more questions, please contact me either at the above mentioned address, or phone me at (0431) 471467 after 14:00.

Hoping to hear from you soon.

Kind regards

....

Johann Keogh

ANNEXURE R

LETTER TO PROF J P LOWE

DATED 11 DECEMBER 1990

11 Pentlands Place

Beacon Bay

5241

11 December 1990

Dr. JP Lowe

Consulting Medical Officer

Gold Fields of South Africa Limited

P O Box 1167

Johannesburg

2000

Dear Dr. Lowe

RE : COURSE FOR REGISTERED NURSES WORKING IN MINE MEDICAL STATIONS

I have developed the final programme for the above mentioned course. Enclosed please find copies of the programme.

The course will be offered at the Department of Nursing of the Potchefstroom University for Christian Higher Education from 7 January 1991 up to 25 January 1991. All practica that cannot be simulated, will be conducted at the Deelkraal mine medical station, as agreed upon by yourself. Lectures will be offered by Mrs CP Kahl, the doctors that you agreed to provide, as well as the pharmacist, and myself. Mrs. B van den Heever from the PU for CHE will unfortunately not be able to offer any lectures any more. She indicated that a Mrs. Van Eeden from Lebanon

Hospital might be interested to offer lectures on trauma nursing. I will contact Mrs. van Eeden in due course. Please note that there will be a formal, written evaluation every friday afternoon, and the doctors that offered lectures during the week, will have to participate in this evaluation. All arrangements for this course were made in close co-operation with Mrs. C P Kahl, my co-promoter.

Unfortunately I do not have the curriculum for pharmacology ready, as this must be drawn up by a pharmacist, but I will fax this to you as soon as it is available.

I indicated to dr. Petschel that the macro-curriculum for the courses in traumatology and occupational health as given to him will be the curriculum that goes to the S.A. Nursing Council, but the micro-curriculum, or course content, must be developed by the person offering the course, this within the framework of the macro-curriculum.

I was unaware of the Lebanon Hospital and it's ties with you, and would like to visit this hospital very much. Dr. Petschel also suggested that the lectures offered by the doctors possibly be split between the medical staff of both Leslie Williams Memorial Hospital and Lebanon Hospital, but I leave this to your discretion.

Please contact me if there is anything else that you require.

Kind regards

....

Johann Keogh.

ANNEXURE S

TIME TABLES

PILOT IMPLEMENTATION OF CURRICULUM

PILOT PRESENTATION OF CONTINUING EDUCATION PROGRAMME

7 - 25 JANUARY 1991

DATE	7	8	9	10	11
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
08:00 08:40		ETHOS	PHNSc	PHNSc	PHNSc
08:45 09:25		ETHOS	PHNSc	PHNSc	PHNSc
09:30 10:10	INTRODUC TION	ETHOS	PHNSc	PHNSc	PHNSc
10:15 10:55	ETHOS	ETHOS	PHNSc	PHNSc	PRAC
11:00 11:40	ETHOS	ETHOS	PHNSc	PHNSc	PRAC
11:45 12:25	ETHOS	ETHOS	PHNSc	PHNSc	PRAC
12:30 13:10	ETHOS	ETHOS	PHNSc	PHNSc	PRAC
14:00 14:40	ETHOS	PRAC	PHNSc	PHNSc	
14:45 15:25	ETHOS	PRAC	PHNSc	PHNSc	
15:30 16:10	ETHOS	PRAC	PHNSc	PHNSc	
16:15 16:55	ETHOS	PRAC	PHNSc	PHNSc	
17:00 17:40					

ETHOS = ETHOS AND PROFESSIONAL PRACTICE : MR J J KEOGH

PHNSc = PRIMARY HEALTH NURSING SCIENCE : DR C P KAHL
: MR J J KEOGH

PILOT PRESENTATION OF CONTINUING EDUCATION PROGRAMME

7 - 25 JANUARY 1991

DATE	14	15	16	17	18
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
08:00 08:40	TRAUMA	OHN	OHN	PHYS ASSESS	PHYS ASSESS
08:45 09:25	TRAUMA	OHN	OHN	PHYS ASSESS	PHYS ASSESS
09:30 10:10	TRAUMA	OHN	OHN	PHYS ASSESS	PHYS ASSESS
10:15 10:55	TRAUMA	OHN	OHN	PHYS ASSESS	PHYS ASSESS
11:00 11:40	TRAUMA	OHN	OHN	PHYS ASSESS	PHYS ASSESS
11:45 12:25	TRAUMA	OHN	OHN	PHYS ASSESS	PHYS ASSESS
12:30 13:10	TRAUMA	OHN	OHN	PHYS ASSESS	PHYS ASSESS
14:00 14:40	TRAUMA	OHN	PRAC	PRAC	
14:45 15:25	TRAUMA	OHN	PRAC	PRAC	
15:30 16:10	TRAUMA	OHN	PRAC	PRAC	
16:15 16:55	TRAUMA	OHN	PRAC	PRAC	
17:00 17:40		OHN			

TRAUMA = TRAUMA NURSING SCIENCE : PROF J P LOWE
: DR J G VAN A. MUNRO
: DR S SHEARER
: DR S HAGEN
: DR E PETSCHEL
: DR P OBERHOLTZER
: DR DUVENHAGE

PHYS ASSESS = CLINICAL NURSING SCIENCE, HEALTH ASSESSMENT, TREATMENT AND CARE : DR C P KAHL
: MR J J KEOGH

PILOT PRESENTATION OF CONTINUING EDUCATION PROGRAMME

7 - 25 JANUARY 1991

DATE	21	22	23	24	25
TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
08:00 08:40	PHYS ASSESS	PHYS ASSESS	PHARM	TRAUMA	EXAM
08:45 09:25	PHYS ASSESS	PHYS ASSESS	PHARM	TRAUMA	EXAM
09:30 10:10	PHYS ASSESS	PHYS ASSESS	PHARM	TRAUMA	EXAM
10:15 10:55	PHYS ASSESS	PHYS ASSESS	PHARM	TRAUMA	EXAM
11:00 11:40	PHYS ASSESS	PHYS ASSESS	PHARM	TRAUMA	
11:45 12:25	PHYS ASSESS	PHYS ASSESS	PHARM	TRAUMA	
12:30 13:10	PHYS ASSESS	PHYS ASSESS	PHARM	TRAUMA	
14:00 14:40	PRAC	PRAC			
14:45 15:25	PRAC	PRAC			
15:30 16:10	PRAC	PRAC			
16:15 16:55	PRAC	PRAC			
17:00 17:40					

PHYS ASSESS = CLINICAL NURSING SCIENCE, HEALTH ASSESSMENT, TREATMENT AND CARE : DR C P KAHL
: MR J J KEOGH

PHARM = PHARMACOLOGY : MISS E L BRAND

TRAUMA = TRAUMA NURSING SCIENCE : MRS B VAN DEN HEEVER

ANNEXURE T

EXAMINATION PAPER

PILOT IMPLEMENTATION OF CURRICULUM

MINE MEDICAL STATION PERSONNEL COURSE

EVALUATION **25 JANUARY 1991**

SECTION A: ETHOS AND PROFESSIONAL PRACTICE

QUESTION 1

1A: Describe the following concepts:

- Responsibility
- Accountability. (5)

1B: Discuss the use of standing orders by doctors in your mine medical stations. (15)

SECTION B: OCCUPATIONAL HEALTH NURSING

QUESTION 2

2A: Evaluate your role as a mine medical stain personnel member in the control of chemical factors as a factor influencing the work environment of the employee.

(15)

2B: You as a registered nurse has a responsibility towards all the employees of your mining company. However, the migrant worker is deemed to be a vulnerable person. Describe the factors that lead to this statement. (5)

SECTION C: TRAUMA NURSING

QUESTION 3

Discuss the role of the dressing stations in the health care system of the gold mining industry, as given by LOWE.

(10)

QUESTION 4

4.1: Give a classification of the types of shock and a short description of the underlying pathology to differentiate between the different types. (5)

4.2: What are the goals with the treatment of shock.

(5)

4.3: A patient suffering from hypo-volemic shock eg. haemorrhage or distributive type of shock needs treatment:

4.3.1: Give a short description under each goal and how will you accomplish treatment for a patient with hypo-volemic shock. (10)

4.3.2: Name the compensatory mechanisms that will rectify:

- the blood pressure (5)
- the blood volume. (5)

SECTION D: PRIMARY NURSING CARE

QUESTION 5

5.1: What does "Health for all by the year 2000" mean? (2)

5.2: Name the eight (8) essential elements, according to the ALMA-ATA Declaration, that should be included in primary health care. (8)

5.3: Define the concept "comprehensive health care". (4)

5.4: Name the six (6) levels of a comprehensive health care system in order of priority. (6)

SECTION E: PHYSICAL ASSESSMENT

QUESTION 6

Name the two (2) types of data that should be obtained by the nurse in order to do a comprehensive assessment of a client, and explain how it is obtained. (2)

QUESTION 7

A nurse should have a framework according to which a history of a client can be obtained. What is the proposed framework, according to VILJOEN (1988). (8)

TOTAL : 110

END