Pharmaceutical care experiences and expectations in elderly patients in a private residency

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PREFACE

The following dissertation was written in article format as specified by the requirements of the North-West University. Chapter 3 contains the results of this study, presented as two manuscripts. Results not discussed in these manuscripts, are discussed in Chapter 4. The two manuscripts were submitted for publication to the journals *Drugs and Aging* and *Health SA Gesondheid.* (Proof of submission is supplied in Annexure E and Annexure F). The manuscripts were prepared in accordance with the specific author guidelines specified by each journal (see Annexure G and Annexure H). Each manuscript is presented as submitted, complete with the relevant reference lists attached in the style required by the journals. These references are also included in the reference list of this dissertation, in the style prescribed by the North-West University.

The dissertation is divided into four chapters. Chapter 1 supplies background to the study, the problem statement, research objectives and research method. Chapter 2 fulfils the objectives for the literature review. Chapter 3 contains the manuscripts related to the objectives of the empirical study. The final chapter, Chapter 4 is dedicated to conclusions, recommendations and limitations of the study. The annexures and reference list completes the dissertation.

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I would like to thank the following people for their contribution to my success:

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ABSTRACT

Pharmaceutical care experiences and expectations in elderly patients in a private residency

Key terms: Elderly, pharmaceutical care, pharmaceutical services, experiences and expectations, face-to face interview, structured questionnaire.

Pharmaceutical care in South Africa is not a formalised process. This study highlights the expectation amongst the elderly to receive pharmaceutical care. The expectations and experiences of an elderly population in terms of pharmaceutical services was also examined. Pharmacists and healthcare funders in South Africa should consider the value of pharmaceutical care added to the pharmaceutical services that forms part of their day-to-day activities. The pharmacist, a drug specialist, should be an integral part of the clinical healthcare team.

The study was done with two main objectives:

A comprehensive literature review included the reason and development of pharmaceutical care, roles of the pharmacist, the challenges in supplying pharmaceutical care locally and internationally, with specific focus on the value and impact of pharmaceutical care to the elderly.

The empirical study consisted of a cross-sectional study that used a structured questionnaire administered by the researcher in face-to-face interviews, to obtain data. The study population was 67 elderly participants in a specific retirement village in a suburban area in Johannesburg, South Africa.

Participants had to be ≥65 years of age.

Data was captured using Excel® and analysed using IBM SPSS Statistics for Windows version 22.0. All statistical significance was considered with a two-sided probability of $p<0.05$. The practical significance of results was computed when the *p*-value was statistically significant ($p\leq0.05$). Variables (age groups, gender, etc.) were expressed using descriptive statistics such as frequency (n), percentage (%), mean and standard deviation.

The dependent *t*-test was used to compare the difference between experience and expectation. Cohen's *d*-value was used to determine the practical significance of the results (with $d \geq 0.8$ defined as a large effect with practical significance).

The results of the study relating to pharmaceutical care showed that there were both practically and statistically significant differences between the expectations of the population in terms of all three phases of pharmaceutical care and their actual experiences. There were no significant differences between the responses of the participants regardless of age, sex, amount of chronic diseases, primary medicine provider or medicine funders. The largest difference between experience and expectation, based on Cohen's *d*-value ($p<=0.001$, $d=1.46$) was that. 95.5 % of the elderly patients perceived that the pharmacist "never" asses their medication required (3.93±0.36), but 32.8 % of the respondents indicated that it should "always" happen (2.28±1.13).

The results of the study relating to pharmaceutical services showed that this population of elderly patients expected more of the pharmacist in terms of pharmaceutical services, than they actually received. Discussions about the effect of other medicines on their chronic medicine ($d=1.94$); whether they have any medicines left from previous issues ($d=1.77$); and questions regarding existing chronic conditions ($d=1.69$) showed statistically and practically significant differences. There was an association between questions regarding the use of chronic medicines at pharmacies and at other healthcare professionals ($d=0.26$), as well as the supply of written information at pharmacies and other healthcare professionals ($d=0.42$).

This study highlights shortcomings in the role of the pharmacist as a healthcare team member. Pharmacists in South Africa do not supply pharmaceutical care. When questioned about the components of pharmaceutical care the elderly population indicated that they expected that care. The community pharmacist should focus on the health-related quality of life of the individual patient and identify the immediate healthcare needs of their unique community (Catic, 2013:206), with specific reference to vulnerable populations like the elderly. Pharmacists have the knowledge and opportunity to address these needs. They need to establish themselves as the go-to healthcare professional.

OPSOMMING

Farmaseutiese-sorg ervarings en verwagtings van bejaardes in ‘n privaat residensie

Trefwoorde: Bejaardes, farmaseutiese sorg, farmaseutiese dienste, ondervinding en verwagtings, een-tot-een onderhoude, vasgestelde vraelyste.

Farmaseutiese sorg in Suid Afrika is nie ’n formele proses nie. Hierdie studie vestig die aandag op bejaardes se verwagting van farmaseutiese sorg. Bejaardes se verwagting van farmaseutiese dienste teenoor hulle werklike ervarings daarvan was ook ondersoek. Aptekers en gesondheidsorgbefondsers in Suid Afrika behoort die waarde van farmaseutiese sorg as toevoeging tot dag-tot-dag farmaseutiese dienste in ag te neem. Die apteker is ’n medisynespesialis en behoort ’n kern lid van die gesondheidsorgspan te wees.

Die studie het twee doelwitte gehad:

’n Volledige literatuurstudie wasgedoen oor die rede vir, en ontwikkeling van, farmaseutiese sorg, die rol van die apteker, sowel as na struikelblokke tot die lewering van farmaseutiese sorg plaaslik en internationaal, met spesifieke fokus op die waarde en impak van farmaseutiese sorg vir bejaardes.

Die empiriese studie was ’n deursneestudie wat deur die navorser self uitgevoer was. Data was versamel deur middel van ’n vooropgestelde vraelys in een-tot-een onderhoude. Die studiepopulasie was 67 bejaardes woonagtig in ’n spesifieke aftreeoord in ’n voorstedelike woonbuurt in Johannesburg, Suid-Afrika.

Deelnemers moes ≥65 jaar oud wees.

Data was met Excel® vasgelê en met IBM SPSS Statistics for Windows weergawe 22.0.ontleed. Alle statisties beduidende waardes was oorweeg met ’n tweesydige moontlikheid van $p<0.05$. Die praktiese beduidenis van resultate was bereken as die p-waarde statisties beduidend was ($p<0.05$). Veranderlikes (ouderdomsgroepe, geslag, ens.) was vergelyk deur middel van beskrywende statistiek, soos frekwensies (n), persentasies (%), gemiddeldes en standaard afwykings.

Die afhanklike t-toets was gebruik om verskille tussen verwagtings en ondervindings te vergelyk. Cohen se d-waarde was gebruik om praktiese beduidenis van die resultate te bepaal (waar $d\geq 0.8$ wel as ’n groot effek met praktiese beduidendheid beskou is).

Die resultate van die studie het getoon dat daar beide prakties en statisties beduidende verskille tussen die populasie se ervaring, tenoor verwagting, vir al drie fases van farmaseutiese sorg

was. Daar was geen beduidende verskille tussen die deelnemers se antwoorde nie, ongeag van ouderdom, geslag, aantal kroniese siektes, primêre gesondheidsorg verskaffer of derde-party gesondheidsorg verskaffers nie. Die grootste verskil tussen ondervinding en verwagting, gebaseer op Cohen se d-waarde ($p<=0.001$, $d=1.46$), was die mening dat aptekers “nooit” die pasiënt se medisynebehoeftes geassesseer het nie (3.93 ± 0.36), terwyl 32.8 % van die deelnemers (2.28 ± 1.13) gereken het dit behoort “altyd” te gebeur.

Die resultate toon dat bejaardes meer van die apteker verwag as wat hulle ondervind. Besprekings oor die effek van ander medisyne op hulle kroniese medikasie ($d=1.94$), of hulle steeds medisyne oor het van vorige kere ($d=1.77$) en vrae in verband met bestaande kroniese siektes ($d=1.69$), toon statisties en prakties beduidende verskille. Daar is ‘n verband tussen vrae in verband met die gebruik van kroniese medisyne by die apteek en by ander gesondheidsorgverskaffers ($d=0.26$), sowel as die verskaffing van geskrewe inligting by apteke en ander gesondheidsorgverskaffers ($d=0.42$).

Hierdie studie vestig die aandag op die tekortkominge in die rol van die apteker as ‘n lid van die gesonheidsorgspan. Aptekers in Suid Afrika verskaf nie farmaseutiese sorg nie. Wanneer die bejaardes in hierdie studie gevra was oor die fases en komponente van farmaseutiese sorg, het hulle aangedui dat hulle dit wel verwag. Die gemeenskapsapteker behoort op die gesondheidsverwante kwaliteit van lewe van die individu te fokus. Aptekers behoort ook die gesondheidsorg behoeftes van hulle onmiddellike omgewing in ag te neem, met spesifieke fokus op bejaardes. Die apteker behoort in ’n posisie te wees om hierdie behoeftes aan te spreek. Aptekers behoort hulself te vestig as die eerste gesondheidsorgverskaffer waarheen patiente gaan met vrae en behoeftes.

AUTHORS' CONTRIBUTION TO MANUSCRIPT 1

AUTHORS CONTRIBUTIONS TO MANUSCRIPT 1

The contributions of each of the authors of manuscript 1, "An elderly, urban population: experiences and expectations of pharmaceutical care", were as follows:

Author	Contribution to the study
Ms A Janse van Rensburg	Planning and designing the study
	Conducting the literature review
	Collection of data
	Data capturing
	Interpreting the results
	Reach conclusions
	Write the manuscript
Ms I Kotzé	Supervisor: Study concept and design
	Guidance for result interpretation
	Revision of the manuscript
Prof MS Lubbe	Co-supervisor for study concept and design
	Guidance for result interpretation
	Revision of the manuscript
Ms M Cockeran	Guidance in result interpretation
	Data analysis
	Statistical verification

With the following statement the co-authors confirm their role in the study and give their permission that the manuscript may form part of this dissertation.

I declare that I have approved the abovementioned manuscript and that my role in this study, as indicated above, is representative of my actual contributions and I hereby give consent that it may be published as part of the MPharm study of A Janse van Rensburg.

Ms I Kotzé

Prof MS Lubbe

Ms M Cockeran

AUTHORS' CONTRIBUTION TO MANUSCRIPT 2

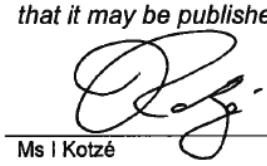
AUTHORS CONTRIBUTIONS TO MANUSCRIPT 2

The contributions of each of the authors of manuscript 2, "An elderly, urban population: experiences and expectations of pharmaceutical services", were as follows:

Author	Contribution to the study
Ms A Janse van Rensburg	Planning and designing the study
	Conducting the literature review
	Collection of data
	Data capturing
	Interpreting the results
	Reach conclusions
	Write the manuscript
Ms I Kotzé	Supervisor: Study concept and design
	Guidance for result interpretation
	Revision of the manuscript
Prof MS Lubbe	Co-supervisor for study concept and design
	Guidance for result interpretation
	Revision of the manuscript
Ms M Cockeran	Guidance in result interpretation
	Data analysis
	Statistical verification

With the following statement the co-authors confirm their role in the study and give their permission that the manuscript may form part of this dissertation.

I declare that I have approved the abovementioned manuscript and that my role in this study, as indicated above, is representative of my actual contributions and I hereby give consent that it may be published as part of the MPharm study of A Janse van Rensburg.



Ms I Kotzé

Prof MS Lubbe

Ms M Cockeran

LIST OF ABBREVIATIONS

ADRs	Adverse drug reactions
ASHP	American Society of Hospital Pharmacists, *name change in 1995 to American Society of Health-System Pharmacists*
CDC	Centres for Disease Control and Prevention
CPhA	Canadian Pharmacists Association
DDI	Drug-drug interactions
EU	European Union
GEMS	Government Employee's Medical Scheme
HMDOH	Her Majesty's Department of Health (United Kingdom)
HREC	The Health Research Ethics Committee at North-West University
MUSA	Medicine Usage in South Africa, School of Pharmacy, North-West University, Potchefstroom Campus
NWU	North-West University, Potchefstroom campus
PCMA	Pharmaceutical Care Management Association of South Africa
PCNE	Pharmaceutical care network Europe
PSA	Pharmaceutical Society of Australia
PSSA	Pharmaceutical Society of South Africa
RCFE	Residential Care Facilities for the Elderly
SAPC	South African Pharmacy Council
SAQA	South African Qualifications Authority
UAE	United Arab Emirates
UK	United Kingdom
USA	United States of America
WHO	World Health Organization

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CHAPTER 1: INTRODUCTION AND SCOPE OF STUDY

1.1 Introduction

This study focused on the experiences and expectations that independently dwelling, ambulatory elderly has of pharmaceutical care. It examined pharmaceutical care and services rendered to the elderly as well as their experience and expectations of it. In the Oxford Dictionary of English (2010:50), *ambulatory* is defined as adapted for walking or mobile. *Ambulatory elderly* is defined by the California residential care facilities guide as a person that is "capable of demonstrating the mental competence and physical ability to leave a building without assistance of any other person or without the use of any mechanical aid in case of an emergency" (Residential Care Facilities for the Elderly (RCFE), 2014:3). For the purposes of this study, the researcher adopted this definition.

1.2 Background

Traditionally, pharmacists have been perceived to manufacture, dispense and distribute medicines. Supplying advice and information to ensure that patients receive optimal outcomes from their medicine therapy was only introduced in the late 1980s (Pearson, 2007:1295). The role of modern pharmacists is changing from a traditional, technical dispensing service to a healthcare professional, team-based clinical perspective (Manasse & Speedie, 2007:82), which includes the management of therapy, improvement of health and prevention of illness (Albanese & Rouse 2010: 36).

The philosophy of pharmacy practice includes the commitment to "provide pharmaceutical care by taking responsibility for the therapeutic outcome of therapy and to be actively involved in the design, implementation and monitoring of an effective pharmaceutical care service" (SAPC, 2010:2). This philosophy was highlighted and formalised by Hepler and Strand (1990:539) in the 1990s. They defined pharmaceutical care as a process of meeting drug-related needs and problems of patients in a responsible way. The goal is to achieve the outcomes of a cure, the elimination, reduction, or prevention of a disease or the symptoms thereof, or the slowing of disease progress. In 1991, Strand *et al.* (1991:548) added "responsible provision of drug therapy for the purpose of achieving definite outcomes to improve a patient's quality of life". Pharmaceutical care is the social responsibility of the pharmacist and integrates humanistic principles.

In 1993, the American Society of Hospital Pharmacists (ASHP, 1993a:1720) subscribed to the same pharmaceutical care principles. The World Health Organization (WHO) (1988:31) sees

pharmaceutical care as a philosophy of practice wherein the pharmacist focuses on the patient to ensure that the patient receives the full benefit, commitment, concern, ethics, functions, knowledge and skills of the pharmacist. They re-enforced the positive therapeutic goals in improving quality of life for the patient.

The Pharmaceutical Care Management Association (PCMA) of South Africa was founded in 1997 with the purpose to promote standards of excellence in therapeutic outcomes in a managed care environment (PCMA, 2014:1). They provide continued professional education in pharmaceutical care and promote the understanding of managed care principles by both healthcare providers and patients. The philosophy of pharmaceutical care includes identifying, resolving and preventing drug therapy problems and to document all the processes (Strand *et al.,* 1991:549).

In 2006, a study by Smith *et al*. (2006:379) showed a positive health outcome for the elderly if pharmaceutical care is applied. At the University of Minnesota, pharmacists supplied pharmaceutical care to approximately 25 000 patients from 2000 to 2003. In this time, 61 % of the subjects in the study experienced drug therapy problems that were resolved. Improved clinical outcomes were achieved or maintained in 83 % of the patients. An estimated USD 1 000 000 were saved in healthcare costs as a direct result of the introduction of this programme. As a result of this study, a healthcare network was established, which includes pharmaceutical care practitioners, to benefit patients clinically and financially (Strand *et al*., 2004:3988).

In studies done in the United Kingdom (Bojke *et al*. 2010: e22), in Europe by Van Mil *et al.* (2006:155), in France by Perraudin, (2011:1), in Canada by Jones *et al.* (2005:1530) and in the United States of America by Brown *et al.* (2003:75) and Budnitz *et al*. (2011:2003), the barriers to effective pharmaceutical care were identified as a lack of funds, inaccessible patient databases, insufficient training in clinical pharmacy, low pharmacist motivation, lack of personnel and re-imbursement issues. In Northern Ireland, time restraints, lack of dedicated consultation areas and low public expectations of pharmaceutical care were named as factors that limit the quality of pharmaceutical care supplied to patients (Van Mil *et al.*, 2001:163). In Thailand, even though the philosophy of pharmaceutical care was initiated in 1990, only eight Thai hospitals offered a pharmaceutical care service by 2006, and a lack of external co-operation, insufficient knowledge and a lack of funding were cited as the limiting factors (Ngorsuraches & Li, 2006: 2144).

Pharmacists are the appropriate professionals to assess the optimal therapy for a patient and to educate and motivate them to achieve improved results from the medication (McPherson,

2011:5). Pharmacists are considered the most accessible healthcare professionals, and in most countries, they are the only professionals with the specific skills and knowledge to supply pharmaceutical care (Van Mil *et al.*, 2001:163). Pharmacists have the skills and knowledge to take responsibility for the positive outcomes of drug therapy (Penna, 1990:544). No appointment is required to see the pharmacist. This places the interaction between patient and pharmacist in a different sphere than those of any other healthcare professional (Hepler & Strand, 1990:540). Pharmacy as a profession has the social responsibility to ensure the safe and effective drug therapy of the elderly individual (Hepler & Strand, 1990:540). The community pharmacist is the preferred healthcare professional to scrutinise the medication history of the elderly patient and should do so at least once a year (Van Schoor, 2009:22). Comprehensive pharmaceutical care contributes to cost containment and improves the quality of care to the patient (Lobas *et al.*, 1992:1686).

Irene Mayer Selznick (1907-1990) said that she wanted to grow very old, very slowly (Pace, 1990). In reality though, the aging process cannot be halted. The French composer Auber (1782-1871) once observed that old age brings problems and shortcomings, but concluded "ageing seems to be the only available way to live a long time" (Runcan, 2013:38). Statistically, humans now grow older than in the previous century. Actuaries estimate that life expectancy increases by 1.5 years per decade (Jacobzone *et al.*, 2001:151). In the USA, life expectancy in 1990 was 47 years, but in 2012 it was 78 years (Lechleiter, 2012). In Australia, the extended life expectancy is heralded with a new increased pensionable age of 67 years by 2023, which will steadily increase to 70 years by 2035 (Hernandez, 2014). In the last five decades, life expectancy in South Africa increased by 13 years (Mayosi *et al.*, 2012:2032). The forecast is that people will live longer: life expectancy for children born since 2000 is 100 to 110 years of age, implying that the elderly population will steadily increase. They will also want to be healthier for longer (Vaupel, 2010:537).

1.2.1 Scope of practice for a pharmacist

The current scope of practice for the pharmacist as described in the South African Pharmacy Act is reflected in Figure 1-1.

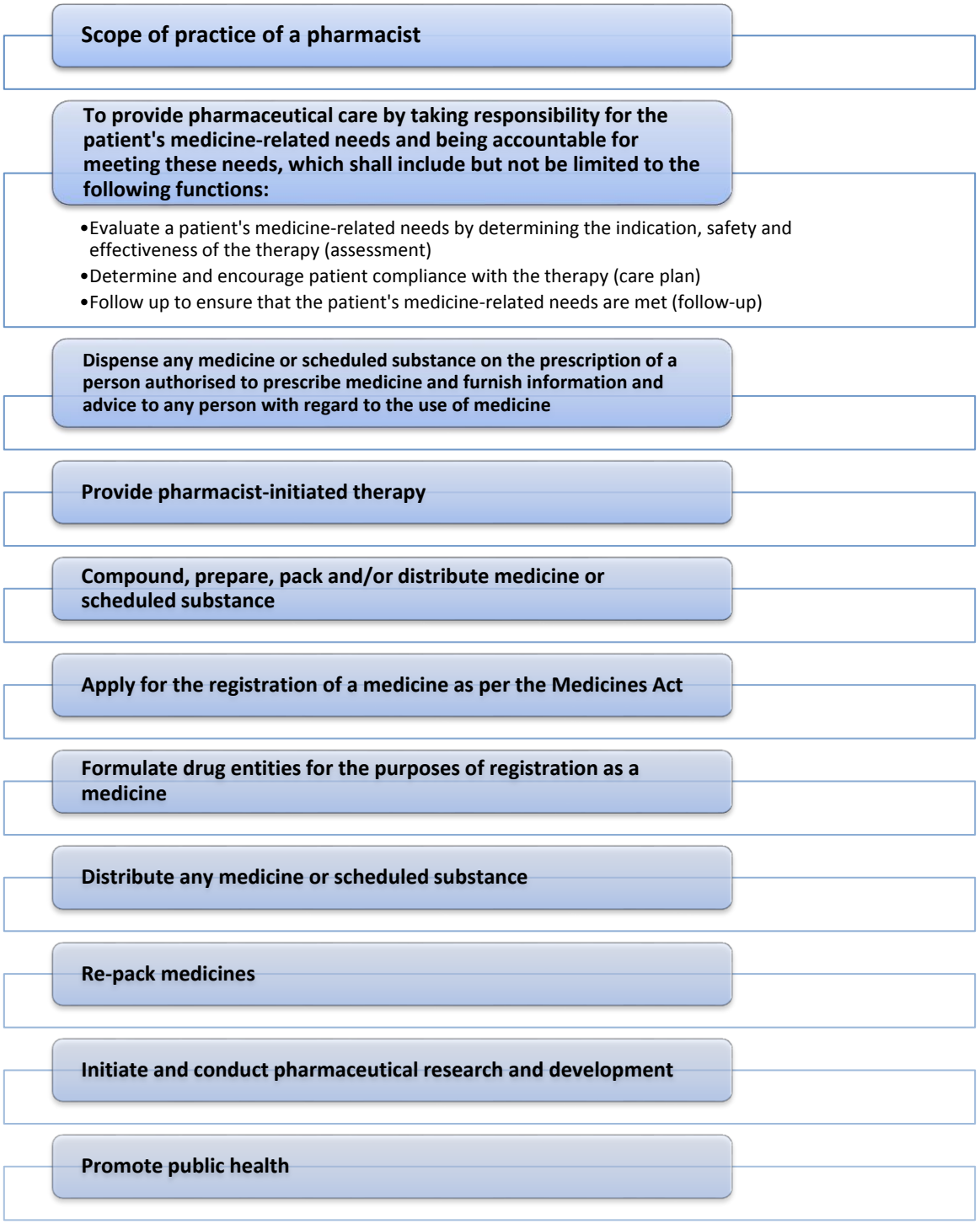

Figure 1-1: Scope of practice for a pharmacist

Pharmaceutical care is an integral part of the scope of practice for pharmacists. Pharmaceutical care planning is a systematic, comprehensive process with three primary functions (Strand *et al*., 1991:30), as shown in Figure 1-2.

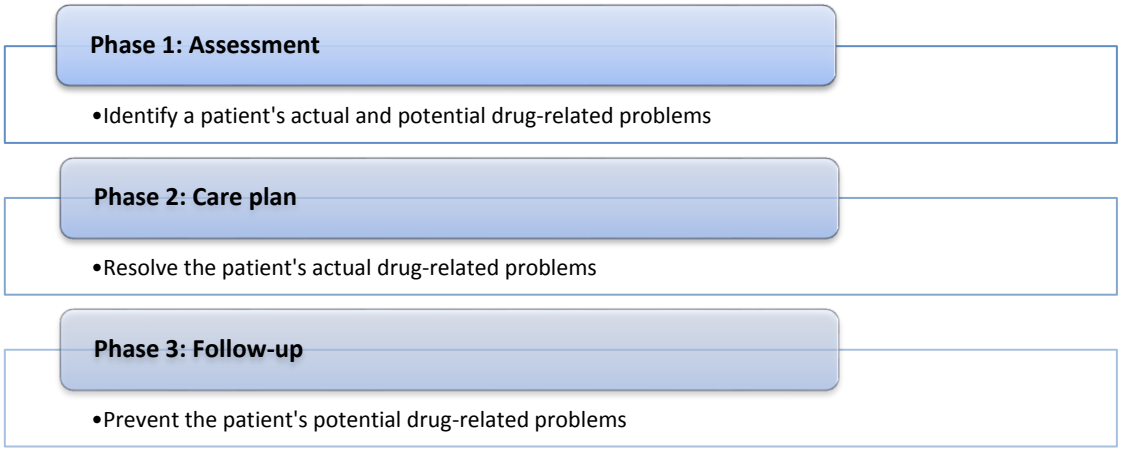

Figure 1-2: Three phases of pharmaceutical care

In South Africa, Blignault (2010:248) found that only 1 out of the 133 pharmacists studied, performed all three stages of pharmaceutical care and only 20 % performed at least one. These pharmacists spent 45.7 % of their workday dispensing medicines and 25.4 % of the day counselling patients. In England, Davies *et al.* (2014:313), found that pharmacists spend 25 % of their workday dispensing products and 10.6 % assessing prescriptions for clinical appropriateness. Only 6.6 % of their day was spent providing advice on non-prescription medicines, 3.8 % on prescription medicine counselling and 3.2 % on pharmaceutical care.

1.2.2 Ambulatory elderly

In 2009, the South African population included 7.8 % citizens over the age of 60 years, of whom 40 % resided in Gauteng (Statistics South Africa, 2011). The Older Persons Act (Act 13 of 2006) classifies the elderly – males over 65 years of age and women over 60 years of age – as a vulnerable group. In South Africa, 51.8 % of persons aged 60 to 79 years suffer from at least one chronic condition and 22 % have two or more chronic conditions (Phaswana-Mafuya *et al.*, 2013), as opposed to the population aged 0 to 59 years, where only 17 % have a chronic disease (Statistics South Africa, 2011). For this reason, it is more likely for the elderly to consult with more than one healthcare professional (Nash *et al*., 2000:3). The leading chronic diseases in South Africa are cardiovascular disease, chronic obstructive pulmonary disease, hypertension and diabetes mellitus (Steyn *et al*., 2006:211). In the USA, the *Centres for Disease Control and Prevention* list heart disease, cancer and stroke as the three most common causes of morbidity in people older than 65 years of age (CDC, 2011). In Germany,

the most common combined chronic conditions in the elderly are hypertension, hypercholesterolemia and chronic back pain (Van den Bussche *et al.*, 2011:103).

The elderly has specific drug-related needs (Mangoni & Jackson, 2004:6; Bressler & Bahl, 2003:1564). Each person differs with regard to state of general health, disability, number of chronic diseases, age-related metabolic changes and the medicines required to control or treat these conditions (Wooten, 2012:437). The absorption, distribution, metabolism and excretion of drugs differ between healthy young volunteers, healthy elderly patients and frail elderly persons (Kinirons & O'Mahoney, 2004:540; Shargel *et al.*, 2001:633). For this reason, the elderly may have idiosyncratic reactions to medicines (Shargel *et al.*, 2001:355). Physiological factors (altered pharmacokinetics and pharmacodynamics), the presence of more than one chronic disease and the use of multiple medicines increase the risk of drug-disease interactions and drug-drug interactions in the elderly (Cresswell *et al.*, 2007:262). Impaired memory contributes to this risk because of decreased adherence (Gurwitz *et al*., 2003:1108).

Individualised dosages will therefore prevent drug accumulation and reduce side effects and/or adverse drug reactions (Aspden *et al*., 2007:355). Absorption of medicines can be affected by difficulty in swallowing and poor nutrition. The aging process reduces plasma-albumin, muscle-to-fat ratio and reduce body water content. Some of the consequences of this process is:

- The total amount of free drug available in plasma-bound medicines such as phenytoin increases.
- Dosages in fat-soluble medicines such as itraconazole (Foreman *et al.,* 2010:278) should be altered.
- The altered distribution dynamics could require a lower loading dose.
- Metabolism through the liver is affected by the reduced hepatic blood flow in the elderly (Hilmer *et al*., 2005:153) and consequently the half-life of drugs may be longer than expected (Wooten, 2012:440).
- Glomerular filtration reduces as the kidneys age (Garasto *et al.*, 2014:493), and adjusted dosages for medicines metabolised by, and excreted through, the kidneys should be considered

Drugs are also transported into the liver at a slower rate. There is no established standard for reduced dosages for hepatically metabolised drugs in the elderly patient (Mangoni & Jackson,

2004:11). The drug therapy for each individual elderly patient should be monitored in a pharmaceutical care setting until a positive outcome is reached.

1.2.3 Polypharmacy

Polypharmacy is defined in the New Oxford American Dictionary (2010) as “the simultaneous use of multiple drugs by a single patient, for one or more conditions”. In professional literature, polypharmacy has both a positive connotation (appropriate medicines for several conditions) (Preskorn, 2005:46) and a negative connotation (inappropriate medicines for a condition) (Bushardt *et al.*, 2008:384). Polypharmacy among the elderly is common (Maher *et al.*, 2014: 59). One in four elderly patients in the United States of America has more than one chronic condition (Benjamin, 2010:627). Polypharmacy does contribute to increased hospitalisation of the elderly (Grymonpre *et al.*, 1988:1094). Some of the medicines interact with each other, or the patient experiences an adverse drug reaction (Page & Ruscin, 2006:298).

Malhotra *et al.* (2001:704) examined consecutive emergency admissions of 578 elderly patients to a hospital in North India, and found that 14 % were either adverse drug reactions or the result of patient non-compliance. They found that 33.2 % of these elderly did not comply with medication regimes. The conclusion of the study was that pharmaceutical care could eliminate a fair amount of these admissions. Tipping *et al.* (2006:1255) conducted a similar study in Cape Town in 2006. Of the elderly admitted to the emergency department of the hospital, 20 % suffered adverse drug reactions and pharmaceutical care could reduce this number. Roehl *et al*. (2006: 33-39) reported that 50 % of the elderly in the United States of America take one or more unnecessary medications and a study in Brazil showed an average of eight medicines used per elderly patient (De Lyra *et al.*, 2007:989). The risk of preventable drug-drug interactions or adverse drug reactions can be reduced by improved pharmaceutical care (Wolff *et al.*, 2001; 2270).

1.2.4 Pharmaceutical care

Pharmaceutical care in the elderly, high-risk patient, taking multiple medications can reduce unnecessary and irrational medicine prescribing and improve health outcomes (Leendertse *et al.*, 2013:380). Medication inconsistencies can occur when elderly patients migrate between health practitioners (Wooten, 2012:437). Pharmacists can assess and evaluate the prescribed medicines for the patient on a regular basis to reduce errors and promote positive patient health outcomes and decreased costs (Martin, 2012:766). The application of formularies, and “whichever available” generic medicines, can also contribute to medication errors (Pollock *et al.,* 2007: 235). Insufficient pharmacological studies on efficacy, safety and adjusted dosages

for the elderly are unique factors that contribute to drug-related problems in the elderly (Fialová & Onder, 2009:641). Doggrell (2013:548) found that only 55 % of ambulatory elderly were compliant chronic medicine users.

Elderly patients exposed to pharmaceutical care had an increased sense that pharmacists care (Volume *et al.*, 2001:411). It created a sense of trust in the pharmacist when they are assisted with their healthcare needs. Pharmaceutical care improved quality of life in the elderly (Spinewine *et al*., 2007:174; de Lyra *et al.*, 2007:989; Mallet *et al.*, 2007:186). The face-to-face pharmaceutical care interaction not only identifies possible adverse drug reactions, but can also identify previously undisclosed complementary medicine use (Graffen *et al.*, 2004:184.) In South Africa, self-medication and traditional medicine use are extensive, and in the multi-prescription-drug elderly, this can increase the risk of adverse drug reactions as well as drug-drug interactions (Metha, 2011:248).

Pharmacists can improve quality of life in the elderly and ensure positive health outcomes by providing pharmaceutical care (Bernsten *et al.*, 2001:65). The pharmacist can create complete patient profiles and medicine use systems (Al-Rahbia *et al.,* 2014:101). The use of these professional, patient-centred profiles combined with communication between the different healthcare professionals will reduce the incidence of adverse drug reactions and side effects and will promote safe and rational medicine use (Hepler, 2004:1493).

1.3 Problem statement

Polypharmacy is the use of an unspecified number of different medicines (necessary or not), prescribed by different healthcare professionals, for patients with multiple chronic diseases (Wooten, 2012: 440). Polypharmacy can lead to the inappropriate and incorrect use of medicine (Maher *et al.*, 2014:57). The therapeutic benefit of medicine in the elderly can be negated by the use of multiple medications and multiple healthcare providers (Bushardt *et al.*, 2008:384). As far back as 1988, in an editorial article in the South African Medical Journal, Pillans (1988:632) cautioned against polypharmacy and irrational medicine use. He urged closer co-operation between clinical and pharmacological departments in hospitals to alleviate this problem.

Polypharmacy is not the only contributor to drug-related problems in the elderly patient. Education levels, language barriers as well as cultural and mental health issues influence the level of drug-related problems experienced. Health literacy can be achieved by addressing all these issues when rendering pharmaceutical care (Wooten, 2012:438). In Europe, 51 % of patients over 65 years of age take more than six medicines daily (Hajjar, 2007:345). In a study

in South Africa, 20 % of elderly patients attended to in the emergency rooms at the Groote Schuur Hospital in the period February to May 2005 experienced adverse drug reactions and were taking more than five medicines per day (Tipping *et al.*, 2006:1255). The pharmacist in the role of counsellor and teacher contributes to the improvement of a patient's state of health in a cost-effective way (Lubbe, 2000). The specialised knowledge base of the pharmacist is an integral link in inter-professional patient care (Albanese & Rouse, 2010:36).

South Africa had 24 registered pharmacists per 100 000 citizens in 2010. The public health sector services 85 % of the population, which is one pharmacist per approximately 14 000 people (Smith, 2011:3). Several medical aids utilise courier dispensaries as preferred providers for their members that require chronic medicine supplies (Discovery Health, 2014:268; GEMS, 2014:6). In their policy statement in 2014, the Pharmaceutical Society of South Africa stated that courier-delivered medicines adversely affect the patient because of the inherent lack of pharmaceutical care (PSSA, 2014:1). Even in private healthcare settings in South Africa, pharmacist-patient and pharmacist-initiated patient interaction is not common (Gray *et al.*, 2002:111). If pharmacists do encourage patients to voice their questions and concerns, pharmaceutical care can be achieved despite the additional language and cultural barriers experienced in South Africa (Watermeyer & Penn, 2009:115).

1.4 Study aims and objectives

1.4.1 Research aim

The aim of this study was to determine the experiences and expectations of pharmaceutical care in an urban, elderly South African population.

1.4.2 Specific research objectives

1.4.2.1 Phase 1: Literature study

The first phase of this study was a thorough literature study to create an international and national picture of pharmaceutical care with a specific focus on the role of pharmaceutical care needs in the elderly. The literature study shows the development of pharmaceutical care and the envisaged road for this in pharmacy practice.

The purpose of the literature study was to achieve the following (Brink *et al.*, 2013:54-57):

- Creating a picture of what is already known about the research problem.
- Assisting in developing a framework for the study.

The specific research objectives of this literature study are listed in Figure 1-3.

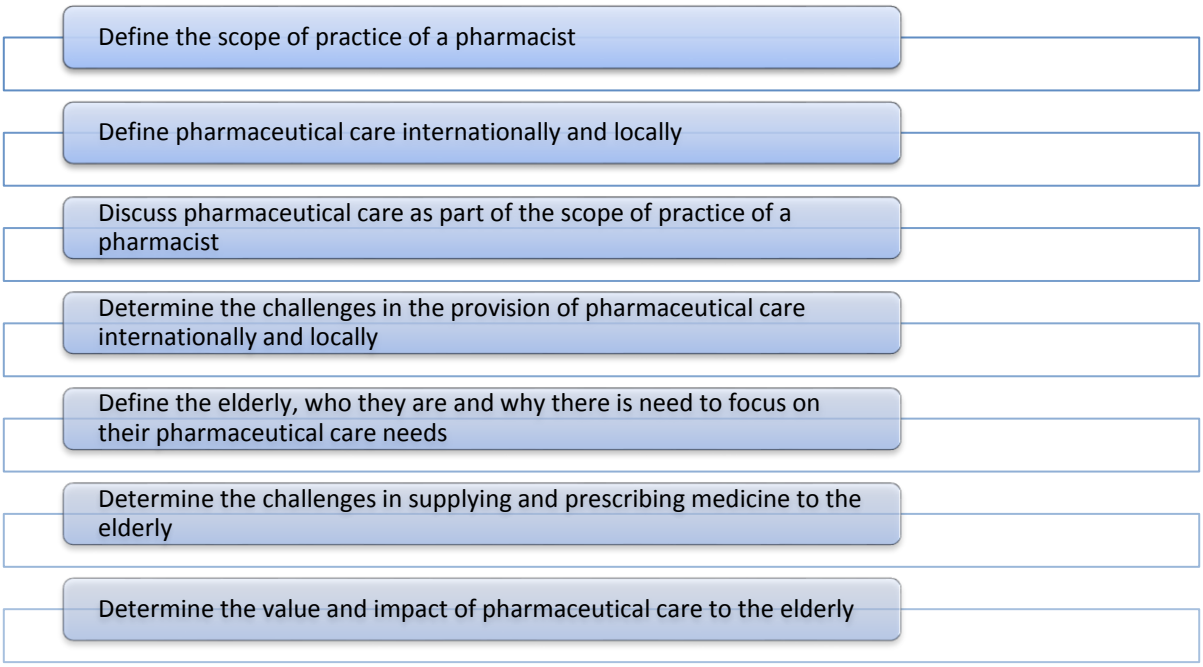

Figure 1-3: Specific research objectives of this literature study

1.4.2.2 Phase 2: Empirical investigation

An empirical study was conducted by means of face-to-face interviews to produce a study among the residents of a private residence concerning the pharmaceutical care experiences and expectations in the elderly.

Specific research objectives of the empirical study:

- Determine the demographic information of the study population
- Establish the perception of own health of the study population
- Establish the number of chronic conditions reported
- Establish the primary medicine provider for chronic and other medicines in this study population
- Establish the primary healthcare professional and the frequency of visits to this healthcare professional
- Establish the medicine usage of the study population: the amount and types of medicines used

- Determine the healthcare and pharmaceutical services at other healthcare practitioners as reported by the study participants
- Observe the physical condition of medicines presented
- Determine the demographic preferences for pharmacists and pharmacies
- Determine the pharmacy-related experiences and expectations as reported by the study population
- Determine the medicine-related experiences and expectations as reported by the study population
- Determine the health-related experiences and expectations as reported by the study population
- Determine the experiences and expectations of the three phases of the patient care process as reported by the study population
- Determine the questions raised by the participants after completing the questionnaire

The questionnaire was divided into eight sections, and it links to the specific objectives as illustrated in Figure 1-4.

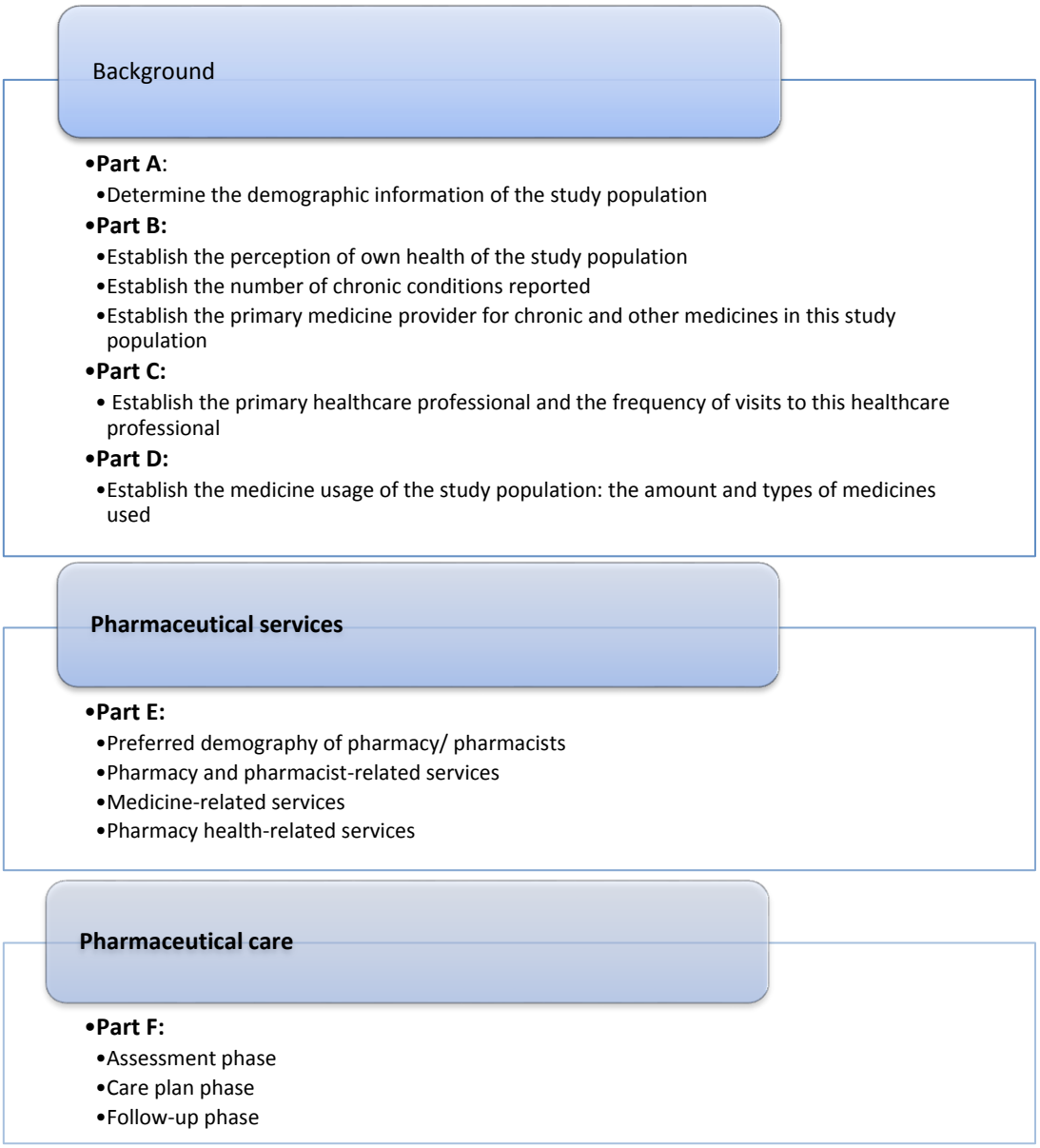

Figure 1-4: Questionnaire linked to specific objectives

The findings of the study as reflected in Chapter 3 relates to the objectives of the empirical study and the structured questionnaire as follows:

Table 1-1: Manuscript 1 results in relation to structured questionnaire

Objectives	**Findings**	**Relevant sections of structured questionnaire**
Determine the demographic information of the study population;	**Demography and background information**	Part A and B
	Pharmaceutical care**:**	
	Assessment phase	Part F1
	Care plan phase	Part F2
	Follow-up phase	Part F3

Table 1-2: Manuscript 2 results in relation to structured questionnaire

Objectives	**Findings**	**Relevant sections of structured questionnaire**
Determine the demographic information of the study population;	Demography and background information	Part A and B and C and D
	Demography of pharmacists	Part E1
	Pharmaceutical services: **Pharmacist vs other healthcare professional**	Part E3 and Part D7
	Pharmacist and pharmacy related needs	Part E2
	Pharmacy: **Medicine related needs**	Part E3
	Pharmacy: **Healthcare services**	Part E4

1.5 Research methodology

1.5.1 Research phases

The research consisted of two phases: a literature study and an empirical study.

1.5.2 Literature study

The literature study examined the questions set out in the problem statement by studying expert publications and recent articles on related subjects. It supplied an international and local literature foundation for the empirical study.

Figure 1-5: Specific research objectives within the context of the literature study

1.5.3 Empirical study

A structured face-to-face questionnaire was administered to determine the experience and expectation of the elderly in terms of pharmaceutical care.

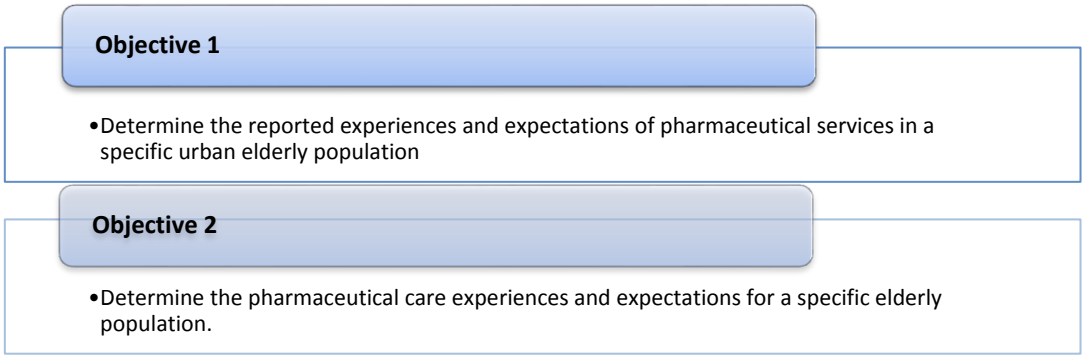

Figure 1-6: Table to link the objectives of the empirical study to the questionnaire

1.5.4 Research design

Parahoo (1997:142) describes research design as “a plan that describes how, when and where data are to be collected and analysed”. Burns and Grove (2003:195) define research design as “a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings”.

A cross-sectional descriptive study was conducted. Joubert and Ehrlich (2012:62) state that descriptive studies set out to describe the characteristics of the population under investigation. This study describes the drug-related experiences of ambulatory elderly patients living in an urban environment: how often, where and how they obtain their medicines, their existing knowledge of their conditions and medications, who they contact with regard to information regarding their condition, medication, experienced side-effects and adverse drug reactions The study also shows their expectations of pharmaceutical care: what happens when they visit a pharmacy, interact with a pharmacist and purchase medicines from the pharmacy.

1.5.4.1 Data collection tools

Quantitative studies measure concepts by capturing details of the social environment and expressing it in numbers. It links the researchers’ perceived concept of the social world (in this case the elderly and their health) with findings in the environment: pharmaceutical care as experienced by the elderly (Neuman, 2014:317). A structured interview (See Annexure D) is a technique of using the same questions in the same way to each respondent and recording the answers. This creates a descriptive statistical database with repeatability. The method

adds to the reliability of the study (Joubert & Ehrlich, 2012:107; Maree, 2012:158; Neuman, 2014:203).

The advantages in using structured questionnaires are (Bryman & Bell, 2011:204-206; Neuman, 2014:347):

- Interpretation from the interviewer in recording of the answer is prevented.
- The respondent's own answer is recorded.
- The participant may find the procedure more personally rewarding, as opposed to completing an impersonal form.
- The questionnaire is completed in the correct sequence.
- This method has the highest response rate.
- The interviewer might answer questions arising from the questionnaire.
- The format of the questionnaire limits interviewer bias.

The disadvantages in using structured questionnaires are (Seale, 2012:198; Neuman, 2014:347):

- The process is time consuming.
- Data collection quality may be influenced by interpersonal factors as the participant may respond in a way that is perceived to be acceptable to the interviewer.

In order to eliminate as many as possible of the disadvantages, the questions are mostly closed ended. Guided by the processes suggested by Joubert and Ehrlich (2012:109) as well as those proposed by Lee (2006:761), the steps in Figure 1-7 were followed.

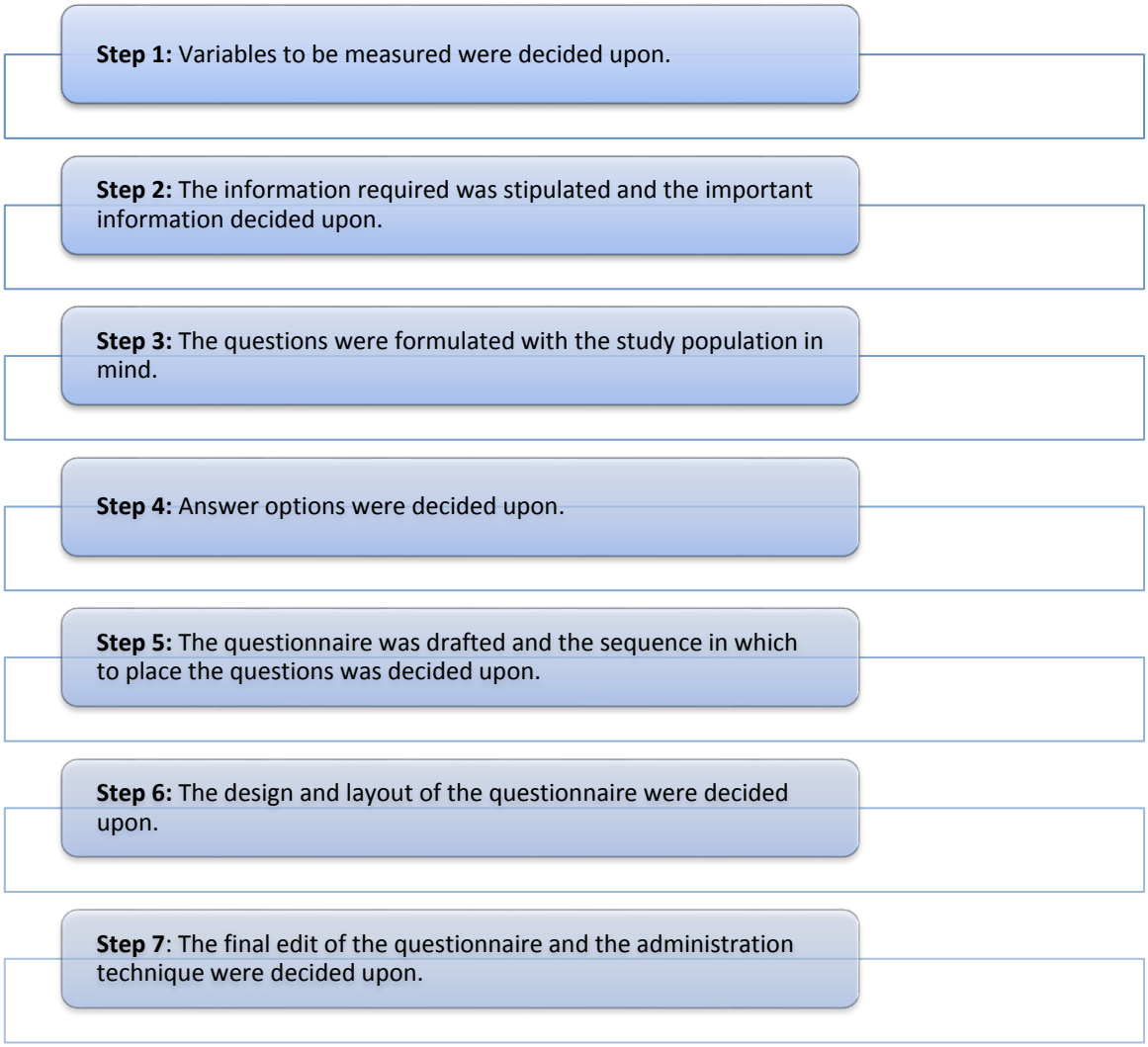

Figure 1-7: Steps followed to eliminate the disadvantages in using a structured questionnaire

As per Lee (2006:765), the questions could be answered without embarrassing the participants (Lee, 2006:766). Only one idea was addressed per question. No questions with double negatives were included. Closed-ended questions, with yes/no answers or a definite fact as answer, were used in the demographic determination (Brink *et al.,* 2013:155). Closed-ended questions are easier to administer and to analyse statistically. They also reduce bias introduced by the interviewer, limit observation variation and their results are easy to reproduce (Joubert & Ehrlich, 2012:110).

The sections of the questionnaire relating to expectation and experience were structured using a rating scale. This scale is easy to construct and reliable. A Likert scale has the advantage of providing data values rather than categories. Neuman (2014: 232) indicated that the number of responses in a Likert scale increases the reliability of the research, but that it levels out at

approximately seven choices. Because the research is among the elderly, in order to improve reliability and keep confusion at a minimum, a scale with four choices was selected.

The four-point Likert scale was used to determine pharmaceutical care as experienced by the participant. The responses *always*, *often*, *seldom* and *never* were chosen as they answer the questions with the least amount of possible confusion. The questions were put in a logical order and linked to one another (Joubert & Ehrlich, 2012:111). This technique produced data that shows clear development of participants' pharmaceutical care experience.

The entire questionnaire was administered by the researcher in the residence of the participant.

1.5.4.2 Validity and reliability

Reliability is a measurement of the extent to which the source is able to provide the data. The elderly population in the residence was a primary source of data (Joubert & Ehrlich, 2012:117). The data were reported by the participants and recorded by the researcher. The participants selected were able to provide actual data on their experiences and expectations when purchasing medicines from their supplier, ensuring reliable data.

Neuman (2014:212) refers to measurement reliability as the ability to get the same measurement with every interview. Reliability reflects the dependability, consistency, accuracy and precision of a questionnaire (Joubert & Ehrlich, 2012:117; Maree, 2012:305).

The questionnaire was designed to elicit responses about the actual experiences and expectations of the participants. Validity is ensured by (Joubert & Ehrlich, 2012:116; Maree, 2012:304; Schommer, *et al*., 1997:2723):

- using a single interviewer,
- questions refer to recent (past year) experiences,
- familiarity of the interviewer with the language and culture of the participants
- questionnaire was developed as per previous studies in this field.

The experience and expectation parts of the questionnaire were designed as a four-point Likert scale. The participant had no middle-ground option, thereby increasing the reliability of the responses.

1.6 Setting

The study was conducted among 242 ambulatory residents of an urban residence in Johannesburg who comprised the target population. The residence was selected for the following reasons:

- It provided an accessible study population with a specific socio-cultural background. This rendered answers in terms of the study for similar groups only, and results are not generalisable to the whole population. It may lead to future studies in other defined groups in order to draw comparisons and generalise the findings (Brink *et al*. 2013:131).

- The residents are pensioners and therefore readily available for face-to-face interviews.

- The residents utilise a wide range of healthcare and medicine providers, and therefore suit the requirements of the study. The researcher examined the experiences and expectations of the participants in terms of pharmaceutical care in a general range of healthcare providers. The study was not limited to participants who utilise healthcare providers in private practice only. The study participants had to be able to pay a fee if they require pharmaceutical care. This means that economic reasons can be eliminated as a reason that inhibited pharmaceutical care for purposes of future studies.

- The residents' committee granted permission for the study to be conducted at this residence.

1.6.1 Target population

The target population for this study were all the ambulatory residents of a residence in an urban environment with 242 residents.

1.6.2 Study population

Because individual interviews with all the elderly in the residence were not practical, a sample was selected. Invitations to an information and contact session were issued to all the residents who qualified for the study (See Annexure A). The signed/unsigned informed consent forms were collected in a sealed box at the clinic at the residence. The residents could hand in signed or unsigned forms to protect their privacy. The researcher collected the sealed box and a random selection of participants were performed as per paragraph 1.6.3. The results of the study will be presented to any interested resident by means of a feedback information session arranged after the completion of the study to which all residents will receive invitations.

1.6.3 Recruitment and sampling

1.6.3.1 Recruitment and selection process

The gatekeepers of the recruitment process were the residents' committee as well as the resident nursing sister. As gatekeeper, the residents' committee supplied written permission for the research to be conducted at the residence. The resident nursing sister, as the resident healthcare professional, introduced the researcher to the residents' committee. The resident nursing sister continued her role as mediator by assisting in identifying participants that would comply with the inclusion criteria and had the competence required to participate in this study.

Two weeks (14 days) before the initial contact meeting, the researcher delivered the attached invitations to attend a contact and information session by hand to every resident. All residents were welcome to attend the meeting. At the meeting, emphasis was placed on the anonymity of the research process, the free and voluntary choice to participate, as well as the right of participants to withdraw from the study at any given time. For the agenda, see Annexure B. The research process was transparent and contact numbers for the researcher, the study leader, the co-study leader, MUSA as well as the numbers for the Health Research Ethics Committee (HREC) of the Faculty of Health Sciences at the NWU, Potchefstroom Campus were supplied on the informed consent form (see Annexure C) in case any questions or concerns arose after the initial contact session. All questions pertaining to the study could be addressed to the researcher first.

A final date for handing in these consent forms were seven days from the initial contact meeting. (See flow diagram in Figure 1-8). The collection box was in the reception area of the residence, which allowed residents to place their consent forms in an unobtrusive way, and therefore contributed to anonymity. The researcher was responsible for the placing of the box. After the seven days had passed, the researcher collected the box.

A random sampling method was used to select the participants. The box containing the signed informed consent the researcher opened forms in the privacy of the researcher's own home. There, forms were withdrawn from the box randomly, to select participants. The box was shaken vigorously after each selection, in the "fishbowl" manner described by Brink *et al*. (2013:135) until all participants were selected.

The researcher via the details supplied on the informed consent document to schedule an appropriate time for the face-to-face interviews contacted the selected participants. The interviews were conducted in the cottage/unit of the participant or at the clinic on the premises

of the residence. The researcher administered the structured questionnaire. The completed questionnaires were handled as described in section 1.8.4 to ensure confidentiality.

An information and contact session was arranged with all the eligible residents. At this initial information and question session, the following was dealt with:

- The objectives of this research were explained.
- Pharmaceutical care was defined and explained.
- Who may participate in the study? Sampling procedure was explained.
- Any questions that arose were addressed.
- The risks in participating in this study were discussed.
- Anonymity, informed consent and the right to withdraw from the study at any time.
- The question “What will happen to the data and who will have access to it?” was answered.
- The research method and data gathering tool (structured questionnaire) was explained.
- Re-assurance regarding the competency of the researcher was supplied.
- Contact details of the researcher for any questions arising were supplied.

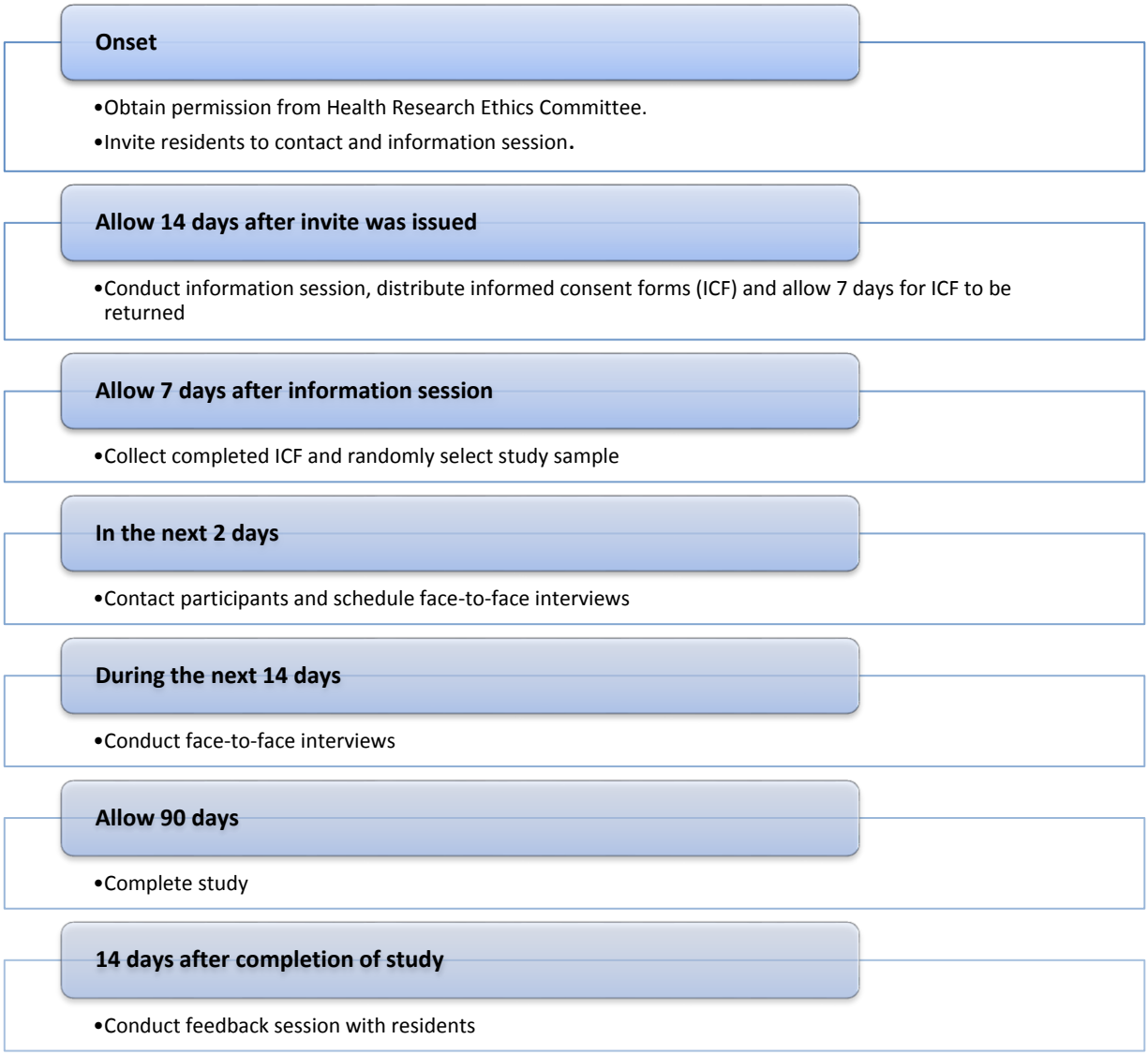

Figure 1-8: Study overview

The time-lapse from the initial contact session to the feedback session was due to the time-consuming nature of the questionnaires, the data capturing, statistical consultations and the conclusions. The researcher reflected the maximum time it should have taken to reach a conclusion from the study before a feedback session could be arranged.

1.6.3.2 Inclusion and exclusion criteria

The following inclusion criteria were applied:

- Participants had to be over 65 years of age. This age was chosen for both men and women to simplify sampling and to minimise possible confusion amongst the study population.

- Participants had to be able to give informed consent.
- Participants had to be ambulatory.
- Participants had to be able to communicate in English or Afrikaans.
- Participants had to be responsible for their own medication procurement and administration.
- Participants had to be willing to be interviewed in their own residence or the clinic on the premises of the residence.
- Participants had to be willing to allow the interviewer access to their medications.
- Participants had to be available for interviews in the selected period.
- Medicine procurement could have been from any available source: private or chain pharmacies, government hospitals or clinics, dispensing doctors or military facilities.

The only exclusion criterion was:

- Participants could not reside outside the selected residence or move to another location during the course of the study.

1.6.3.3 Description and verification of sample size

The total population in the residence was 242 and the total eligible participants were 238, as reported by the residents' committee. The sample size in correlational research, such as this study, is a minimum of 30 (Maree, 2013:179).

The researcher and study leader met with Ms Marike Cockeran from the Statistical Consultation Services at the NWU on 28 May 2014 to confirm the statistical methods and sampling size.

1.7 Data analysis

IBM SPSS Statistics for Windows, version 22.0 was used to analyse the data in consultation with the Statistical Consultation Services of the NWU. Statistical significance was considered with a two-sided probability of $p<0.05$. Practical significance was determined when the p-value was statistically significant ($p\leq0.05$). Variables (age groups, gender, etc.) were expressed using descriptive statistics such as frequencies (n), percentages (%), means, standard deviations and 95 % confidence intervals (CI).

The two-sample *t*-test was used to compare the difference between the means of two groups. For more than two groups, analysis of variance (ANOVA) was used. If a difference was indicated, a Tukey multiple comparison test was performed to determine which groups differed statistically significantly. Cohen's *d*-value was used to determine the practical significance of the results, with $d \geq 0.8$ defined as a large effect with practical significance.

The chi-square test was used to determine an association between proportions of two or more categorical variables, and Cramer's *V* was used to test the practical significance of the association, with Cramer's $V \geq 0.5$ defined as practically significant.

1.8 Ethical considerations

1.8.1 Informed consent

Informed consent for participation in the study was obtained from the eligible residents, as described in 1.6.1 and 1.6.2. The information and informed consent form are attached as Annexure C. At this information session, this process that the research followed, the period to complete informed consent forms, the day of random selection and the period in which the participants would be contacted were explained (see Annexure B for agenda). The attendees were requested to sign the informed consent form only after reflection, and collection was done seven days after the information session.

1.8.2 Anonymity

The initial contact and information session was an open invitation to all eligible residents. The participants were able to contemplate their participation in the privacy of their own dwellings. The signed informed consent forms were collected in a sealed box at the residence. The participants could enter the reception area where the box were placed, at any given time and drop their informed consent forms into it, without drawing undue attention to themselves. The researcher randomly selected participants from this box in the privacy of his/her own dwelling, contacted the participants personally, and arranged the times for the interviews. The researcher did the data capturing. Hard copies and computerised data were kept secure as per paragraph 1.8.4.

1.8.3 Confidentiality

The researcher conducted the face-to-face interviews according to the structured questionnaire at the dwelling of the participant at an appointed time, ensuring a high level of confidentiality. Any answers supplied by the participant were noted on the questionnaire form

without any traceable personal information. The only persons with access to the personal data were the researcher and the study leaders.

1.8.4 Data storage

Questionnaire forms were stored in a file in a locked cupboard at the office of the researcher. Once the data capturing process was completed, the forms were moved to the research entity Medicine Usage in South Africa (MUSA) at the NWU where they will be kept for the regulatory five to seven years, after which they will be dealt with as per NWU policy.

All electronic data related to this study were protected on the personal (not shared), password-protected computer of the researcher. Electronic files are also stored on disk space dedicated for research data at MUSA. The confidentiality of this disk space complies with NWU policy.

The face-to-face questionnaire forms has no data that could identify the participants. The researcher captured the data from the questionnaires. The research statistics, results and research report do not disclose any information that can link the participants to the study.

1.8.5 Respect for recruited participants and study communities

The contact details of the researcher were supplied to all the residents. The concerns and questions of any resident were addressed during the study.

At the initial contact session, the residents were informed that they have the right to know the results of the research. At the conclusion of the study, another contact and information session was arranged with the residents as well as the committee members to give feedback about the findings of the study.

1.8.6 Risk-benefit ratio

1.8.6.1 Risks

Participants were subjected to minimal risk. The research tool was a structured questionnaire about their pharmaceutical care experiences and expectations. The researcher conducted the interviews using the structured questionnaire. The questions were set in a manner and with terminology that the participants were able to understand. If the participant did not understand a question, the researcher was able to clarify the matter. This interview did not cause any undue harm or distress to the participants.

Figure 1-9 sets out the possible risks with the precautions taken to counteract them.

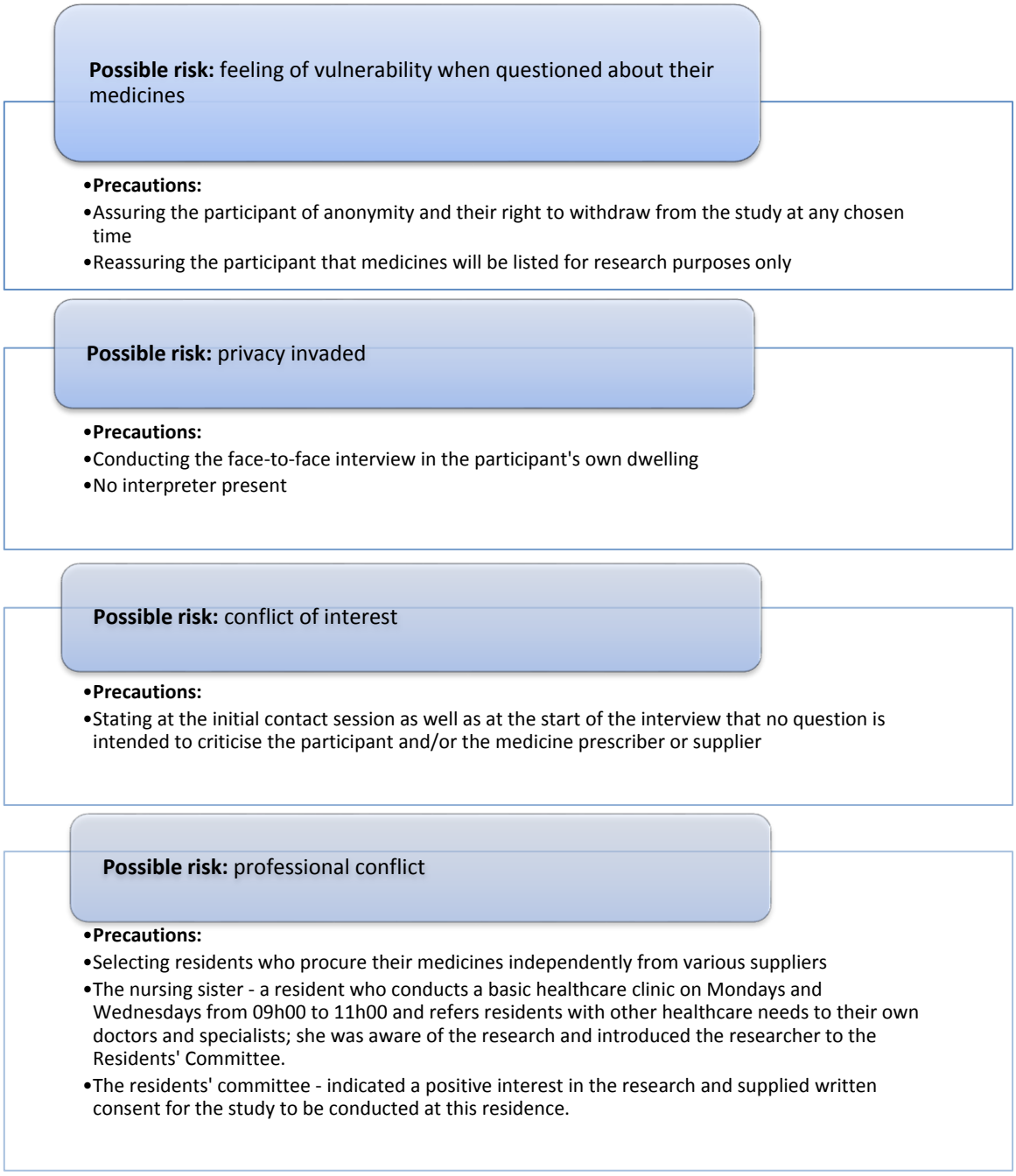

Figure 1-9: Anticipated risks and precautions taken

1.8.6.2 Benefits

This study did not have specific direct benefits for the participants. However, the study did contribute to the enrichment of knowledge in the following aspects:

- It raised awareness of pharmaceutical care with participants.

- Awareness of pharmaceutical care can lead to better compliance and improved health literacy, which can, in turn, reduce unnecessary over-the-counter medicine use as well as reduce hospital admissions due to adverse drug reactions (Al-Rashed *et al.*, 2002:664).

- Pharmaceutical care reduces the amount of drug-related problems in the elderly and improves their quality of life (De Lyra *et al*., 2007:998; Lau & Dolovich, 2005:176; Krska *et al*., 2001:210).

- Inappropriate medicine use can lead to emergency room visits and even death in elderly people. The continued assessment of their medicines and how they use it can save lives and improve quality of life (Page & Ruscin, 2006:297).

- Education in the use and working of their medicines increases health literacy in the elderly and reduces the number of medications and amount of hospital treatments. Continued pharmaceutical care is associated with maintaining quality of life (Ellis *et al.*, 2000:1515; Mason, 2011:497).

- The researcher attempted to address any questions arising from the interviews. It was an opportunity for the participants to raise medicine-related questions in private.

- The researcher was in a position to inform the participant of risks and benefits of medicine use in a confidential and personalised setting.

1.9 Chapter summary

This chapter supplied the background for the study. The problem statement was formulated and the aims and objectives of the study was given. The research method, population, sampling method and data analysis was described. The ethical considerations and risks-benefit ratio was determined.

CHAPTER 2: LITERATURE REVIEW

As per Burns & Grove (2003:96n) and Cronin *et al*. (2007:38), this literature review involves finding and reading published, peer-approved material on a topic to understand it and to:

- Form conclusions about the existing research,
- Present it in an organised manner,
- Form an independent conclusion about the subject,
- Form the basis for a new study, and
- Use the study to suggest further studies on the subject.

This literature review focuses on the pharmacy profession, the concept of pharmaceutical care as part of the scope of practice of the pharmacist and how the need for pharmaceutical care developed. The practice of pharmaceutical care is defined and the philosophy of pharmaceutical care examined. The practice of pharmaceutical care internationally and locally is examined and the question as to who needs/should receive pharmaceutical care is considered. International and local challenges to and benefits of pharmaceutical care are reviewed. The elderly and their specific needs for pharmaceutical care and the value and impact of pharmaceutical care to the health-related quality of life in the elderly population is also discussed.

2.1 Reasons for and development of pharmaceutical care

In the late twentieth century, the explosive development of new drug entities as well as increased patient self-medication created a remarkable increase in adverse drug reactions and related hospital admissions all over the world (Van Mil *et al.*, 2004:303). It became the responsibility of the pharmacist, as the expert on medicines, to start providing advice and suggestions on medication regimens on an individual basis to patients and healthcare professionals alike (Van Mil & Schultz, 2006:156). In 2005, Davies *et al.* (2009:1) found 50 % of hospital admissions for adverse drug reactions to be avoidable. Gandhi *et al.* (2003:1556), studied adverse drug reactions in an outpatient setting and found that more than one third of these admissions to emergency care could have been avoided with pharmaceutical care.

The pharmaceutical care process involves the active involvement of the pharmacist in the design, implementation and monitoring of a pharmaceutical care plan which includes a positive

health outcome goal. Pharmaceutical care focuses on the patient as the sole beneficiary of the pharmacists' actions (WHO, 1988:4). Mikeal *et al*. (1975:567) originally coined the term pharmaceutical care after studying the positive effect of the presence of a full time pharmacist on the quality of care to hospitalised patients. They described pharmaceutical care as the "care that a given patient requires and receives which assures safe and rational drug usage". Over the period 1995-2015 in particular, the profession of pharmacy has evolved from a dispensing, product-orientated service to a clinical, patient-orientated care process (Berenguer *et al*., 2004:3931). Pharmaceutical care developed from the philosophy that a pharmacist has the responsibility to meet the drug-related needs of a patient and to assist the patient in achieving healthcare-related goals (McGivney *et al.,* 2007:621).

In 1980, Brodie *et al*. (1980:277) cemented the concept of pharmaceutical care for the individual patient in a continuous process that not only included the drug-related needs of patients but also the consideration of their health and healthcare before and after treatment. Brodie (1980:277) introduced the concept of feedback after treatment. The role of the pharmacist was now expanding to that of a healthcare professional interacting with the patient and other healthcare professionals to advise on medicine use. The development of pharmacist-patient relationship was taking hold (Hepler, 1987:376). In 1990, Hepler and Strand (1990:534) developed the concept that is still at the core of pharmaceutical care: "the responsible provision of drug therapy for the purpose of achieving definite outcomes which improve the patient's quality of life". In 1992, Strand *et al.* (1992:547) introduced the patient-pharmacist relationship as the central concept in pharmaceutical care.

In 1993, Van Mil *et al.* described pharmaceutical care as intensified care by the pharmacist for an individual patient to achieve the optimal drug-therapy, with the patient and the accompanying co-morbidities as a primary concern, to achieve improved health-related quality of life (Van Mil *et al.* 1993:1244). Munroe and Dalmady-Israel (1998:suppl II) stated in 1998 that pharmaceutical care is a continuous process that involves clinical and psychological monitoring of drug treatment on the patient. The concept of the pharmacist as the responsible person in monitoring adherence and outcomes in individuals as part of the pharmaceutical care process was introduced (Berenguer *et al*., 2004:3933; Cipolle *et al*. 2004:881).

In 2005, Franklin and Van Mil included the pharmacist as a member of a team of healthcare professionals working with individual patients to ensure optimum pharmaceutical care and healthcare outcomes (Franklin & van Mil 2005:137). In 2014 Alleman *et al.* (2014:544-555) summarised pharmaceutical care as the contribution of healthcare professionals to optimise health-related quality of life and the use of drug-therapy in achieving this aim.

Pharmaceutical care as a concept was first introduced to South Africa in 1995 with pharmaceutical care principles introduced as outcomes in the revised BPharm curriculum (Lubbe, 2000). The Pharmaceutical Care Management Association of South Africa (PCMA South Africa, 2014;1) was established in 1997 with the following objectives:

- Promote successful therapeutic outcomes in managed care
- Provide a forum for healthcare professionals interested in clinical outcomes and pharmacoeconomics
- Have input in continued professional education with the focus on managed care
- Promote pharmaceutical care principles with providers and consumers of pharmaceuticals

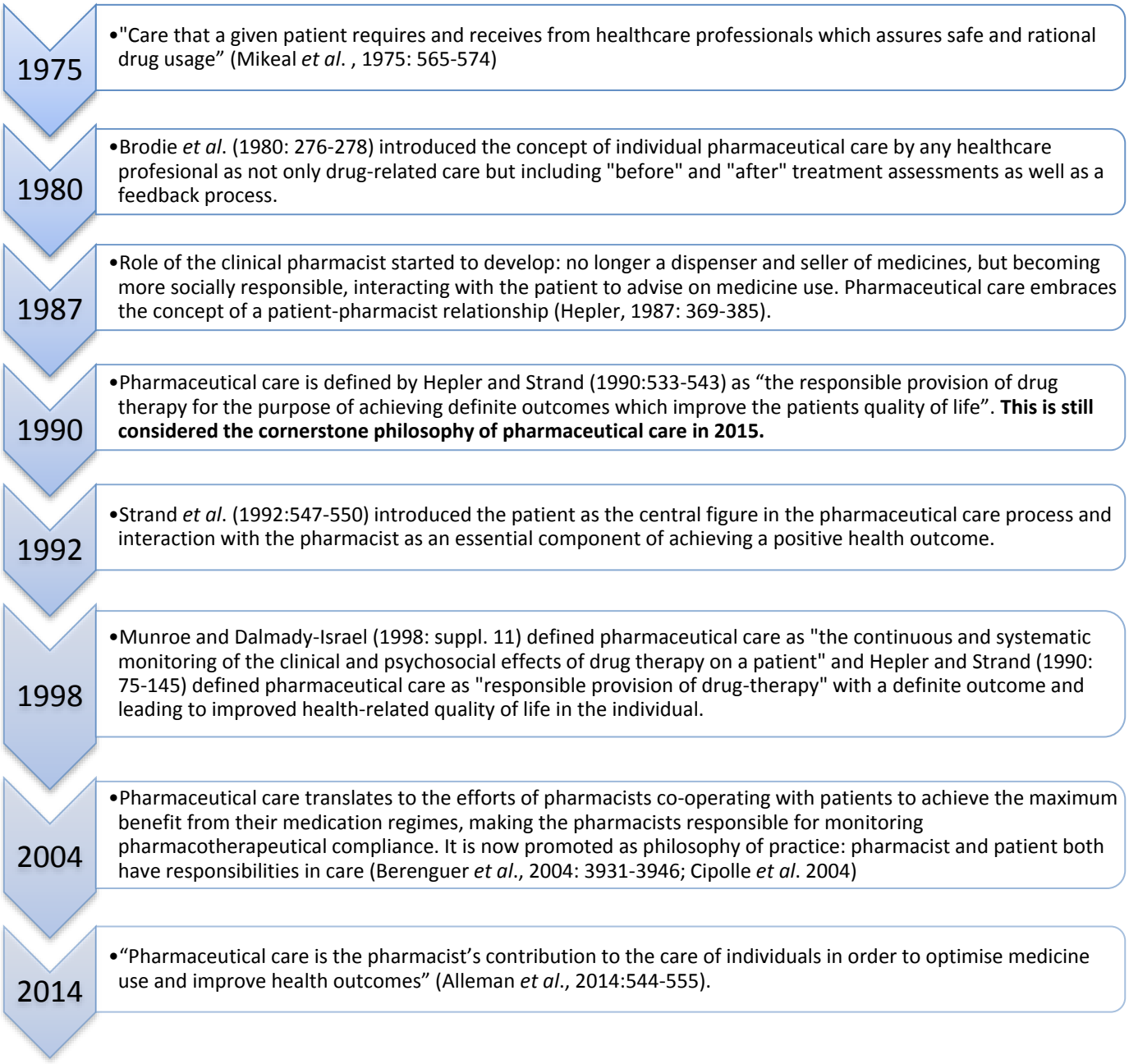

Figure 2-1: Development of the term pharmaceutical care

2.1.1 International and local definitions of pharmaceutical care

Pharmaceutical care is a scientific, patient-centred process and a tool to review and record tailor-made treatment options for each individual patient (Al-Quteimat & Amer, 2014:371). Pharmaceutical care developed from an initial need to ensure safe and rational medicine treatments to hospital patients (Mikeal *et al*., 1975:567) to the current accepted patient-pharmacist interaction where both the pharmacist and the patient are responsible for the patient's optimum health-related quality of life.

Hepler and Strand (1990:533) and Strand *et al*. (1992:548) divided the pharmaceutical care process into specific phases with allocated roles in each domain. Their description of pharmaceutical care applies to the community at large and provides for general disease education and prevention.

Pharmaceutical care can be divided into three stages (Hepler & Strand 1990:539; Krska *et al.*, 2000:659; Strand *et al*., 2004:3991):

- The assessment phase: lifestyle, medicine and disease information of the patient is assessed in order to determine the drug-therapy needs of the patient.

- The care plan phase: steps are taken to improve and/or prevent drug-therapy problems in consultation with the patient and the relevant healthcare professionals. Drug-therapy problems are prioritised, and treatment and interventions are researched and decided upon. Goals are set for the intervention and the follow-up appointment is scheduled.

- The follow-up phase: the patient is contacted at agreed-upon intervals to assess the effectivity of the care plan. The care plan is adjusted if required, and documentation regarding the pharmaceutical care process is updated.

The following principles should be followed when a pharmacist supplies pharmaceutical care (March *et al.,* 1999:221; Strand *et al*., 2004:3991; APhA, 2015:3; SAPC, 2015:1; Alleman *et al.*, 2014:555).

- Assessment phase:

  The pharmacist and patient establish an honest and professional relationship, which will aid to the sharing of information. The pharmacist must endeavour to use all the skills and resources available to ensure the patient's health welfare, while the patient must undertake not to withhold personal and lifestyle information.

  A patient-specific database must be created in order to collect research and store information regarding the pharmaceutical care process for this patient. Every action and/or consultation must be recorded and the database must be maintained.

- Care plan phase:

  The history, medication and lifestyle of the individual patient must be considered. Liaison with other healthcare professionals might be required, and lifestyle

changes might be suggested to the patient. The physical and psychological health of the individual must be taken into consideration. The care plan must be drawn up in full consultation with the patient. All decisions taken as well as the responsibilities accepted by the patient must be recorded.

The pharmacist must ensure that the patient has the required equipment, knowledge and understanding of the undertaken responsibilities.

- Follow-up phase:

  The pharmacist must take responsibility to monitor the patient's progress with the care plan and co-operate with other healthcare professionals to help the patient achieve the goals of the care plan. The process must be documented and the underlying principles of cost-containment, rational drug use and improved health-related quality of life must be observed.

Farris and Schopflocher (1999:55) re-iterated that pharmaceutical care encompasses the patient as a whole, and that pharmaceutical care interventions regarding a specific, single aspect of a patient's drug-related needs would have limited effect.

In South Africa, the role of the pharmacist as a pharmaceutical care practitioner is increasingly acknowledged. In a message from the president of the Pharmaceutical Society of South Africa (Malan, 2015:6), pharmacists are encouraged to be the medicine experts and to use their unique skills to prevent, identify and resolve medicine-related problems, to recommend cost-effective therapy, and to counsel patients on drug therapy. The South African Society of Clinical Pharmacy also promotes pharmaceutical care and aims to assist in the cost-effective, rational and appropriate use of medicines to the benefit of the individual patient as well as the community (Gous, 2011:1).

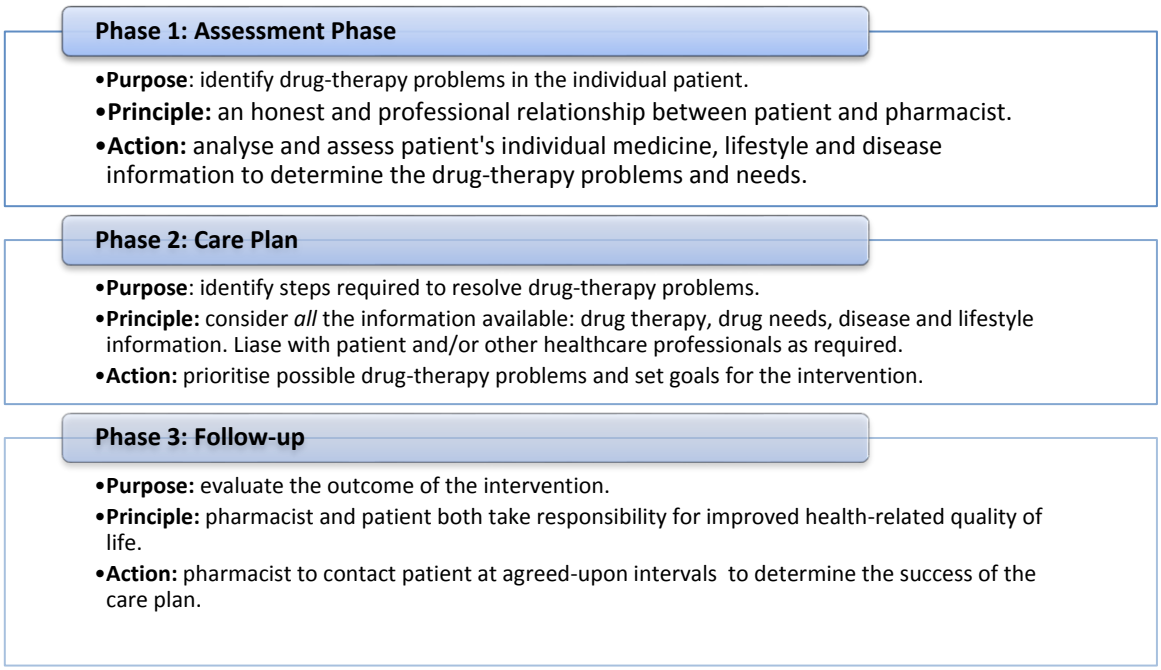

Figure 2-2: Phases of pharmaceutical care

As per Alleman *et al.* (2014:545), the pharmaceutical care provider may be any healthcare professional who supplies pharmaceutical care in the relevant form (e.g. assessment, education, counselling) to an individual patient or the community regarding a specific matter in order to optimise health-related quality of life. Hepler and Strand (1990:540), Bootman *et al.* (1997:2089), Krska *et al*. (2000:656-660), Mikeal *et al*. (1975:568), the South African Pharmacy Council (SAPC, 2015:1) and the World Health Organization (WHO, 1994:7) differ from this opinion. They all hold that the pharmacist is the healthcare professional with the appropriate training and knowledge to provide pharmaceutical care successfully.

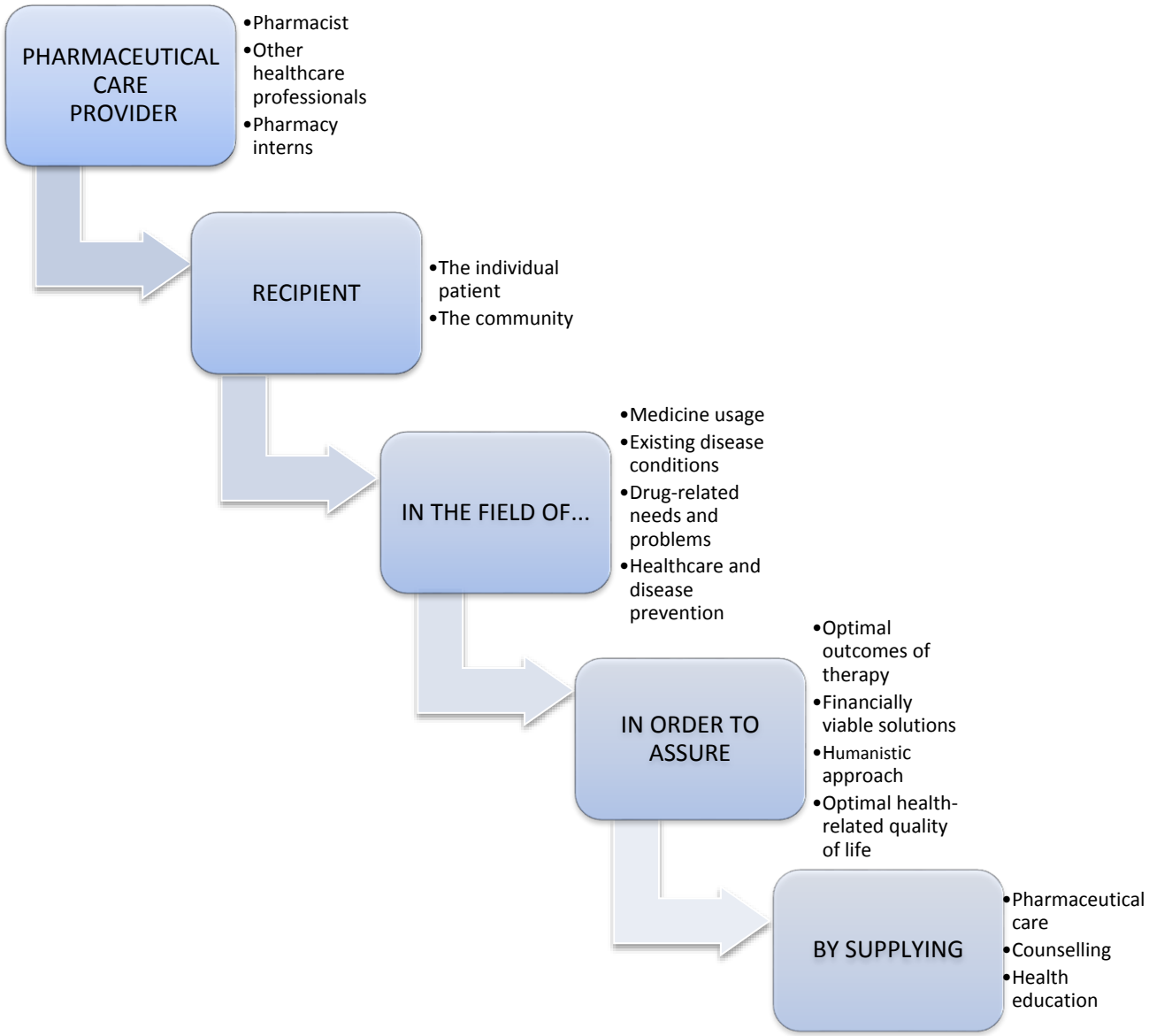

Figure 2-3: The different roles in pharmaceutical care

The philosophy of practice defines what the pharmacist should do, and these actions are guided by legislation. The role of the pharmacist in the healthcare team and the relationship of the pharmacist in the specific environment and/ or healthcare team are regulated by law (Pharmacy Act 53 of 1974). In pharmaceutical care, the philosophy of practice refers to the approach that is taken to meet the patient's needs (Hepler & Strand, 1990:539; Strand *et al.*, 1991:549; Cipolle *et al.,* 2004:72). Pharmaceutical care considers the patient and the health-related quality of life of the patient as the primary beneficiary of the pharmacist's actions (Strand *et al.,* 2004:3990; Cipolle *et al*., 2012:880). Pharmaceutical care philosophy is a planned process that comprises the attitude, behaviour, commitments, concern, ethics,

functions, knowledge, responsibilities and skills of the pharmacist on the provision of drug therapy with the goal of achieving definite therapeutic outcomes toward patient health and quality of life (Hepler & Strand, 1990:539; Krska, 2000:657).

The pharmaceutical care process developed into the following services and outcomes:

- Technical pharmaceutical care service: the provision of drug therapy in a responsible way to ensure improved quality of life for the patient, as suggested by Hepler (1987:378), using pharmacology and pharmaceutical knowledge.

- Humanistic pharmaceutical care outcome: the patient is directly involved in care decisions, as per Strand *et al.* (1992:547-548), and patient satisfaction with the outcome of the pharmaceutical care process is considered a humanistic outcome.

- Clinical pharmaceutical care outcome: the monitoring and psychosocial assessment of the effect of medicines on the patient, as per Munroe and Dalmady-Israel (1998: suppl. 11), and the clinical judgement of the pharmacist as to the success of the pharmaceutical care process at the follow-up meeting is considered a clinical outcome (Cipolle *et al.,* 2004:360).

- Supportive pharmaceutical services: other non-pharmacological measures to improve the patient's health-related quality of life fall into the support philosophy. It includes advice on lifestyle, diet, exercise and/or stress management techniques (Cipolle *et al.,* 2004:57). The pharmacist's Scope of Practice includes actions that contribute to maintained health-related quality of life (SAPC, 2015:1).

Since the inception of the pharmaceutical care concept, different countries have embraced it in different ways, and culturally different models developed (Berenguer *et al*., 2004:3935), as set out in Figure 2-4.

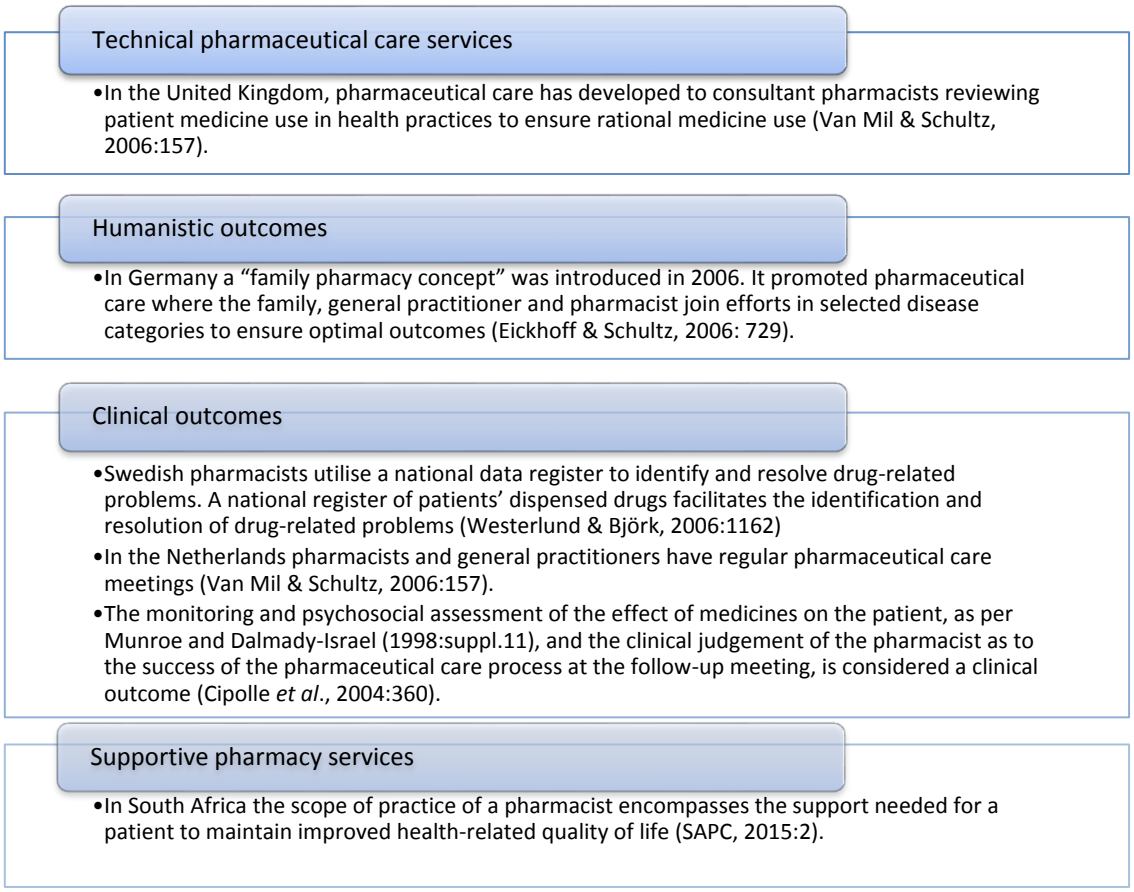

Figure 2-4: Outcome philosophies of pharmaceutical care

The South African pharmaceutical care process includes the combination of the outcomes of the humanistic, technical and clinical approaches and that the pharmacist is well skilled in a supportive role. The Pharmacy Act (53 of 1974) sets one of the objects of the South African Pharmacy Council (SAPC) as the promotion of pharmaceutical care with the goal of achieving definite therapeutic outcomes for the health and quality of life of a patient.

Rational medicine use will be assured during the assessment phase, and the pharmacist's skill in dispensing services, health education and medicine counselling ensures the continued health-related quality of life of the patient.

The care phase will mainly involve the clinical aspects, while the follow-up phase will embrace the humanistic approach.

During the follow-up process, feedback is obtained from the patient to complete the process. During the entire pharmaceutical care process, the pharmacist is still responsible for the traditional support to the patient: dispensing, compounding, advice, counselling, supply of medical devices and over-the-counter medications. The South African pharmacist can

supply all three phases of pharmaceutical care as well as the supportive pharmaceutical services to ensure the philosophy of pharmaceutical care is met.

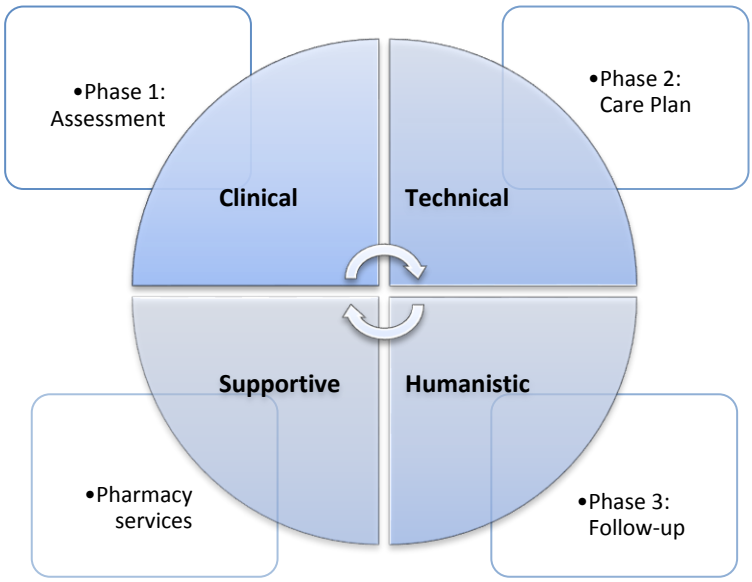

Figure 2-5: The philosophy of pharmaceutical care in the South African context

2.1.2 Who is the pharmacist?

From the most ancient writings available to humankind, there is mention of preparers of remedies to cure ills. Greek, Roman, Chinese, Arab and Indian medicinal cultures merged as civilisation developed but it was always steeped in mysticism (Sonnedecker, 1986:22). In the nineteenth century, the scientific study of physiology, pharmacognosy, pharmacology and pharmaceutical chemistry introduced sound scientific principles to the practice of pharmacy (Anderson, 2005:31). The industrialisation of medicine manufacturing in the 1900s changed the face of pharmacy to that of drug-trader in response to physician prescription (Hepler & Strand, 1990:533). Pharmacists were primarily drug compounders and distributors and had little involvement in patient care (Holland & Nimmo, 1999:1759). The proliferation of prescribed medicines and the resultant rise in adverse drug reactions prompted international action: the pharmacist was prompted to apply the professional skills and knowledge of training to address the problem (Hepler & Strand, 1990:533-543).

The Scope of Practice of a pharmacist as per the Regulations in the Pharmacy Act in terms of pharmaceutical care is as follows (Act 53 of 1974):

“The provision of pharmaceutical care by taking responsibility for the patient’s medicine related needs and being accountable for meeting these needs, which shall include but not be limited to the following functions:

(a) Evaluation of a patient’s medicine related needs by determining the indication, safety and effectiveness of the therapy;

(b) Dispensing of any medicine or scheduled substance on the prescription of a person authorised to prescribe medicine;

(c) Furnishing of information and advice to any person with regard to the use of medicine;

(d) Determining patient compliance with the therapy and follow up to ensure that the patient’s medicine related needs are being met; and

(e) Provision of pharmacist initiated therapy.”

Pharmaceutical services are an integral part of who the pharmacist is, also in the eyes of the public. The Pharmacy Act (53 of 1974) stipulates the following objectives for providing a pharmaceutical service:

A pharmacist must always focus on the welfare of the patient and the public.

Pharmacy buildings, furnishings and equipment must comply with minimum standards, and must be convenience to the patient.

Standard operating procedures must be in place for all operations. It will reduce the chances of error in everyday pharmaceutical service and prevent harm to staff and patients alike.

Purchase and distribution of medicines must be done according to unambiguous guidelines to ensure legality and proper chain of accountability for the physical condition of medicines.

Prescriptions must be monitored to ensure recording, and storage of these records are done in a confidential and retrievable manner. It will also promote rational and economic prescribing and enhance optimal use of medicines, one of the outcome measures of pharmaceutical care. Retail pharmacy is the primary supplier of medicines, the source of medicine information and

advice, and the custodian of correct use of medicine by monitoring the effects of the drugs on the individual patient (pharmaceutical care).

Counselling to patients must be done every time a scheduled substance is supplied in a private or semi-private area to ensure the safe use thereof.

Medicine information must be provided orally and/or in written or brochure form to promote the safe, effective and correct use of medicines.

Pharmacists should participate or initiate health education programmes in schools, community clinics and patient support groups.

Adverse drug reaction reporting must be done as per standard operating procedure, contributing to accurate after-market statistics and promoting rational medicine use.

Relationships and co-operation with other healthcare professionals is an ongoing contribution to the health-related quality of life of each individual patient.

The profession of pharmacy is a dynamic profession that adapts the scope of practice to meet the drug-related needs of the community in pace with the development of knowledge and technology. Community pharmacy developed from a historical manufacturing, compounding and consultative profession to an individual patient-oriented service industry where the health-related quality of life of the individual patient is the focus (Kelly, 2012:3).

The pharmacist is trained to fulfil the role of medicine supplier as well as health educator and should use the patient's need for medicine as a contact to the purpose of medicine management, education and care to the greater benefit of the whole society (Wiedenmayer *et al.,* 2006:9).

2.2 Pharmaceutical care as part of the scope of practice of a pharmacist

The underlying philosophy of the practice of pharmacy is to advise the public on safe, rational and appropriate medicine usage (SAPC, 2010:2). Pharmacists strive to be the most accessible providers of cost effective healthcare information (McGann, 2012:1). The philosophy of pharmaceutical care since the 1980s has contributed to the transformation of the role of the pharmacist, developing it into a more patient-oriented service rather than the traditional concept of a dispensing service (Ahmed *et al*., 2010:193). The scope of practice of the South African pharmacists is described in Section 35A of the Pharmacy Act (Act 53 of 1974). It entails the provision of pharmaceutical care by taking responsibility for the patient's medicine-related needs and being accountable for meeting these needs.

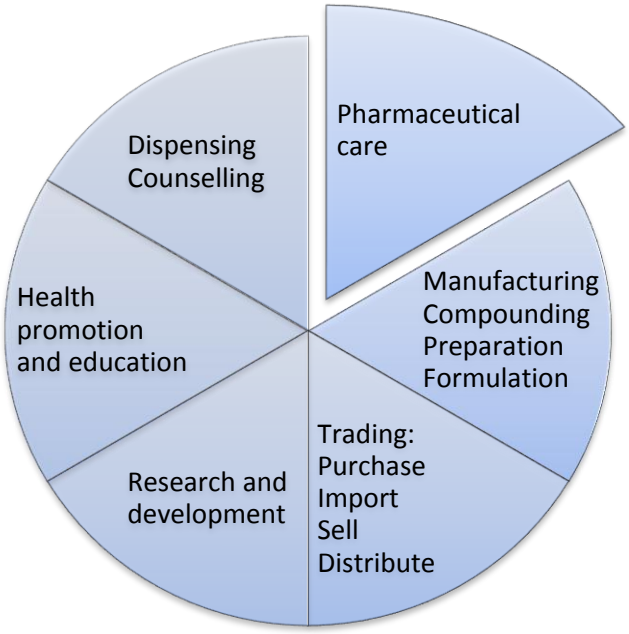

Figure 2-6: Pharmaceutical care in relation to the general role of the pharmacist

Pharmaceutical care is defined as the contribution of a pharmacist to patient care in order to "optimise medicine use and improve health outcomes" (PCNE, 2014:1). The principles of pharmaceutical care are embedded in the scope of practice and in the philosophy of pharmacy as a profession. In South Africa, the Scope of Practice for the pharmacist as described in the Pharmacy Act (53 of 1974) makes specific provision for all three phases of pharmaceutical care. Pharmaceutical care brought about a new clinical role for the pharmacist, assisting patients to improve their health-related quality of life, rather than simply providing a product or service (Rothman & Weinberger, 2002:91). In Pakistan, there is a considerable a gap between

the rudimentary community concept of the role of the pharmacist, and the potential health-related quality of life improvements that pharmaceutical care can deliver. Khan *et al*. (2013:94) identified the opportunities to develop the concept of pharmaceutical care and impact positively on patient care in Pakistan. The role of the pharmacist becomes patient centred, with the focus on quality of care and improved health outcomes. (Albanese & Rouse, 2010:36).

Philosophy of pharmacy practice	Pharmacist: scope of practice	Roles of the pharmacist	Pharmaceutical care
• Pharmacy is a dynamic, information-driven, patient-orientated profession whereby pharmacists, through their competence and skills, are committed to meeting the health care needs of the people of South Africa by being the: • custodian of medicines; • formulator, manufacturer, distributor and controller of safe, effective and quality medicine; • advisor on the safe, rational and appropriate use of medicine; • provider of essential clinical services including screening and referral services; • provider of health care education and information; • provider of pharmaceutical care by taking responsibility for the outcome of therapy and by being actively involved in the design, implementation and monitoring of pharmaceutical plans; • provider of cost-effective and efficient pharmaceutical services. • The profession is committed to high standards of competence, professionalism and co-operation with other health care personnel in order to serve the interests of the patient and the community.	• The provision of pharmaceutical care by taking responsibility for the patient's medicine-related needs and being accountable for meeting these needs, which shall include but not be limited to the following functions: • (a) Evaluate patients' medicine-related needs by determining the indication, safety and effectiveness of the therapy; • (b) Dispense any medicine on a prescription; • (c) Furnish information and advice with regard to the use of medicine; • (d) Determine patient compliance with the therapy and follow up; and • (e) Provide pharmacist initiated therapy. • Compound, manipulate, manufacture, prepare or pack any medicine. • The purchasing, acquiring, importing, keeping, possessing, using, releasing, storage, packaging, repackaging, supplying or selling of any medicine. • The application for the registration of a medicine in accordance with the Medicines Act. • Formulate any medicine for the purposes of registration as a medicine. • The distribution of any medicine or scheduled substance. • Initiate and conduct pharmaceutical research and development. • Promote public health	• Caregiver: pharmacy practice is an integral and on-going part of the health care system. • Decision-maker: Evaluate and collate data and information and decide on the most appropriate medicine treatment options. • Communicator: Has the knowledge and position to interact with other health professionals and the public. • Manager: Manage resources and information effectively. Play leading roles in healthcare teams • Life-long-learner: Keep knowledge and skills up to date. • Teacher: Educate and train public regarding pharmaceutical and healthcare matters. • Leader: In multidisciplinary healthcare teams the pharmacist has the skill and knowledge to lead the pharmaceutical decisions. • Researcher: promote rational medicine useage: Apply evidence-based research to ensure unbiased health and medicine-related information to the public and other healthcare professionals..	• Pharmaceutical care is defined by Hepler and Strand (1990:533-543) as "the responsible provision of drug therapy for the purpose of achieving definite outcomes which improve the patients quality of life". • The assessment of the chronic conditions of a patient and the chronic as well as occasional medicines that the patient uses. • Establishing a care plan in co-opration with the patient to improve health-related quality of life and metabolic parameters. Co-operate and consult with other heathcare providers if required. • Determine a follow-up period that will establish the success of the care-plan. If there is insufficient improvement, re-assess and redo care-plan and determine a new follow-up.

Figure 2-7: Philosophy of pharmacy practice in relation to scope of practice, roles of the pharmacist and pharmaceutical care

Who should receive pharmaceutical care

Pharmaceutical care is linked to the practice of dispensing and the resultant drug-related advice that should be supplied to the patient (McGivney *et al.,* 2007:620). The mandate of the SAPC (2015:1) and therefore all South African pharmacists is "to protect, promote and maintain the health, safety and wellbeing of patients and the public ensuring quality pharmaceutical service for all South Africans". All patients have the right to pharmaceutical care, but it is impossible to have enough pharmacists to devote this level of consultation time to every patient. The focus, according to Tomechko *et al*. (1995:33), should therefore be on all patients:

- Taking chronic medicines
- Presenting a new prescription for fill
- Indicating that there is a problem with adherence or drug therapy
- With recent adverse drug reaction experience
- Newly diagnosed with a chronic condition

The principles of pharmaceutical care are to assist in and contribute to a positive health outcome in individual patients by optimising medicine usage (Alleman *et al.,* 2014:555). A basic element of pharmaceutical care is that the pharmacist assumes responsibility for rational drug use and improved health-related quality of life in the individual patient (Segal, 1997:47). The focus should be on identifying the frail, non-adherent, multidrug and/or multimorbid patient and applying pharmaceutical care to improve their health and reduce their adverse drug reactions (Franklin & Van Mil, 2005:137).

2.3 Challenges in supplying pharmaceutical care

Hill (2012:2-3) challenges the term "pharmaceutical care" and the philosophy behind it. Even though he agrees that pharmacists and other healthcare providers have responsibilities in patient care, he believes the phrases "responsible for healthcare outcomes" and "committed to meeting healthcare needs of patients" is questionable. He is of the opinion that patients have to be committed to treatment and take responsibility for their own healthcare outcomes, *not* the pharmacist. The pharmacist can merely be the facilitator.

Table 2-1: Challenges and barriers in the provision of pharmaceutical care internationally and locally

Country	Challenges and barriers experienced in pharmacists supplying pharmaceutical care
UAE	
Ghazal *et al*. (2014:68)	Lack of time, insufficient staff, lack of motivation
USA	
Kassam *et al.* (1996:402)	Insufficient pharmaceutical care training
Bloom (1996:68)	The non-compliant patient
Cooksey (2002:183)	Lack of third-party reimbursement, pharmacist workload does not allow time for pharmaceutical care
Christensen and Farris (2006:400)	Remuneration: pharmacists still paid mainly for dispensing services
Scotland	
Akram *et al*. (2012:321)	Limited available medication, lack of communication between healthcare professionals
Sub Saharan Africa	
King and Fomundam, (2010:30)	Patient non-adherence, inadequate access to medicines, insufficient healthcare workers
Malaysia	

Country	Challenges and barriers experienced in pharmacists supplying pharmaceutical care
Chua *et al.* (2012:388)	Patient non-adherence, incorrect administration of medicines
India	
Tumkur *et al*. (2012:286)	Pharmacist has a reduced role in healthcare because the focus is more industrial instead of clinical
Amir (2011:1)	Patients' complaints: the pharmaceutical care process delays the receiving time when collecting chronic medicines
China	
Mao *et al.* (2015:284)	Overuse of medicines linked to bonuses for prescribing doctors, lack of essential medicines that are cheap and effective, irrational medicine use, primarily in rural areas, because of immoral demand and inappropriate supply of medicine
South Africa	
Stigling (1999:2)	Irrational use of resources. poor working conditions, inadequate infrastructure
Gray *et al.* (2002:111)	Poor resources, under staffing
Bronkhorst *et al.* (2014:44)	Pharmacist non-compliance
Cuba	

Country	Challenges and barriers experienced in pharmacists supplying pharmaceutical care
Sánchez (2010:697)	Pharmacists are not remunerated for pharmaceutical care, no professional recognition of the clinical pharmacist, regarded as “merely” a pharmacist in the more traditional sense, pharmacists are trained in pharmaceutical care but it remains an academic field
Sánchez and De las Mercedes (2013:1237)	Pharmacists’ lack of time, unavailability of other healthcare professionals to liaise with clinical pharmacist, insufficient use of the pharmacist as drug utilisation expert, unclear ethics in inter-professional communication
Nigeria	
Mmuo *et al.* (2013:209)	Pharmacists’ lack of time, lack of effort on part of pharmacist, insufficient remuneration, no co-operation among healthcare professionals, insufficient staff
Brazil	
Gertner (2010:120)	The pharmacist has more commercial interests rather than a public health interest (remuneration), improved legislation and regulation required in the pharmaceutical care field, lack of resources, poor electronic recordkeeping
De Castro and Correr (2007:1493)	Insufficient remuneration of pharmacists, insufficient pharmaceutical care education
Macedonia	
Dauti *et al.* (2014:315)	Pharmacist-physician relationships dysfunctional

Country	Challenges and barriers experienced in pharmacists supplying pharmaceutical care
Poland	
Waszyk-Nowaczyk *et al.* (2014:538)	Polypharmacy, extensive use of over-the-counter medications
United Kingdom	
Bojke *et al.* (2010: e22)	The positive effect of pharmaceutical care on rationalisation of prescribing and cost saving is questioned
Ireland	
Grimes *et al.* (2014:576)	Absence of physician support in terms of pharmaceutical care, teamwork between healthcare professionals is insufficient
France	
Boeckxstaens and De Graaf (2011:363)	No co-operation between physicians and pharmacists, general disregard for possible adverse drug reactions and quality of care

The different barriers to pharmaceutical care are discussed below.

2.3.1 Attitudinal factors

The attitudes of physicians, pharmacists, patients and other healthcare players significantly hinder the implementation and provision of pharmaceutical care (Shu Chuen Li, 2003:95). Other healthcare professionals still have an overwhelming image of the pharmacist as a "shopkeeper" (Hughes & McCann, 2003:601). Pharmacists express a general positive attitude toward pharmaceutical care, regardless of their field of practice (Al Arifi, 2009:677). Some physicians perceive initiatives like pharmaceutical care as a threat to their control, and pharmacists exacerbate this situation by, in turn, attributing ultimate authority to doctors. Combined with professional insecurity of employee pharmacists, it reflects the attitudinal barriers to successful pharmaceutical care (Edmunds & Calnan, 2001:945). Pelicano-Romano *et al*. (2013:1721) summarised it well when they concluded that pharmaceutical care benefits will be improved when the patient is actively encouraged take part in dialogue.

2.3.2 Knowledge and compliance

Undergraduate and postgraduate training among healthcare professionals will increase the multidisciplinary knowledge of the healthcare team. Knowledge of the role of pharmacists in a healthcare team will serve to dispel the pharmacist's fear of role duplication (Leaviss, 2000:485; Owens & Gibbs, 2001:306). One of the barriers to providing pharmaceutical care expressed among pharmacists is a lack of education in disease issues (Scheerder *et al.,* 2008). Lack of specific training in pharmaceutical care is listed as a barrier in Argentina (Uema *et al.,* 2007:214).

2.3.3 Demand

Physicians and other healthcare professionals are not aware of the role and impact of pharmaceutical care, and pharmacists need to actively promote their knowledge and abilities to physicians and the public (Mushunje, 2012:22). Pharmaceutical care is directed to improve the health of the patient and population, not replacing other healthcare professionals (Gonzalez-Martin *et al.,* 2003:17). In India, for example, patients complain about the time consuming pharmaceutical care process, thereby reducing the demand (Tumkur *et al*., 2012:285).

2.3.4 Financial factors

Changes to reimbursement models and infrastructure are needed to facilitate enhanced collaboration between pharmacists and physicians in the community setting (Kelly *et al.,* 2013:218). Pharmacists in Canada, Australia and the USA reported lack of reimbursement systems for pharmaceutical care as a major barrier. (Jones *et al.*, 2005:1530; Roberts *et al.,* 2003:228; Kassam *et al*., 1996:402). Dylst *et al*. (2013:60) suggest pharmacist remuneration to be "performance based": The pharmacist will be paid for the provision of services and knowledge rather than rewarded for product sales.

2.3.5 Profession

Physicians have a misconception of the role that can be played by the pharmacist in patient care. The pharmacist is often perceived only as the provider of medicines and related products (Al Shaqua & Zairi, 2001:282; Hepler & Strand, 1990:533). In the USA, a study showed that physicians were unsure of the role of the pharmacist in the healthcare team (Smith *et al*, 2002:51). The professional barrier where there is a lack of communication with physicians is an international barrier to the provision of pharmaceutical care (Sancar *et al*., 2013:245; Akram *et al*., 2012:318; Sánchez & De las Mercedes, 2013:1237; Mmuo *et al*., 2013:207; Gidman *et al*., 2012:1).

2.3.6 System

In the pharmacy, the dispensing areas and semi-private counselling areas create a physical barrier between the pharmacist and the patient that hinders a confidential, open pharmacist-to-patient relationship. These barriers limit the exchange of essential information and thus inhibits the pharmaceutical care process (Al Shaqua & Zairi, 2001:282). In Iran pharmaceutical care is hampered by a lack of skills training and inadequate regulation and environment (Mehralian *et al.,* 2014:1088). Government policy, insufficient healthcare workers and inadequate infrastructure in the healthcare system further limit pharmaceutical care opportunities (Roberts *et al*., 2003:227; King & Fomundam, 2010:30; Stiglingh, 1999:2; Gertner, 2010:119).

2.3.7 Resources

Educating other healthcare professionals about the role of the pharmacist and the benefits of pharmaceutical care will contribute to an increase in the use of the pharmaceutical care process (Owens & Gibbs, 2001:306). The healthcare system in many countries limits the pharmacists' access to healthcare information and prevents a positive pharmaceutical care

outcome (Shu Chuen Li, 2003:95; Al Shaqua & Zairi, 2001:282). A lack of time for the pharmacist to apply pharmaceutical care is another resource barrier (Uema *et al.,* 2007:214; Ghazal *et al.,* 2014:68).

2.3.8 Information

The practice philosophy of pharmaceutical care requires a good therapeutic relationship between patients and pharmacists (Hepler & Strand, 1990:536). The co-operation of the patient is a vital component of pharmaceutical care. To break down some barriers to pharmaceutical care, the benefits of the process should be public knowledge (Bloom, 1996:68; Akram *et al*., 2012:321; King & Fomundam, 2010:30; Chua *et al*., 2012:388; Mansour *et al.,* 2000:514).

The root of all the above-mentioned barriers in pharmaceutical care (See Table 2-1) may well be pharmacists themselves. Pharmacists should change their attitudes and be confident about their abilities to participate in patient care, be part of a healthcare professional team and be able to liaise with healthcare administrators (Shu Chuen Li, 2003:95; Mushunje, 2012:134).

In 2012 in South Africa 25 % of third party funders participated in a study done by Mushunje (2012:145). They were of the opinion that pharmacists are valuable members of the healthcare team. They recognise the ability of the pharmacist to have direct patient contact, to provide advice on prevention and early diagnosis of many conditions, to give critical motivation and support for lifestyle modification and contribute to the promotion of public health. The Pharmacy Act (53 of 1974) was amended in 2012 to include pharmaceutical care (procedure code 0011) as one of the services for which a pharmacist may levy a fee at R74.80 (VAT inclusive) in units of 4 minutes. Despite this, healthcare funders are hesitant to remunerate the pharmacist for these services (Mushunje, 2012:146).

2.4 Benefits of pharmaceutical care

Pharmaceutical care was developed in response to increased irrational drug use and unexpectedly high adverse drug reactions (Hepler & Strand, 1990:533). The purpose of pharmaceutical care is to promote patient compliance to treatment regimens and to reduce or eliminate improper drug use like overdoses, sub-therapeutic doses, adverse drug reactions, over prescribing and under prescribing. According to King and Fomundam, (2010:30), the end target of pharmaceutical care is the improved quality of health in the individual patient.

A study among adults diagnosed with asthma showed that applying the multifaceted pharmaceutical care interventions of medication assessment, intervention in the form of

asthma education, education on inhaler technique and aids, and follow-up consultations can improve the quality of life in these patients and improve their general well-being (Mostert, 2007:132). One of the reasons adverse drug reactions develop is due to non-adherence (Osterberg & Blaschke, 2005:488). Vervaeren (1996:212) found that pharmaceutical care improves adherence in chronic diseases like asthma, diabetes and coronary heart disease and that it contributes to better health-related quality of life. Adverse drug reactions caused by prescription error can be prevented with the addition of a clinical pharmacist in the healthcare team (Leape *et a*l*.,* 1999:269).

The benefits of pharmaceutical care are discussed below.

2.4.1 Resolving therapy issues

Pharmaceutical care has been found to resolve medicine-related issues (therapy failure and side-effects) in diabetic, hypertensive and hyperlipidaemic patients (Chua *et al*., 2012:388).

2.4.2 Compliance and adherence

It has been found that pharmaceutical care improves patient knowledge, attitude and compliance (Balaiah *et al*., 2014:458) and increases patient compliance and improved treatment outcomes (Bluml *et al*., 2000:164). Pharmaceutical care at discharge from hospital ensures adherence to treatment regimens and reduces re-admittance due to adverse drug reactions (Tumkur *et al*., 2012:285; Drew & Scott, 2015:3).

2.4.3 Reducing the incidence of adverse drug reactions

In oncology, pharmaceutical care was found to increase adherence to therapy, decrease emesis, improve health-related quality of life and ultimately increase patient satisfaction (Jaehde *et al*., 2008:168; Liekweg *et al*., 2012:2677).

2.4.4 Improving patient health-related quality of life:

Pharmaceutical care assists in the detection, prevention and correction of medicine-related problems (Dauti *et al*., 2014:313; Waszyk-Nowaczyk *et al*., 2014:540). It also introduced effective pain management in palliative care and reduced cost of care (Naidu & DiPiro, 2015). Pharmaceutical care reduced adverse drug reactions, in this case hypoglycaemia, at a healthcare facility in the USA by 80 % (Milligan *et al*., 2015:1631).

2.4.5 Decreased healthcare costs

Pharmaceutical care reduces polypharmacy and inappropriate prescribing, and it improves patient compliance, thereby reducing healthcare costs to treat adverse drug reactions and money wasted on unnecessary medications (Sabatè, 2003:2; Strand *et al*., 2004:3989; Kwan & Farrell, 2013:23; Bradley *et al*., 2012:1430). Non-adherence to therapy costs the USA about $300 billion per year. Pharmaceutical care curbs non-adherence, polypharmacy and inappropriate prescribing (Maass & Weaver 2015:1). Schumock *et al*. (2003:130), studied a five-year period and reported economic benefits in rendering pharmaceutical care.

Granas and Bates (1999:265) has shown the positive effect the pharmacist's review of chronic medicines in elderly patients may have: Significant changes in drugs regimens, no increase in workload for other healthcare professionals and the cost saving to the healthcare system was found to be greater than the cost of the intervention.

2.5 The elderly

2.5.1 Defining the elderly

In South Africa, the Older Persons Act (13 of 2006) classifies the elderly as males over 65 years of age and women over 60 years of age. The elderly is frail and require pharmaceutical care because they often have multiple chronic diseases and co-morbidities. The altered physiology in the elderly due to declined organ function results in altered drug metabolism, and responses to some drugs can widely vary between individuals.

Table 2-2 shows the organ changes and the resulting effects thereof in the elderly patient (Nash *et al.,* 2000:3).

Table 2-2: Organ changes and the resultant frailty in elderly patients

Organ	Change	Result
Heart	Increased left ventricular wall thickness and reduced myocardial contraction	Myocardial stiffness and reduced cardiac function
Lungs	Reduced intercostal muscle strength and increased rigidity of chest wall	Decreased expiratory flow
Kidneys	Loss of renal cortical tissue	Altered fluid, electrolyte and acid-base balance and therefore abnormal medication metabolism/ excretion
Gastro-intestinal tract	Villi in the small intestine reduce after age 60	Reduced absorption of nutrients and medicines
Liver	Reduce in size but liver function remains normal when not challenged	Liver function decreases when challenged with multiple medications
Endocrine and immune systems - women	Menopause	Decreased oestrogen leads to reduced cardio-protection and increased cholesterol levels, osteoporosis
Endocrine and immune systems - men	Decreased testosterone levels	Anaemia, muscle atrophy
Endocrine and immune systems: - men and women	Reduced pancreatic function	Reduced glucose tolerance
	Decreased adrenal gland function	Reduced ability to regulate pulse rate, blood pressure and pH
Neurological	Reduced cerebral blood flow and oxygen consumption	Vision, balance and hearing are adversely affected, increased pain threshold

2.5.2 The need for pharmaceutical care in the elderly

Innovation and improvements in healthcare creates demographic ageing. This means that people will live longer and therefore the population that is defined as elderly will increase steadily (Busemeyer *et al.,* 2009:210). This phenomenon will increase the demand for private and public healthcare geared towards a population with increasing chronic medicine needs (Joubert & Bradshaw, 2006:204). As per the WHO health statistics released in 2014, the life expectancy for girls born in 2012 is 73 years and that of boys 68 years. These statistics shows that this generation will live six years longer than children born in 1990 (WHO, 2014:5). The situation in South Africa follows suit: the life expectancy for a girl born in 2002 was 67 years and for a boy 61 years. In 2014, this increased to a life expectancy of 71 years for girls and 64 years for boys (Statistics South Africa, 2014). The increased elderly population will require increased resources to ensure effective healthcare.

Pharmaceutical care for the individual patient can eliminate most adverse drug reactions and drug-drug interactions (DDIs) in elderly patients (Nash *et al*., 2000:6). Pharmacist inclusion in healthcare teams treating frail elderly of 80 years and older has been shown to reduce re-admission to hospital due to DDI by 80 % (Gillespie *et al.,* 2009:895). Obreli-Neto *et al.* (2011:643) found that pharmaceutical care improved physiological outcomes in elderly patients with hypertension.

Frailty is generally used to describe the biological age of an individual (Akner, 2013:3). Reduced organ functions cause frailty that increases the probability of adverse drug reactions (Nobili *et al*., 2011:28-44). About 17 % of the elderly (>65 years of age) are frail, and patients older than 80 years of age are considered “very frail” in terms of physiology. The resultant changes in senses, balance and bone heath result in higher percentages of clinically significant falls, less mobility, more hospitalisation and eventually full-time care. (Boeckxstaens & De Graaf, 2011:363).

The phenomenon of hoarding in older adults (Ayers *et al.,* 2015:143) is an underreported condition, and healthcare professionals should be heedful of the condition in socially isolated and multimorbid elderly (Dozier & Ayers, 2015:4). Even though Diefenbach *et al*. (2013:1045) hold that hoarding may not be more common in the elderly and may not be to the extent of hoarding disorder, they do agree that it affects the general health of the hoarder. The increase in clutter associated in hoarding may cause falls. Poor hygiene can lead to increased nutritional and medical problems as well as rodent infestations, which can exacerbate existing morbidities (Ayers *et al*., 2015:150). The elderly hoarder might experience social isolation and tend to non-adhere to medication regimens (Dozier & Ayers, 2015:764).

Multimorbidity, the presence of two or more chronic diseases in an individual, inevitably leads to the use of multiple drugs, i.e. polypharmacy. With an increasing elderly population, frailty, multimorbidity and polypharmacy have increased dramatically (Nobili *et al.,* 2011:30) and therefore require individual attention in order to prevent drug-drug interactions and adverse drug reactions. As the population grows older, mortality rates decline and concomitantly the amount of elderly living with two or more chronic conditions is on the increase. In a study of 31 million patients in the USA, 62 % of those over the age of 65 years had more than two chronic conditions (Salive, 2012:76). In Vietnam, 40 % of persons over 65 years of age had two or more chronic diseases. Multimorbidity is considered a definite factor in predicting adverse drug reactions (Woo & Leung, 2014:925). One in four elderly Americans suffer from more than one chronic disease, and are prescribed multiple medicines, increasing their risk of treatment failure and death (Benjamin, 2010:626). In South Africa 51.8 % of the population over 50 years of age suffers from more than one chronic disease (Phaswana-Mafuya *et al.,* 2013:54).

A study in China (Xin *et al*., 2014:965) assessed the results of pharmaceutical care over a six-month period on diabetic patients with co-morbidities of hypercholesteraemia and hypertension. This pharmaceutical care intervention resulted in reduced re-hospitalisation, reduced drug costs as well as an improvement in the diabetic, cholesterol and cardiovascular diseases of the patients. Pharmaceutical care prevents a “one drug fits all” approach that can be detrimental to the health-related quality of life of the elderly patient (Nash *et al*. 2000:6). Obreli-Neto *et al*. (2011:649) proved the success of pharmaceutical care in elderly people suffering from diabetes as well as hypertension in a 36-week program. Pharmaceutical care given over 12 months to diabetic patients with coronary heart disease risk, reduced risk of cardiovascular events and improved overall HbA1c readings (Mazroui, *et al*., 2009:549). In Brazil, Martins *et al*. (2013:611) implemented a pharmaceutical care programme that improved clinical health outcomes in elderly diabetic patients with hypertension and increased cardiovascular risk.

Multimorbidities pave the way for potential inappropriate prescribing. Inappropriate prescribing occurs when one or more physicians introduce the use of a drug that may contribute to potential adverse drug reactions when there is an equally effective, lower risk alternative available (Elliot & Stehlik, 2013:313). In the USA and Europe as much as 40 % of prescriptions were found to be inappropriate (Galagher *et al*., 2007:114; Liu & Christensen, 2002:847) and as much as 90 % misused (Hughes & McCann, 2003:602, Doucette *et al*., 2005:1104). Aparasu and Mort (2015:344) produced similar results in South Dakota despite the recent development of drug utilisation review (DUR) systems. In Brazil, Obreli-Neto *et al*. (2012:345)

found that prescriber characteristics is a factor in adverse drug reactions. Inappropriate prescribing was the cause of 30 % of hospitalisations of elderly people in the USA, physician education can reduce this (Hamilton *et al.,* 2009:3). In 1998, Lazarou *et al.* (1998:2001) examined a database in the USA and found adverse drug reactions to be the fourth leading cause of death in hospitalised patients in the period 1966 to 1994. In South Africa, inappropriate antibiotic prescribing to patients in intensive care units was found to be common and led to poor healthcare outcomes (Paruk *et al.,* 2012:613). As much as 30 % of South African elderly are victims of inappropriate prescribing (Chetty & Gray, 2004:150). In Ireland 36 % of prescriptions to the elderly (>70 years of age) was inappropriate (Cahir *et al*., 2010:543). The challenge to prescribe appropriate medicine can be aided by developing comprehensive and detailed medical records entailing the treatments, social situation and follow-up care (Akner, 2013:3).

The incidence of polypharmacy, that is, the use of multiple drugs (generally accepted as five or more), increases with age. It is mainly because drugs are constantly being developed to treat and prevent chronic illnesses. Treatment for diseases like diabetes, hypertension and hyperlipidaemia is a life-long endeavour (Khan & Preskorn, 2005). Elderly patients are prescribed more drugs and uses more over-the-counter drugs than people under the age of 60 and are therefore at great risk to suffer adverse drug reactions (Bushardt & Jones, 2005:39). Elderly patients in the USA with five or more chronic diseases may have as much as 50 prescriptions filled in a calendar year and may see 14 different healthcare professionals in that same year: a cocktail for polypharmacy and adverse drug reactions (Benjamin, 2010:627).

Several studies demonstrate that pharmaceutical care for elderly patients can reduce drug-related problems and adverse drug reactions (Bernsten *et al*., 2001:75; Hanlon *et al*., 1996:430; Brook *et al.,* 1990:225; Taylor *et al.,* 2003:2). Burns and Still (2003:266) found that pharmaceutical care intervention at point of prescribing reduces the potential for inappropriate prescribing. In Bangalore, Nagaraju *et al*. (2015:395) suggested that pharmaceutical care in elderly patients be compulsory after discharge from hospital. They concluded that pharmaceutical care reduced re-admission for adverse drug reactions due to polypharmacy (Nagaraju *et al.,* 2015:398). In Australia, Semple and Roughead (2009:24) found that the intervention of a pharmacist at discharge from hospital can reduce medication errors. In patients older than 65 years of age, pharmaceutical care in an Ireland hospital reduced potential inappropriate prescribing (Grimes *et al.,* 2014:576). A study in India found 59 % of 1 003 examined prescriptions contained more than five drugs (Nagaraju *et al.,* 2012:488) and in Sweden in 1994 78 % of everybody over 65 years old in the village of Tierp used multiple

prescription drugs (Jörgensen *et al*., 2001:1005). In South Africa, a study in the town of George showed an average of 5.6 drugs per prescription for the elderly in a primary healthcare facility with at least 43 % of these prescriptions having potential drug-drug interactions (Kapp *et al.,* 2013:78-84). In the South African province of Gauteng, a study amongst the elderly showed that they had a 97 % risk of adverse drug reactions when taking multiple medications (Annor *et al.,* 2014:100). In the United Kingdom, 36 % of the elderly take four or more medicines, and they suffer from more than two chronic conditions that requires complicated treatment regimens (Burns & Still, 2003:266). In Canada, 7 % of pensioners use at least five medicines daily, and at least 12 % of these patients suffered adverse drug reactions (Reason *et al.* 2012:428). In the United Kingdom, people 65 years and older account for 21 % of the population, yet their medicines are not managed to the approved national standards in both nursing and care homes (Banning *et al*., 2008:187). Pharmaceutical care reduces the amount of admissions to hospital as well as time spent in hospital due to adverse drug reactions (ADRs) (Janknegt, 2015:190). Several pharmaceutical care studies have shown the positive effect of pharmaceutical care on the reduction of ADR's (Berenguer *et al.,* 2004:3932). Bellingan *et al*. (1996:28) studied pharmaceutical care in South Africa and found that it can reduce the incidence of polypharmacy by 41 %.

Pharmacists fulfil the role of medication expert in healthcare and as such can ensure appropriate, safe and correct medicine use, in the elderly. The pharmacist can identify, resolve and prevent medicine–related problems that may result from multiple-medicine use in elderly patients (Roy & Varsha, 2006:77). Pharmaceutical care can improve drug therapy in ambulatory elderly through pharmacist-physician interaction (Doucette *et al*., 2005:1110). Pharmaceutical care for the elderly should routinely be done to eliminate polypharmacy and inappropriate prescribing (Denneboom *et al.,* 2007:726).

Elderly people have complex health and social needs. Multimorbidity and the effects of polypharmacy can contribute to the social isolation experienced by the elderly patient. Social isolation is the condition where an (elderly) person has no familial or other ties to people (Jones *et al.*, 2005:466; Dykstra, 2009:92). Recent improvements in disease treatments for the elderly has resulted in longevity, which aids cultural isolation and a new view of old age. The previous generations' concept of wisdom and spirituality has been replaced with medically complex individuals attempting to live life "to the full" (Knickman & Snell, 2002:850). Social isolation may lead to increased pain perception and depression, which can add to the multimorbid burden of the elderly patient (Molton & Terrill, 2014:197). A study in the United Kingdom has shown a significant correlation between socially isolated elderly and their health-related quality of life (Hawton *et al.,* 2011:57). Social isolation has a negative impact on adherence to

treatment regimens (Nobili *et al.,* 2011:30). Pharmaceutical care, with particular focus on the care plan phase, combines shared decision making with individual attention and reduces the elderly patient's feeling of isolation (Ford, 2013:54). Begley *et al.* (1997:111) found that home-based visits from the pharmacist to the elderly patient improved their social "health" and resulted in improved compliance. In a study of adherence for heart-failure patients, Wu *et al.* (2008:604) indicate a lack of social support as a contributing factor to non-adherence.

The elderly with their multimorbidities and polypharmacy may be non-adherent to the prescribed drug treatment regimens. Non-adherence in elderly patients have several root causes: social isolation, disinterest in medication unfamiliar to them, not realising the impact or value of the medication and forgetfulness (Pasina *et al*., 2014:283). The pharmaceutical care process serves as a direct contact between the pharmacist and elderly patient and it educates the patient regarding effects and management of daily medicine use (Tumkur *et al.,* 2012:283). In a rural setting, Taylor *et al.* (2003:15) have shown improved compliance and medicine knowledge in an elderly population by applying pharmaceutical care. Poor medication management and non-adherence to prescribed medicine regimens may be improved with regular drug-review in pharmaceutical care and co-operation between healthcare professionals (Elliot, 2006:59). Home visits to the elderly by a pharmacist applying pharmaceutical care were shown to increase adherence in high-risk elderly patients (Begley *et al*., 1997:112). A 2011 Cochrane Review also showed that pharmaceutical care improves adherence (Ryan *et al.,* 2014). Pharmaceutical care training given to pharmacists and applied in practice improved patient knowledge and adherence (Fried *et al*., 2008:1840). Oncology drugs are complex and toxic and have a high potential for ADRs, which often lead to non-adherence, but pharmaceutical care was shown to contribute to alleviate these problems (Liekweg *et al.,* 2004:79; Jaehde *et al.,* 2008:162). Obreli-Neto *et al*. (2011:645) also demonstrated the effectiveness of pharmaceutical care in improving adherence in the elderly. A Cochrane report (Pande *et al.,* 2013) on non-dispensing pharmacy services in eleven middle-income countries showed that pharmaceutical care contributed to the improved health of the patients suffering from chronic diseases like diabetes and hypertension in these communities. In elderly diabetic patients, pharmaceutical care improved adherence to therapy as well as health-related lifestyle changes to give overall improvement in health-related quality of life (Nascimentoa *et al.,* 2015:127).

Table 2-3 shows reasons why elderly patients do not adhere to their medicine regimes and suggest ways in which pharmacists can assist these patients to overcome these barriers. This table was adapted from Jimmy and Jose (2011:155-159).

Table 2-3: Reasons for non-adherence to medicine regimes and how pharmacists can assist

Problem	Pharmaceutical care phase addressing the problem	Possible solutions
Complex medication regimens	Assessment phase	Draw up a daily schedule on an easy-to follow diagram. Use cell phone alarms and set up a schedule.
(In)convenience factors, e.g. dosing frequency	Assessment phase	Schedule compatible medicine together. Use dosing trays if required.
Behavioural factors	Care plan phase:	Motivate the patient to adjust to correct treatment regime: Analyse and utilise unique personality traits.
Treatment of asymptomatic conditions	Care plan phase	Research and educate the patient with regard to dangers of asymptomatic or “silent” diseases. Explain the need and purpose for taking medicines.
Affordability	Care plan phase	Research and suggest reliable and affordable generics. Liaise with appropriate other healthcare professionals if required.
Side effects experienced	Care plan phase	Research and liaise with other healthcare professionals to reduce/ eliminate side effects. Plan correct dosing frequencies to attempt to eliminate side effects.
Patient disagreeing with therapeutic plan	Care plan phase	Educate and motivate patient. Adjust the treatment regime to accommodate the patient without sacrificing clinical efficiency. Set therapeutic goals. Document pharmaceutical care process carefully.
Therapeutic goals not met	Follow-up phase	Re-motivate patient, suggest alternatives where appropriate. If appropriate, suggest the use of multi-therapy dosage forms to simplify treatment.

Lipton *et al.* (1992:647) conducted a trial that showed proof of improvement on appropriateness of drug prescribing to elderly patients in outpatient settings. In 2008, Moen *et al.* (2008:136) interviewed elderly patients regarding their multiple medicines. The patients expressed their difficulty with the regimens prescribed. American elderly with multiple chronic conditions (25 % of elderly) may have 50 prescriptions filled per year, complicating adherence to treatment (Benjamin, 2010:626). Roughead *et al.* (2011:696) found that about 20 % of elderly interviewed in Australia, New Zealand, Canada, the United Kingdom and the USA did not adhere to treatment plans for the following reasons:

- They did not agree with the treatment plan.
- The treatment plan was too difficult to follow.
- The treatment plan was too costly.
- They felt marginalised in decisions about their care.

In Cape Town, a study showed that the elderly had a 50 % non-adherence to treatment regimens (Gillis *et al*., 1987:603). Hospitalisation, resulting changes in attending physician and/or changes in drug regimens can lead to non-adherence and/or adverse drug reactions and re-hospitalisation (Schnipper *et al*., 2006:565). Several studies have found that adherence improve with pharmaceutical care, which points to adherence as a major influence on patients' health-related quality of life (George *et al*., 2008:308; Volume *et al*., 2001:415; Wiedenmayer *et al*., 2006:3). A study by Hanlon *et al.* (2013:1365) found that 90 % of emergency room admissions in elderly patients could have been prevented if the patients followed their treatment regimens. Petkova *et al.* (2005:179) re-iterated that the provision of pharmaceutical care would mean that pharmacists would have to adopt a philosophy of practice where they as healthcare professionals assume responsibility for the medicine component of a patient's health-related quality of life.

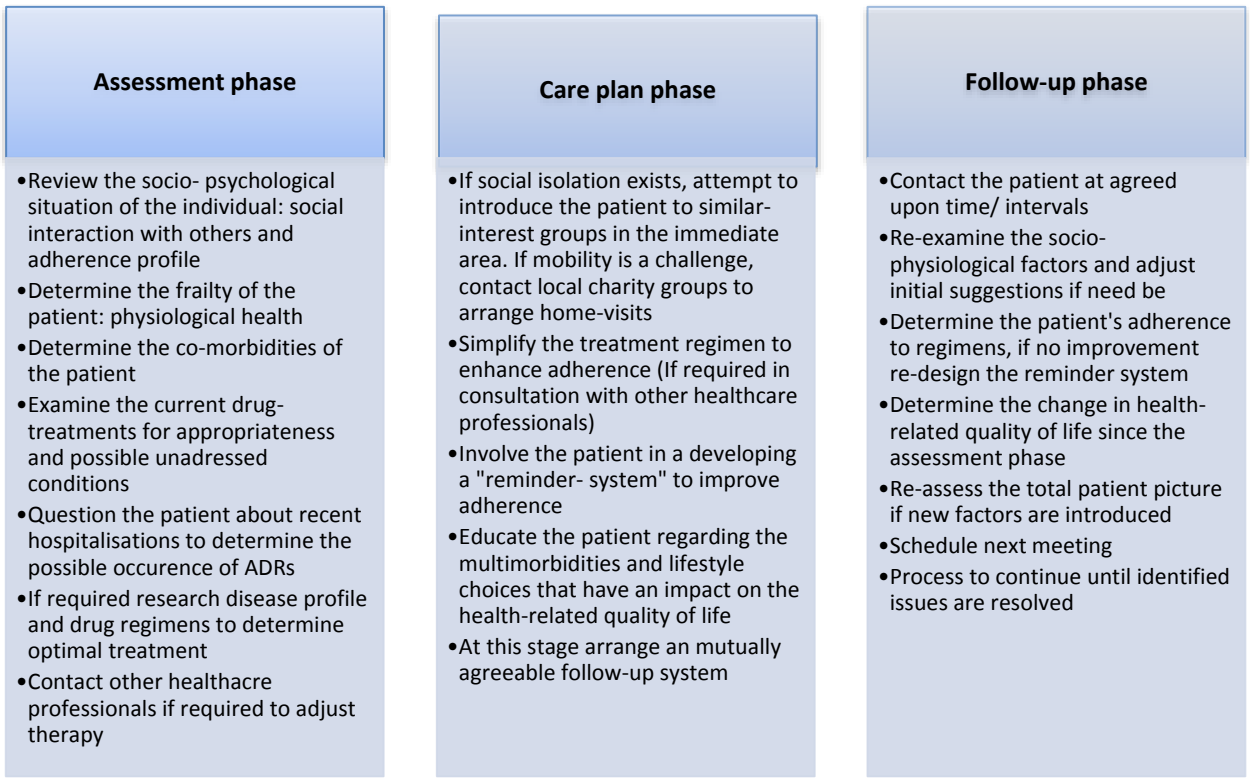

Figure 2 8: Solutions for healthcare challenges in the elderly in context of the pharmaceutical care phases

2.6 Chapter summary

This chapter provided an overview of pharmaceutical care, the pharmacist, the role of the community pharmacist as a pharmaceutical caregiver, the elderly, the challenges and benefits of pharmaceutical care in general and in terms of improving health-related quality of life in the elderly. The chapter has shown that pharmaceutical care to the frail, elderly, multimorbid, polypharmacy patient has a positive impact on the health-related quality of life.

CHAPTER 3: RESULTS

As mentioned in the preface, this chapter contains the results from the empirical study. These results are presented in two manuscripts which were submitted for publication. The title of the first manuscript is: “An elderly, urban population: experiences and expectations of pharmaceutical care”. The title of the second manuscript is: “An elderly, urban population: Their experiences and expectations of pharmaceutical services”. Table 3-1 shows the correlation between the manuscripts, the different parts of the structured questionnaire and the objectives of the empirical study.

Table 3-1: Objectives, manuscripts and structured questionnaire

Objective	**Manuscript**	**Relevant sections of structured questionnaire**
Determine the reported experiences and expectations of pharmaceutical services in a specific urban elderly population	1	Part A, B, F1, F2, F3
Determine the pharmaceutical care experiences and expectations for a specific elderly population	2	Part A, B, C, D, E1, E2, E3, E4

3.1 Manuscript 1

In this chapter, a manuscript titled: “An elderly, urban population: experiences and expectations of pharmaceutical care” is presented. This paper was submitted to the journal *Drugs and Aging,* as a research article. This article was prepared according to the specific instructions to authors for this journal (See Annexure G).

Instructions to the author can be viewed at the following link:

http://www.springer.com/medicine/internal/journal/40266?print_view=true&detailsPage=pltci_2640962

Manuscript 1 addresses the first objective of the empirical study:

> Determine the reported experiences and expectations of pharmaceutical services in a specific urban elderly population.

An elderly, urban population: experiences and expectations of pharmaceutical care

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An elderly, urban population: experiences and expectations of pharmaceutical care

Comment:

Pharmaceutical care in South Africa is not a formalised process. This article highlights the expectation amongst the elderly to receive such a service. Pharmacists and healthcare funders in South Africa should consider the value of pharmaceutical care. The pharmacist, a drug specialist, should be an integral part of the clinical healthcare team.

Abstract

Background: The positive impact of pharmaceutical care on elderly patients has been proven repeatedly. The aim of this study was to determine the actual, reported experiences of an elderly population at their medicine provider against their expectations of pharmaceutical care. Do they in fact receive pharmaceutical care?

Design and setting: A cross-sectional descriptive empirical study was conducted by means of a structured questionnaire. The researcher in face-to-face interviews at the participants' own dwellings administered the questionnaire. Participants had to be ≥65 years of age (n=67).

Main outcome and results: There were both practically and statistically significant differences between the expectations of this population in terms of all three phases of pharmaceutical care and their actual experiences. There were no significant differences between the responses of the participants regardless of age, sex, amount of chronic diseases, primary medicine provider or medicine funders. The largest difference between experience and expectation, based on Cohen's d-value (p<=0.001, d=1.46) was that. 95.5% of the elderly patients perceived that the pharmacist "Never" asses their medication required (Mean ±SD=3.93±0.36), but 32.8 % of the respondents indicated that it should "Always" happen (Mean ±SD=2.28±1.13).

Conclusions: This study highlights shortcomings in the role of the pharmacist as a healthcare team member. Pharmacists in South Africa do not supply pharmaceutical care. When questioned about the components of pharmaceutical care the elderly population indicated that they expected that care.

Keywords:

- Elderly
- Pharmaceutical care
- Expectation and experience
- Face-to-face interview

1. Introduction

The elderly is defined as citizens over the age of 60 years (females) and over the age of 65 years (males) [1]. Each elderly person has unique, individual healthcare needs[2, 3], as they differ with regard to state of general health, frailty, disability, number of chronic diseases, age-related metabolic changes and the medicines required to control or treat these conditions[4, 5.] These factors increase the risk of drug-disease and drug-drug interactions in the elderly and can contribute to idiosyncratic reactions[6, 7, 8, 9]. Insufficient pharmacological studies on efficacy and safety of medicines in the elderly, as well as the lack of adjusted dosages for the elderly are unique factors that contribute to their medicine-related problems[10]. Impaired memory can contribute to non-compliant medicine use[11]. Only 55 % of ambulatory elderly are compliant chronic medicine users[12]. Pharmacists can improve health-related quality of life in the elderly patient and ensure positive health outcomes by supplying pharmaceutical care[13].

The danger of adverse drug reactions due to polypharmacy (generally accepted, as the use of more than five medicines and/or the use of unnecessary medicines[14] among the elderly is common. The elderly suffers from more diseases than persons younger than 50 years of age[15], use multiple medications and consult with multiple healthcare providers[16]. One in four elderly patients in the United States of America has more than one chronic condition[17] and 50 % of the elderly take one or more unnecessary medications[18]. In Brazil, elderly patients use an average of eight medicines[19]. Tipping *et al*.[20] studied elderly patients admitted to the emergency department of a Cape Town hospital. Adverse medicine reactions were identified as the cause of 20 % of the admissions. These patients were taking more than five medications per day.

Adverse medicine reactions are preventable with pharmaceutical care[21]. The pharmacist in the role of counsellor and teacher contributes to the improvement of a patient's state of health in a cost-effective way[22]. In the period 2000 to 2003, pharmacists at the University of Minnesota supplied pharmaceutical care to approximately 25 000 patients and resolved medicine-related problems in 61 % of the participants. Improved clinical outcomes were achieved or maintained in 83 % of the patients, and substantial healthcare cost savings were achieved as a direct result of the introduction of this pharmaceutical care programme[23.]

The philosophy of pharmaceutical care was formalised by Hepler and Strand[23] in the 1990s. They defined pharmaceutical care as a process of meeting patients' medicine-related needs and problems in a responsible way. The goals of pharmaceutical care are to achieve the outcomes of a cure, the elimination, reduction, or prevention of a disease or the symptoms thereof, or the slowing of disease progress. In the words of Strand and Cipolle: "Responsible provision of drug therapy for the purpose of achieving definite outcomes to improve a patient's quality of life"[24.]

Pharmaceutical care developed into a three-phase process, defined by Strand *et al*[25] as:

> The assessment phase: Identify medicine-therapy problems in the individual patient through an honest and professional relationship between patient and pharmacist, by analysis and assessment of the patient's individual medicine, lifestyle and disease information to determine the medicine-therapy problems and needs

The care plan phase: Identify steps required to resolve medicine-therapy problems by considering all the information available: medicine therapy, medicine needs, disease profiles and lifestyle information. Liaise with patient, and/or other healthcare professionals as required in order to prioritise possible medicine-therapy problems and set goals for this intervention

The follow-up phase: The responsibility lies with both pharmacist and individual patient to evaluate the outcome of the care plan intervention to determine improved health-related quality of life. Pharmacist to contact patient at agreed upon intervals to determine the success of the care plan

In South Africa, the underlying philosophy of pharmacy practice is to advise the public on safe, rational and appropriate medicine usage[26]. Pharmacists are the most accessible providers of cost effective healthcare information[27]. The philosophy of pharmaceutical care has, since the 1980 has, contributed to the transformation of the role of the pharmacist and transformed it into a more patient-oriented service rather than the traditional concept of a dispensing service[28]. The principles of pharmaceutical care are embedded in the scope of practice and in the philosophy of pharmacy as a profession in South Africa. The Pharmacy Act (53 of 1974)[29] makes specific provision for all three phases of pharmaceutical care. Pharmaceutical care enables the pharmacist to impact positively on patient care[30].

This study was conducted to determine whether the pharmacist delivers pharmaceutical care by determining the actual reported pharmaceutical care experiences of elderly patients against their expectations.

2. Method

A cross-sectional descriptive study was conducted by means of a structured questionnaire administered by the researcher in face-to-face interviews. To ensure privacy, these interviews were done at each patient's own dwelling. The elderly selected for the study had to be ≥65 years of age[1] ambulatory, able to administer their own medications and they had to remain residents at this specific residence for the duration of the study.

The target population was the 242 residents at this residence, and 67 (27.7%) complied with the inclusion criteria, were willing to give informed consent and participated in this study. The data were collected during June 2015. Each question addressed one idea. No questions with double negatives were included. Closed-ended questions, with yes/no answers or a definite fact as answer, were used in the demographic determination[31]. A four-point Likert scale was used to determine their pharmaceutical care expectations and experiences. The options "Always", "Often", "Seldom" and "Never" were offered for both the experience and expectation determination. The questions were designed to cover all aspects of the three phases of pharmaceutical care. The questionnaire addressed participants' experiences of pharmaceutical care at the pharmacy in the past year.

Validity and reliability was ensured by[32,33,34]:

- Using a single interviewer

[1] The decision to limit the sample age to .65 years of age was taken in order to minimise possible confusion amongst participants

- The elderly patients reported their recent (past year) personal experiences and opinions
- The validity of the study is increased by the fact that the researcher is familiar with the language and culture of these elderly patients
- The questionnaire was reviewed and approved by staff members of Pharmacy Practice and Clinical Pharmacy, of the School of Pharmacy at the North-West University, Potchefstroom Campus as well as the study leaders to ensure and that the questionnaire tested what it was supposed to be testing[35]
- The questionnaire being developed as per previous studies in the field[25,34,36,37,38.]

3. Statistical Analysis

Data were analysed using IBM SPSS Statistics for Windows version 22.0. All statistical significance was considered with a two-sided probability of $p < 0.05$. The practical significance of results was computed when the *p*-value was statistically significant ($p \leq 0.05$). Variables (age groups, gender, etc.) were expressed using descriptive statistics such as frequencies (n), percentages (%), means and standard deviations.

The dependent *t*-test was used to compare the difference between experience and expectation. Cohen's *d*-value was used to determine the practical significance of the results (with $d \geq 0.8$ defined as a large effect with practical significance).

4. Results

The demographic profile of the population is shown in Table I. Of the 242 elderly housed in the residence, 67 participated in this study, a response of 27.7 %. Most of the elderly patients fell into the age group 70-79 years (n=40, 59.9 %). There were more female (n=41, 61.2 %) than male patients (n=26, 38.8 %). The majority of patients belonged to a medical aid (n=60, 89.6 %), and 39 patients (58.9 %) used a specific retail pharmacy as their primary medicine provider. There was no difference in the prevalence of chronic diseases between genders ($p>0.05$).

There were 58 elderly patients (87.9 %) who suffered from at least one chronic condition, but on the question: "Do you perceive your own health as 'Poor', 'Average' or 'Good'?", the majority, 71.7 % (n=48), perceived themselves to be in good health. The maximum number of chronic diseases reported per patient was five. The average number of chronic conditions per patient was 1.9 and the reported average medicine usage was 5.6 medicines per patient. The most common disease combination was hypertension, arthritis and hypercholesterolemia (8.9 %, n=6). Only 23.3 % (n=14) of participants used courier pharmacies for their chronic medications, even though 89.6 % (n=60) of them belonged to a medical aid. The primary medicine supplier in this study population was retail pharmacy at 62.7 % (n=42). (See Table I.)

During the assessment phase of pharmaceutical care, the pharmacist should identify and address possible drug-therapy problems. The largest difference between experience and expectation, based on Cohen's *d*-value ($p<=0.001$, $d=1.46$) was on the assessment of medication required. 95.5% of the elderly patients perceived that the pharmacist "Never" asses their medication required (Mean ±SD=3.93±0.36), but 32.8 % of the respondents indicated that it should "Always" happen (Mean ±SD=2.28±1.13). There were statistical and practical significant differences in all components of the assessment phase of the experiences of the elderly patients measured against their expectations ($p=<0.001$; $d=>1.01$). (See Table II.)

Among the 67 elderly patients, they reported that pharmacists "Never" prioritised their medicine therapy problems (Mean ±SD=3.97±0.24), while the indicated that they would expect it to be "Always" done (Mean ±SD=2.04±1.07). This indicated a statistically and practically significant difference (p=<0.001; d=1.81). Their reported expectations of the care phase aspects were varied, but dependent *t*-tests showed statistically and practically significant differences (p<0.001 and d=>1.41) of their experiences against their expectations. Table III evaluates the reported experience of this study population regarding the identification and prioritising of medicine therapy problems and the goal setting process against their expectations of this process.

Table IV evaluates the experiences of the elderly patients regarding the follow-up phase of the pharmaceutical care process against their expectations. In the follow-up phase, the regularity with which a pharmacist would make contact after implementing a care plan is "Never" (Mean ±SD=3.99±0.12), and the expectations of these elderly patients are that the pharmacist should do so "Always" (Mean ±SD=2.19±1.1). Likewise, the patients have expectations of "Always" being contacted after receiving new medicines (Mean ±SD=2.21±1.15), but their reflection indicates that it "Never" happens (Mean ±SD=3.97±0.24. The elderly patients' expectations of the follow-up phase were varied, but there were both statistically and practically significant differences between their experiences and expectations (p=<0.001 and d=>1.26).

5. Discussion

There were both practically and statistically significant differences between the expectation of this study population in terms of all three phases of pharmaceutical care and their actual experiences *(*p=<0.001 and d=>1.01). There were no significant differences between the responses of the participants in terms of age, sex, amount of chronic diseases, primary medicine provider or medical aid status (p>0.001). Earlier research among pharmacists (n=133) regarding pharmaceutical care showed that 20 % (n=26) performed one of the three stages of pharmaceutical care[39]. In private healthcare settings in South Africa, who are responsible for the healthcare of 25 % of the South African population, pharmacist-patient and pharmacist-initiated patient interaction is not common.

The World Health Organization (WHO)[40] sees pharmaceutical care as a philosophy of practice wherein the pharmacist focuses on the patient to ensure that the patient receives the full benefit, commitment, concern, ethics, functions, knowledge and skills of the pharmacist. They re-enforced the positive therapeutic goals in improving quality of life for the patient. In 2006, a study by Smith *et al*[41] showed a positive health outcome for the elderly if pharmaceutical care is applied**.** Modern pharmacists are changing their focus and role in the community from a traditional, technical dispensing service to that of a healthcare professional service focused on the individual[42]. The focus has moved from pill-counter to management of therapy, improvement of health and prevention of illness[42]. The philosophy of pharmacy practice includes the commitment to "provide pharmaceutical care by taking responsibility for the therapeutic outcome of therapy and to be actively involved in the design, implementation and monitoring of an effective pharmaceutical care service"[26].

The study population were mainly members of medical aids (89.6 %, n=60). The South African Pharmacy Act (53 of 1974)[29] allows for pharmacists to be remunerated for all three phases of pharmaceutical care, and most major medical aids will pay the pharmacy directly for pharmaceutical care.

The significant underservicing of the study population leads to some questions for further studies:

- Are the public aware of the pharmaceutical care process and the role it can play in their continued health?
- Does the pharmacist offer/suggest pharmaceutical care?
- If they do not offer or suggest it, why not?

This study population expressed an expectation of pharmaceutical care. If pharmacists do encourage patients to voice their questions and concerns, pharmaceutical care can be initiated, even across the additional language and cultural barriers as experienced in South Africa[43].

6. Limitations of the study

This study was done amidst a specific population. It does not reflect the experiences or expectations of a representative sample of the elderly South African population. There is a risk of recall bias with self-reporting. The questionnaire could also have raised expectations where none existed before.

7. Conclusion

This elderly population uses mainly private retail pharmacies to supply their medicine (62.7%, n=42). This study showed that the elderly population studied did not experience pharmaceutical care from their medicine providers. They did however have an expectation of such care. It is also possible that they are not aware of the pharmaceutical care process and the advantages it holds for their health-related quality of life. This study highlights the shortcomings in the healthcare system to utilise pharmaceutical care to ensure rational and optimum medicine use in the elderly.

Compliance with ethical standards

No sources of funding were used to conduct this study or to prepare this manuscript. The authors declare that they have no conflict of interest with the content of this study.

This study was approved by the Health Research Ethics Committee, Faculty of Health Sciences, North-West University, Potchefstroom campus (NWU-00036-15-S1). Informed consent was obtained from all participants in this study.

Table I: Demographics of the participants (n=67)

Variable	Category	n (%)
Gender	Male	26 (38.8)
	Female	41 (61.2)
Age (years)	≥65-69	10 (14.8)
	≥70-79	40 (59.9)
	≥80	17 (25.4)
Home language	English	50 (74.6)
	Afrikaans	13 (19.4)
	Other	3 (4.5)
Marital status	Married	38 (56.7)
	Divorced	3 (4.5)
	Widowed and other	26 (38.9)
Medical aid	Yes	60 (89.6)
	No	6 (9.0)
Chronic disease	Yes	58 (86.6)
	No	8 (11.9)
Primary medicine provider	Specific retail pharmacy	39 (58.2)
	Any retail pharmacy	3 (4.5)
	Courier pharmacy	14 (20.9)
	Public hospital	4 (6.0)
	Dispensing doctor	5 (7.5)
Type of chronic diseases	Hypertension	36 (53.7)
	Hypercholesteraemia	33 (49.3)
	Arthritis	20 (29.9)
	Diabetes	14 (20.9)
	Hypothyroidism	12 (19.9)
	Depression	6 (9.0)
	Chronic obstructive pulmonary disease	4 (6.0)
	Asthma	2 (3.0)
Amount of chronic diseases	None	11 (16.4))
	One	18 (26.90
	Two	16 (23.8)
	Three	15 (22.4)
	Four	3 (4.5)
	Five	4 (6.0)
Previous adverse medicine reaction	Yes	21 (31.3)
	No	46 (68.7)

Table II: Pharmaceutical care: assessment

	EXPERIENCE			EXPECTATION				
Question: **Does your pharmacist with every visit…**	**Response**	**n (%)**	**Mean ±SD**	**Response**	**n (%)**	**Mean ±SD**	**Dependent *t*- test**	
							p-value	Cohen's *d*-value
Assess your medication required?	Always		3.93±0.36	Always	22 (32.8)	2.28±1.13	<0.001	1.46
	Often	2 (3)		Often	17 (25.4)			
	Seldom	1 (1.5)		Seldom	15 (22.4)			
	Never	64 (95.5)		Never	13 (19.4)			
Asses your current chronic medications and health history?	Always	1 (1.50)	3.90±0.5	Always	22 (32.8)	2.30±1.14	<0.001	1.40
	Often	2 (3.0)		Often	17 (25.4)			
	Seldom			Seldom	14 (20.9)			
	Never	64 (95.5)		Never	14 (20.9)			
Assess your current acute medications?	Always	1 (1.50)	3.85±0.5	Always	22 (32.8)	2.28±1.14	<0.001	1.38
	Often	1 (1.5)		Often	18 (26.9)			
	Seldom	5 (7.5)		Seldom	13 (19.4)			
	Never	60 (89.6)		Never	14 (20.9)			
Analyse your personal, medicine and disease information?	Always		3.9±0.35	Always	23 (34.3)	2.25±1.13	<0.001	1.45
	Often	1 (1.5)		Often	17 (25.4)			
	Seldom	5 (7.5)		Seldom	14 (20.9)			
	Never	61 (91.0)		Never	13 (19.4)			
Identify potential and current medicine-therapy problems?	Always		3.84±0.54	Always	24 (35.8)	2.22±1.13	<0.001	1.43
	Often	5 (7.5)		Often	16 (23.9)			
	Seldom	1 (1.5)		Seldom	15 (22.4)			
	Never	61 (91.0)		Never	12 (17.9)			

	EXPERIENCE			EXPECTATION				
Question:	**Response**	**n (%)**	**Mean ±SD**	**Response**	**n (%)**	**Mean ±SD**	**Dependent *t*- test**	
Does your pharmacist with every visit…							*p*-value	Cohen's *d*-value
Contact other health professionals if required?	Always		3.67±0.62	Always	24 (35.8)	2.18±1.09	<0.001	1.36
	Often	5 (7.5)		Often	16 (23.9)			
	Seldom	12 (17.9)		Seldom	16 (23.9)			
	Never	50 (74.6)		Never	10 (14.9)			
Document your details and medicine information?	Always	12 (17.9)	3.22±1.19	Always	31 (46.3)	2.01±1.12	<0.001	1.01
	Often	5 (7.2)		Often	14 (20.9)			
	Seldom	6 (9.0)		Seldom	12 (17.9)			
	Never	44 (65.7)		Never	10 (14.9)			

Table III: Pharmaceutical care: care plan

	EXPERIENCE			EXPECTATION				
Question:	**Response**	**n (%)**	**Mean ±SD**	**Response**	**n (%)**	**Mean ±SD**	**Dependent *t*-test**	
Does your pharmacist with every visit…							*p*-value	Cohen's *d*-value*
Prioritise possible medicine-therapy problems?	Always		3.97±0.24	Always	28 (41.8)	2.04±1.07	<0.001	1.81
	Often			Often	16 (23.9)			
	Seldom	1 (1.5)		Seldom	15 (22.4)			
	Never	66 (98.5)		Never				
Set goals for your medical condition, prevention?	Always		3.99±0.12	Always	29 (43.3)	2.04±1.09	<0.001	1.77
	Often			Often	15 (22.4)			
	Seldom	1 (1.5)		Seldom	14 (20.90			
	Never	66 (98.5)		Never	9 (13.4)			
Set goal criteria for your treatment (e.g. reduce blood glucose to under 7)?	Always		4.00±0	Always	31 (46.3)	2.04±1.13	<0.001	1.72
	Often			Often	12 (17.9)			
	Seldom			Seldom	14 (20.9)			
	Never	67 (100)		Never	10 (14.9)			
Does the pharmacist research your medicine and disease information if required?	Always		3.93±0.32	Always	31 (46.3)	2.07±1.16	<0.001	1.60
	Often	1 (1.5)		Often	11 (16.4)			
	Seldom	3 (4.5)		Seldom	14 (20.9)			
	Never	63 (94.0)		Never	11 (16.4)			
Does the pharmacist suggest therapy as required?	Always	1 (1.5)	3.73±0.62	Always	32 (47.8(	2.00±1.13	<0.001	1.53
	Often	3 (4.5)		Often	13 (19.4)			
	Seldom	9 (13.4)		Seldom	12 (17.9)			
	Never	54 (80.6)		Never	10 (14.9)			

	EXPERIENCE			EXPECTATION				
Question:	**Response**	**n (%)**	**Mean ±SD**	**Response**	**n (%)**	**Mean ±SD**	**Dependent *t*-test**	
Does your pharmacist with every visit…							*p*-value	Cohen's *d*-value*
If needed, does the pharmacist refer to other healthcare professionals?	Always		3.78±0.55	Always	29 (43.3)	2.12±1.15	<0.001	1.44
	Often	4 (6.0)		Often	12 (17.9)			
	Seldom	7 (10.4)		Seldom	15 (22.4)			
	Never	56 (83.6)		Never	11 (16.4)			
Do you receive counselling about your medicines?	Always	3 (4.5)	3.67±0.75	Always	28 (41.8)	2.06±1.09	<0.001	1.49
	Often	2 (3.0)		Often	16 (23.9)			
	Seldom	9 (13.4)		Seldom	14 (20.9)			
	Never	53 (79.1)		Never	9 (13.4)			
Are you provided with literature about your treatment/condition?	Always		3.94±0.3	Always	26 (38.8)	2.24±1.18	<0.001	1.44
	Often	1 (1.50)		Often	13 (19.4)			
	Seldom	2 (3)		Seldom	14 (20.9)			
	Never	64 (95.5)		Never	14 (20.9)			
Are the care plan and interventions documented?	Always		3.93±0.26	Always	30 (44.8)	2.18±1.24	<0.001	1.41
	Often			Often	11 (16.4)			
	Seldom	5 (7.5)		Seldom	10 (14.9)			
	Never	62 (92.3)		Never	16 (23.9)			

Table IV: Pharmaceutical care: follow-up

	EXPERIENCE			EXPECTATION				
Question:	**Response**	**n (%)**	**Mean ±SD**	**Response**	**n (%)**	**Mean ±SD**	**Dependent *t*-test**	
							p-value	Cohen's *d*- value
Does your pharmacist contact you at agreed intervals after implementing a care plan?	Always		3.99±0.12	Always	24 (35.8)	2.19±1.10	<0.001	1.62
	Often			Often	17 (25.4)			
	Seldom	1 (1.5)		Seldom	15 (22.4)			
	Never	66 (98.5)		Never	11 (16.40			
Does your pharmacist contact you at agreed intervals after dispensing a new medicine to you?	Always		3.97±0.24	Always	25 (37.3)	2.21±1.15	<0.001	1.53
	Often			Often	16 (23.9)			
	Seldom	1 (1.5)		Seldom	13 (19.4)			
	Never	66 (98.5)		Never	13 (19.40			
Is the outcome of the care process determined and documented?	Always	1 (1.5)	3.93±0.44	Always	30 (44.8)	2.19±1.26	<0.001	1.38
	Often	1 (1.5)		Often	11 (16.4)			
	Seldom			Seldom	9 (13.4)			
	Never	65 (97.0)		Never	17 (25.4)			
If goals are not met, is the care plan process repeated?	Always		4.00±0	Always	24 (35.8)	2.36±1.24	<0.001	1.32
	Often			Often	14 (20.9)			
	Seldom			Seldom	10 (14.9)			
	Never	67 (100)		Never	19 (28.4)			
Do you know whether the follow-up process is documented by the pharmacist?	Always		4.00±0	Always	26 (38.8)	2.40±1.30	<0.001	1.26
	Often			Often	10 (14.9)			
	Seldom			Seldom	9 (13.4)			
	Never	67 (100)		Never	22 (32.8)			

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3.2 Manuscript 2

In this chapter, a manuscript titled

“An elderly, urban population: Their experiences and expectations of pharmaceutical services” is presented. This paper was submitted to the journal *Health South Africa Gesondheid,* as a research article. This article was prepared according to the specific instructions to authors for this journal (See Annexure H).

Instructions to the author can be viewed at the following link:

https://www.elsevier.com/journals/health-sa-gesondheid/1025-9848?generatepdf=true

Manuscript 2 addresses the second objective of the empirical study:

> Determine the pharmaceutical care experiences and expectations for a specific elderly population.

Title: An elderly, urban population: Their experiences and expectations of pharmaceutical services

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Abstract

Objective: The aim of this study was to determine the pharmaceutical services experiences of an elderly, urban population in relation to their expectations.

Design and setting: The study was a cross-sectional descriptive empirical study and was conducted by means of a structured questionnaire that was administered by the researcher in face-tot-face interviews at an old age residence in the participants' own dwellings.

Main outcome and results: This population of elderly patients expected more of pharmacists in terms of pharmaceutical services than they actually received. Discussions about the effect of other medicines on their chronic medicine (d=1.94), whether they have any medicines left from previous issues (d=1.77) and questions regarding existing chronic conditions (d=1.69) showed statistically and practically significant differences. There was an association between questions regarding the use of chronic medicines at pharmacies and at other healthcare professionals (d=0.26), as well as the supply of written information at pharmacies and other healthcare professionals (d=0.42).

Conclusions: The community pharmacist should focus on the health-related quality of life of the individual patient and identify the immediate healthcare needs of their unique community, with specific reference to vulnerable populations like the elderly. Pharmacists should establish themselves as the go-to healthcare professional.

Keywords: Elderly, pharmaceutical services, experiences and expectations, face-to face interview, structured questionnaire

1 Introduction

Constant improvement in healthcare results in longevity, and people are now living longer than in previous years (Bunker, 2001). Life expectancy of South Africans has increased from 47 years in 1960 to 60 years (Mayosi et al., 2012). The resulting increased number of elderly would want to live healthier for longer (Vaupel, 2010). Actuaries estimate that life expectancy increases 1.5 years per decade (Jacobzone et al., 2001). Pharmacists, with expert medicine knowledge, supplying supportive pharmaceutical services have an important role to play in health-related quality of life in the elderly population.

Elderly patients are prescribed more medicines and uses more over-the-counter medicines than persons younger than 60 years of age (Benjamin, 2010). Multi-morbidity and the associated polypharmacy, education levels, language barriers as well as cultural and mental health issues all contribute to medicine-related problems in the elderly patient (Nobili et al., 2011).

2 Objective

The aim of this study was to determine the reported experiences and expectations of pharmaceutical services in a specific urban, elderly population.

3 Ethical considerations

The study was approved by the Health Research Ethics Committee (HREC) of the Faculty of Health Sciences, North West University (NWU-00036-15-S1).

4 Setting

A cross-sectional descriptive study was conducted. The researcher used a structured questionnaire to conduct face-to-face interviews with the participants at their own dwellings.

The setting was an urban residence for the elderly with 242 residents. Participation was voluntary and informed consent was obtained from all participants.

Participants had to comply with the following inclusion criteria:

- They had to be over 65 years of age. (In South Africa, the elderly is classified by the Older Person's Act (13 of 2006) as males of ≥65 years of age and females of ≥60 years of age (Vaupel, 2010).)
- They had to be ambulatory.
- They had to be able to administer own medicines. The resident nursing sister assisted in determining their ability to do so.
- They had to be residents at this specific residence for the duration of the study.

A perception of pharmaceutical services as experienced in the past year as well as the expectations as reported by this specific population was obtained. One idea was addressed per question. The demographic data was obtained using closed-ended questions, with yes/no

answers or a definite fact as options. The pharmaceutical services expectation and experience-questionnaire was structured using a four-point Likert scale. Pharmaceutical services as indicated in the Pharmacy Act (53 of 1974) were used as guidelines in the development of the questionnaire. Participants were afforded an opportunity to raise questions regarding the study and/or regarding their health issues or medicines after the interview.

Validity and reliability in this study were ensured by the use of only one interviewer (Joubert & Ehrlich, 2012). The researcher was familiar with the language and culture of the participants, increasing the face validity of the study (Joubert & Ehrlich, 2012). The questionnaire was set around personal experiences of the study population over the past 12 months. Staff members of the Pharmacy Practice and Clinical Pharmacy departments of the School of Pharmacy at the NWU, Potchefstroom Campus, and the study leaders reviewed the questions and structure of the questionnaire to ensure it tested what it was supposed to (Maree, 2012). The researcher also used questions adapted from those used in other studies in the field of pharmaceutical services and pharmaceutical care (Strand et al., 2004; Volume et al., 2001).

The data from the participants were collected during June 2015. Questions in the questionnaire focused on the following aspects: demographical profile of participants, chronic disease and medication profile of participants, preferences of participants related to pharmacist and pharmacies, as well as participants' experiences and expectations of pharmaceutical services.

5 Statistical analysis

Data analysis was done with IBM SPSS Statistics for Windows, version 22.0 (IBM, 2013) in consultation with the Statistical Consultation Services of the NWU. Statistically significance was considered with a two-sided probability of $p < 0.05$. Practically significance of results was computed when the p-value was statistically significant ($p \leq 0.05$). Variables (age groups, gender, etc.) were expressed using descriptive statistics such as frequencies (n), percentages (%), means and standard deviations.

The two-sample *t*-test was used to compare the difference between the means of two groups. ANOVA was used for more than two groups. If a difference was indicated, a Tukey multiple comparison test was performed to determine which groups differed statistically significantly from one another. Cohen's *d*-value was used to determine the practical significance of the results (with $d \geq 0.8$ defined as a large effect with practical significance).

Chi-square tests were used to determine associations between proportions of two or more categorical variables. Cramer's *V* statistic was used to test the practical significance of this association (with Cramer's $V \geq 0.5$ defined as practically significant).

6 Theory

Ancient writings make mention of dedicated healers who prepared remedies to cure ills. As civilisation developed, Greek, Roman, Chinese, Arab and Indian medicinal cultures merged, but they were always steeped in mysticism (Sonnedekker, 1976). It was only in the 19th century when the study of physiology, pharmacognosy, pharmacology and pharmaceutical chemistry brought scientific principles to the practice of pharmacy (Anderson, 2015). In the 1900s, industrialisation changed the face of pharmacy and the profession of pharmacy to that of medicine-trader as per physician prescription (Hepler & Strand, 1990). The role of pharmacists as healthcare professionals diminished, and they were seen as shopkeepers that mainly compounded and distributed medicines.

In the 1980s the abundance of prescribed medicines gave rise to an increased amount of adverse drug reactions. The pharmacist was identified as the healthcare professional competent to address the problem (Hepler & Strand, 1990). The pharmacist, with unique drug therapy knowledge, has to fulfil a clinical role: provide individualised patient therapies and co-operate with other healthcare professionals and the patient to obtain positive healthcare outcomes (Al Shaqua & Zairi, 2001), as well as supply the traditional pharmaceutical support services. Pharmacists have the knowledge and the skill to improve patients' health-related quality of life and they should proudly take their place in the healthcare team (Wiedenmayer et al., 2006).

In a message from the president of the Pharmaceutical Society of South Africa (Malan, 2015), pharmacists were encouraged to be the medicine experts and to use their unique skills to prevent, identify and resolve medicine-related problems, to recommend cost-effective therapy, and to counsel patients on drug-therapy. The International Pharmaceutical Federation likewise promotes pharmaceutical care, underpinned by the traditional support to the patient: dispensing, compounding, advice, counselling, supply of medical devices and supply of over-the-counter medications (FIP, 1998).

Most of the non-dispensing services offered in community pharmacy in South Africa are blood pressure monitoring, medicine monitoring, advice on nutrition, blood glucose monitoring and infant care (Blignault, 2010). On average 50% of a pharmacist's workday is devoted to

dispensing, with 35% of the day spent on counselling patients about medicines and how to use it (Blignault, 2010).

Pharmacists are the primary gatekeepers to medicines in the community (Gous, 2011). The role of the pharmacist has evolved from provider, dispenser, procurer and distributor of medicines to that of healthcare educator. Pharmacists now focus on the individual patient by providing the following (SAPC, 2010; Wiedenmayer et al., 2006; FIP, 1998):

- Counselling
- Drug information
- Disease prevention
- Monitoring of drug therapy
- Supply of pharmaceutical services
- Provision of pharmaceutical care
- Dispensing of medicine, on prescription or over-the-counter

The pharmacist is the most accessible healthcare professional (McGann, 2012): no appointments are needed and the public considers the pharmacist as the first port of call in healthcare (Oakley, 2015). The pharmacist should use the patient's need for medicine as a contact point to supply health education and pharmaceutical care (Wiedenmayer, 2006).

In 2009, the South African population included 7.8% citizens over the age of 60 years, of whom 40 % resided in Gauteng (Statistics South Africa, 2011). Of the persons aged 60 to 79 years, 51.8 % suffered from at least one chronic condition (Statistics South Africa, 2011; Phaswana-Mafuya et al., 2013). The leading chronic diseases in South Africa are cardiovascular disease, chronic obstructive pulmonary disease, hypertension and diabetes mellitus (Steyn et al., 2006). The benefits of pharmaceutical care and the supply of pharmaceutical services to the elderly population have been proven (Aspden et al., 2007; Leendertse et al., 2013; Bernsten et al., 2001). Pharmaceutical care and the appropriate pharmaceutical services contribute to improved health literacy and the resultant effective use of medicines (Wooten, 2012). South Africa had 24 registered pharmacists per 100 000 citizens in 2010. The public health sector services 85% of the population, which equates to one pharmacist per approximately 14 000 people (Smith, 2011). Even in private healthcare settings in South Africa, pharmacist-patient and pharmacist-initiated patient interaction is not common (Gray et al., 2002). However, the question can be asked whether pharmacists encourage elderly patients to voice their questions and concerns.

7 Results and findings

The target population for this study was all the ambulatory residents of a residence that housed 242 elderly pensioners, of which 67 (27.6 %) participated in this study. The demographics for the sample population are shown in Table I.

Table I: Demographics

Variable	Category	n (%)
Gender	Male	26 (38.8)
	Female	41 (61.2)
Age (years)	>65-69	10 (14.8)
	>70-79	40 (59.9)
	>80	17 (25.4)
Home Language	English	50 (74.6)
	Afrikaans	13 (19.4)
	Other	3 (4.5)
Marital status	Married	38 (56.7)
	Divorced	3 (4.5)
	Widowed and other	26 (38.9)
Medical Aid	Yes	60 (89.6)
	No	6 (9.0)
Chronic disease	Yes	58 (86.6)
	No	8 (11.9)
Chronic medicine provider	Specific retail pharmacy	39 (58.2)
	Any retail pharmacy	3 (4.5)
	Courier pharmacy	14 (20.9)
	Public hospital	4 (6.0)
	Dispensing doctor	5 (7.5)
Did you visit a pharmacy in the past year for:	Chronic medicine	46 (68.7)
	Over-the-counter medicines	48 (71.6)
	Acute prescription meds	32 (47.8)
	Advice	16 (23.9)
	Advertised specials	14 (20.9)
	Primary healthcare e.g. Blood pressure check	22 (32.8)

Hypertension (n=36, 53.7 %), hypercholesteraemia (n=33, 49.35 %), arthritis (n=20, 29.9 %), and diabetes (n=14, 20.9 %) were the four chronic diseases most prevalent. There were no more than five chronic diseases per participant (n=4, 6.0 %). The majority of the participants had a single chronic disease (n=18, 26.9 %), 16 participants (23.8 %) had two, and 15 (22.4 %) had three chronic diseases. The primary healthcare professional of choice was the general practitioner (n=55, 82.1 %), and bi-annual visits were the most common (n=26, 38.8 %). The pharmacist was the first port-of-call for participants if they had a question regarding medicines (n=38, 56.7 %). Participants remembered to take their chronic medicines every day (n=55, 82.1 %), but those who forgot remedied the situation by taking it as soon as possible (n=3, 4.5 %), skipping and carrying on the next day (n=2, 3.0 %) or asking their spouses to help them remember (n=1, 1.5 %).

The researcher asked the participants to show all the medicines in the dwelling, and the following observations were made:

- Only 8 (11.9%) of the participants had expired medicines in their possession.
- Medicines were labelled correctly in terms of instructions, storage conditions and warnings (n=64, 98.5 %).
- Medicines were intended for use by the participant only (n=66, 98.5 %)
- There was no excess of chronic medicines (hoarding) in 63 (94.0 %) of the cases.
- Medicines were stored in appropriate conditions 98.5 % (n=66) of the time.

The participants were questioned about their demographic preferences for pharmacists/ pharmacies (see Table II)

Table II: Preferred pharmacist demographics as reported by male and female participants

Variable	Response from male participants (n= 26): n (%)	Response from female participants (n=41): n (%)
Preferred gender of pharmacist:		
Male		5 (12.2)
Female	2 (7.7)	5 (12.2)
No preference	24 (92.3)	31 (75.6)
Prefer to be served in:		
Home language	16 (61.5)	23 (57.5)
Any language you can understand	10 (38.5)	18 (42.5)
Preferred age of pharmacist:		
<40 years		2 (4.9)
40- 50 years	1 (1.5)	4 (9.8)
>50 years	2 (7.7)	6 (14.6)
No preference	23 (88.5)	29 (70.7)
Prefer to first speak to:		
Pharmacist	11 (42.3)	18 (43.9)
Pharmacist assistant	1 (3.8)	1 (2.4)
Front shop assistant	1 (3.8)	1 (2.4)
No preference	13 (50.0)	21 (51.2)
Prefer to see the same pharmacist with every visit:		
Yes	13 (50.0)	25 (61.0)
No	5 (19.2)	7 (17.1)
No preference	8 (30.8)	9 (22.0)
Prefer the pharmacy to have a delivery service:		
Yes	7 (26.9)	16 (39.0)
No	14 (53.8)	11 (26.8)
No preference	5 (19.2)	14 (34.1)

Participants had no specific preference in terms of pharmacy/ pharmacist demographics. The only definite was that they would like to see the same pharmacist with every visit (male response 50.0 % (n=13) and female response 61.0 % (n=25).

The participants were asked to report their experiences at pharmacies and at other healthcare professionals. (See Table III). A comparison was made between the healthcare services received at pharmacies and those same services received at other healthcare professionals. Statistically significant differences (p <0.05) were found in most aspects examined. The only significant associations found with regard to the participants' experiences at pharmacies and at other healthcare professionals were: whether they are using any chronic medicines (d=0.26), were they told how to store medicine (d=0.26) and whether they received written information about their conditions and/or their medications (d=0.42).

Table III: Pharmaceutical services: pharmacy experience vs other healthcare professionals experience

	OTHER HEALTHCARE PROFESSIONALS			PHARMACY			Dependent *t*-test	
Question	**Response**	**n (%)**	**Mean ±SD**	**Response**	**n (%)**	**Mean ±SD**	***p*-value**	**Cohen's *d*- value**
Do they ask you about other medicines you take?	Always	4 (6.0)	3.48±0.92	Always	7 (10.4)	3.38±1.02	<0.001	0.10
	Often	7 (10.4)		Often	5 (7.5)			
	Seldom	8 (11.9)		Seldom	10 (14.9)			
	Never	47 (70.1)		Never	15 (67.2)			
Are you questioned about any chronic disease you have?	Always	3 (4.5)	3.23±0.87	Always	4 (6.0)	3.47±0.92	<0.001	0.26
	Often	10 (14.9)		Often	7 (10.4)			
	Seldom	22 (32.8)		Seldom	9 (13.4)			
	Never	31 (46.3)		Never	47 (70.1)			
Are you told what medicines you receive?	Always	7 (10.4)	2.73±0.97	Always	18 (26.9)	2.62±1.21	<0.001	0.08
	Often	21 (31.3)		Often	12 (17.9)			
	Seldom	21 (31.3)		Seldom	15 (22.4)			
	Never	17 (25.4)		Never	22 (32.8)			
Do they explain the purpose of the medicine?	Always	12 (17.9)	2.79±1.13	Always	12 (17.9)	2.86±1.18	<0.001	0.06
	Often	14 (20.9)		Often	15 (22.4)			
	Seldom	16 (23.9)		Seldom	11 (16.4)			
	Never	24 (35.8)		Never	29 (43.3)			

Question	OTHER HEALTHCARE PROFESSIONALS			PHARMACY			Dependent *t*-test	
	Response	n (%)	Mean ±SD	Response	n (%)	Mean ±SD	*p*-value	Cohen's *d*- value
Do you understand the terminology they use?	Always	31 (46.3)	1.79±0.92	Always	39 (58.2)	1.77±1.05	<0.001	0.01
	Often	23 (34.3)		Often	9 (13.4)			
	Seldom	16 (23.9)		Seldom	13 (19.4)			
	Never	24 (35.8)		Never	6 (9.0)			
Do they tell you how to take/ use the medicine?	Always	12 (17.90	2.59±1.11	Always	29 (43.3)	2.18±1.26	<0.001	0.10
	Often	23 (34.3)		Often	15 (22.4)			
	Seldom	11 (16.4)		Seldom	5 (7.5)			
	Never	20 (29.9)		Never	18 (26.9)			
Do they tell you how to store the medicine?	Always	1 (1.5)	3.79±0.6	Always	1 (1.5)	3.59±0.74	<0.001	0.26
	Often	3 (4.5)		Often	7 (10.4)			
	Seldom	5 (7.5)		Seldom	11 (16.4)			
	Never	57 (85.1)		Never	48 (71.6)			
Are the possible side-effects and what to do about them explained to you?	Always	2 (3.0)	3.58±0.75	Always	4 (6.0)	3.48±0.92	<0.001	0.01
	Often	4 (6.0)		Often	7 (10.4)			
	Seldom	14 (20.9)		Seldom	8 (11.9)			
	Never	46 (68.7)		Never	48 (71.6)			
Do you receive any brochures/ written information about your condition(s)/ medicine(s)?	Always		3.92±0.37	Always		3.94±0.24	<0.001	0.42
	Often	2 (3.0)		Often				
	Seldom	1 (1.5)		Seldom	4 (6.0)			
	Never	62 (92.5)		Never	63 (94.0)			

Dependent *t*-tests showed statistically and practically significant differences of the experiences vs the expectations in terms of pharmacist and pharmacy related needs. The biggest significant difference is their need for a private/ semi-private counselling area (d=0.76), to be able to identify the pharmacist on duty (d=0.55) and their expectation for sufficient seating (d=0.50). (See Table IV.)

Table IV: Pharmacy services: pharmacist and pharmacy related needs

	EXPERIENCE			EXPECTATION				
Question	**Response**	**n (%)**	**Mean ±SD**	**Response**	**n (%)**	**Mean ±SD**	**Dependent *t*-test**	
							***p*-value**	**Cohen's *d*- value**
Are the staff identified with nametags?	Always	40 (59.7)	1.87±1.18	Always	51 (76.1)	1.39±0.76	0.001	0.40
	Often	7 (10.4)		Often	7 (10.4)			
	Seldom	9 (13.40		Seldom	8 (11.9)			
	Never	11 (16.4)		Never	1 (1.5)			
Can you see who the pharmacist on duty is?	Always	31 (46.3)	2.06±1.18	Always	51 (76.1)	1.41±0.8	<0.001	0.55
	Often	12 (17.9)		Often	7 (10.4)			
	Seldom	11 (16.4)		Seldom	7 (10.4)			
	Never	12 (17.9)		Never	2 (3.0)			
Are you given an opportunity to speak to the pharmacist, even if you do not want to purchase anything?	Always	25 (37.3)	2.25±1.17	Always	38 (56.7)	1.72±0.93	<0.001	0.46
	Often	14 (20.9)		Often	13 (19.4)			
	Seldom	14 (20.9)		Seldom	13 (19.4)			
	Never	14 (20.9)		Never	3 (4.5)			
Can the pharmacist sufficiently address your question?	Always	39 (58.2)	1.72±1.04	Always	51 (76.1)	1.36±0.71	0.004	0.34
	Often	17 (25.4)		Often	9 (13.4)			
	Seldom	2 (3.0)		Seldom	6 (9.0)			
	Never	9 (13.4)		Never	2 (3.0)			
Is there a private/ semi-private area available where you can speak to the pharmacist?	Always	20 (29.9)	2.28±1.08	Always	46 (68.7)	1.46±0.78	<0.001	0.76
	Often	20 (29.9)		Often	13 (19.4)			
	Seldom	15 (22.4)		Seldom	6 (9.0)			
	Never	12 (17.9)		Never	2 (3.0)			

Question	EXPERIENCE			EXPECTATION			Dependent *t*-test	
	Response	n (%)	Mean ±SD	Response	n (%)	Mean ±SD	*p*-value	Cohen's *d*- value
Is there sufficient seating available for elderly persons while they wait for their medicines?	Always	29 (43.3)	1.97±1.01	Always	45 (67.2)	1.46±0.75	<0.001	0.50
	Often	17 (25.4)		Often	14 (20.9)			
	Seldom	15 (22.4)		Seldom	7 (10.4)			
	Never	6 (9.0)		Never	1 (1.5)			
Do you prefer a delivery service?	Always	16 (23.9)	3.01±1.26	Always	23 (34.3)	2.54±1.23	0.001	0.38
	Often	4 (6.0)		Often	4 (6.0)			
	Seldom	10 (14.9)		Seldom	21 (31.3)			
	Never	37 (55.2)		Never	19 (28.4)			
Can you contact the pharmacist telephonically to discuss your medicine-related needs?	Always	36 (53.7)	1.81±1.02	Always	42 (62.7)	1.63±0.93	0.213	0.18
	Often	14 (20.9)		Often	12 (17.9)			
	Seldom	11 (16.4)		Seldom	9 (13.4)			
	Never	6 (9.0)		Never	4 (6.0)			

Table V shows statistically and practically significant differences between the medicine-related experiences and expectations of the participants. They expected to receive information about the effect of other medicines on their chronic condition/ medicines (d =1.94). They also expected to be asked about medicines left over from previous issues (d =1.77) and whether they suffer from any other chronic conditions (d =1.69).

Table V: Pharmacy services: medicine-related needs

	EXPERIENCE			EXPECTATION				
Question	**Response**	**n (%)**	**Mean ±SD**	**Response**	**n (%)**	**Mean ±SD**	**Dependent *t*-test**	
							***p*-value**	**Cohen's *d*- value**
Are you questioned about the medicine you take?	Always	7 (10.4)	3.39±1.01	Always	36 (58.2)	1.79±0.98	<0.001	1.57
	Often	5 (7.5)		Often	13 (19.4)			
	Seldom	10 (14.9)		Seldom	14 (20.9)			
	Never	15 (67.2)		Never	4 (6.0)			
Are you questioned about any chronic disease you have?	Always	4 (6.0)	3.48±0.91	Always	39 (58.2)	1.76±1.02	<0.001	1.69
	Often	7 (10.4)		Often	10 (14.9)			
	Seldom	9 (13.4)		Seldom	13 (19.4)			
	Never	47 (70.1)		Never	5 (7.5)			
Are you questioned about any allergies you have?	Always	11 (16.4)	3.07±1.17	Always	41 (61.2)	1.72±1.03	<0.001	1.16
	Often	10 (14.9)		Often	10 (14.9)			
	Seldom	9 (13.4)		Seldom	10 (14.9)			
	Never	37 (55.2)		Never	6 (9.0)			
Are you told what medicines you receive?	Always	18 (26.9)	2.61±1.21	Always	42 (62.7)	1.61±0.92	<0.001	0.83
	Often	12 (17.9)		Often	13 (19.4)			
	Seldom	15 (22.4)		Seldom	8 (11.9)			
	Never	22 (32.8)		Never	4 (6.0)			

	EXPERIENCE			EXPECTATION				
Question	**Response**	**n (%)**	**Mean ±SD**	**Response**	**n (%)**	**Mean ±SD**	**Dependent *t*-test**	
							***p*-value**	**Cohen's *d*- value**
Do they tell you the purpose of the medicine?	Always	12 (17.9)	2.85±1.17	Always	40 (61.2)	1.60±0.85	<0.001	1.07
	Often	15 (22.4)		Often	17 (25.4)			
	Seldom	11 (16.4)		Seldom	7 (10.4)			
	Never	29 (43.3)		Never	3 (4.5)			
Do you understand the terminology they use?	Always	39 (58.2)	1.79±1.05	Always	47 (70.1)	1.43±0.78	0.009	0.34
	Often	9 (13.4)		Often	9 (13.4)			
	Seldom	13 (19.4)		Seldom	5 (7.5)			
	Never	6 (9.0)		Never	3 (4.5)			
Do they tell you how to take the medicine?	Always	29 (43.3)	2.18±1.25	Always	50 (74.6)	1.42±0.82	<0.001	0.61
	Often	15 (22.4)		Often	9 (13.4)			
	Seldom	5 (7.5)		Seldom	5 (7.5)			
	Never	18 (26.9)		Never	3 (4.5)			
Do they tell you how to store the medicine?	Always	1 (1.5)	3.58±0.74	Always	34 (50.7)	1.96±1.12	<0.001	1.45
	Often	7 (10.4)		Often	11 (16.4)			
	Seldom	11 (16.4)		Seldom	13 (19.4)			
	Never	48 (71.6)		Never	9 (13.4)			
Are you told what to do if you skip a dose/ take an extra dose?	Always	1 (1.5)	3.82±0.55	Always	22 (32.8)	2.25±1.08	<0.001	1.45
	Often	2 (3.0)		Often	16 (23.9)			
	Seldom	5 (7.5)		Seldom	19 (28.4)			
	Never	59 (88.1)		Never	10 (14.9)			

	EXPERIENCE			EXPECTATION				
Question	**Response**	**n (%)**	**Mean ±SD**	**Response**	**n (%)**	**Mean ±SD**	**Dependent *t*-test**	
							***p*-value**	**Cohen's *d*- value**
Are the possible side-effects and what to do about them explained to you?	Always	4 (6.0)	3.49±0.91	Always	36 (53.7)	1.85±1.09	<0.001	1.51
	Often	7 (10.4)		Often	14 (20.9)			
	Seldom	8 (11.9)		Seldom	8 (11.9)			
	Never	48 (71.6)		Never	9 (13.4)			
When you collect/ receive your chronic medicines, are you asked about medicines left over from previous issues?	Always		3.91±0.38	Always	17 (25.4)	2.26±0.93	<0.001	1.77
	Often	2 (3.0)		Often	23 (34.3)			
	Seldom	2 (3.0)		Seldom	21 (31.3)			
	Never	62 (92.5)		Never	6 (9.0)			
Do you receive information about the effect that other medicines might have on your chronic medicines/ condition?	Always		3.64±0.64	Always	36 (53.7)	1.75±0.97	<0.001	1.94
	Often	6 (9.0)		Often	18 (26.9)			
	Seldom	12 (17.9)		Seldom	7 (10.4)			
	Never	49 (73.1)		Never	6 (9.0)			
Do you know who to ask if you have any queries regarding medicines?	Always	45 (67.2)	1.61±1.03	Always	55 (82.1)	1.22±0.55	0.001	0.38
	Often	11 (16.4)		Often	10 (14.9)			
	Seldom	3 (4.5)		Seldom	1 (1.5)			
	Never	8 (11.9)		Never	1 (1.5)			
Does the pharmacist help you to manage your medicine/ condition(s)?	Always	6 (9.0)	3.48±0.94	Always	25 (37.3)	2.18±1.15	<0.001	1.13
	Often	3 (4.5)		Often	19 (28.4)			
	Seldom	11 (16.4)		Seldom	9 (13.4)			
	Never	47 (70.1)		Never	14 (20.9)			
Do you receive any brochures/ written information about your condition(s)/ medicine(s)?	Always		3.94±0.24	Always	12 (17.9)	2.94±1.15	<0.001	0.87
	Often			Often	10 (14.9)			
	Seldom	4 (6.0)		Seldom	15 (22.4)			
	Never	63 (94.0)		Never	30 (44.8)			

The participants used pharmacy healthcare services during the past year, yet there were statistically and practically significant differences between the use of these services and their need thereof. The only statistically and practically significant association is that this population has and will be willing to pay for healthcare services at the pharmacy (p =0.201 and d =0.03). The results are shown in table VI.

Table VI: Pharmaceutical healthcare services

	EXPERIENCE			EXPECTATION				
Question	**Have you used this service?**	**n (%)**	**Mean ±SD**	**Will you use this service?**	**n (%)**	**Mean ±SD**	**Dependent *t*-test**	
							p-value	Cohen's *d*- value
Blood cholesterol monitoring	Always	4 (6.0)	3.6±0.89	Always	11 (16.4)	2.70±0.98	<0.001	0.91
	Often	6 (9.0)		Often	12 (17.9)			
	Seldom	3 (4.5)		Seldom	30 (44.8)			
	Never	54 (80.6)		Never	14 (20.9)			
Blood glucose monitoring	Always	3 (4.50	3.69±0.78	Always	9 (13.4)	2.76±0.97	<0.001	0.95
	Often	4 (6.0)		Often	11 (16.4)			
	Seldom	4 (6.0)		Seldom	28 (41.8)			
	Never	56 (83.6)		Never	16 (23.9)			
Blood pressure monitoring	Always	6 (9.0)	3.4±0.99	Always	12 (17.9)	2.72±1.03	<0.001	0.67
	Often	6 (9.0)		Often	11 (16.4)			
	Seldom	10 (14.9)		Seldom	28 (41.8)			
	Never	45 (67.2)		Never	16 (23.9)			
Peak flow measurement	Always		3.99±0.12	Always	5 (7.5)	3.31±0.91	<0.001	0.74
	Often			Often	5 (7.5)			
	Seldom	1 (1.5)		Seldom	21 (31.3)			
	Never	66 (98.5)		Never	36 (53.7)			

	EXPERIENCE			EXPECTATION				
Question	**Have you used this service?**	**n (%)**	**Mean ±SD**	**Will you use this service?**	**n (%)**	**Mean ±SD**	**Dependent *t*-test**	
							p-value	Cohen's *d*- value
Immunisation service e.g. flu vaccines	Always	9 (13.4)	3.03±1.14	Always	16 (23.9)	2.6±1.18	<0.001	0.37
	Often	15 (22.4)		Often	17 (25.4)			
	Seldom	8 (11.9)		Seldom	12 (17.9)			
	Never	35 (52.2)		Never	22 (32.8)			
A call out service	Always	1 (1.5)	3.87±0.46	Always	9 (13.4)	3.24±1.09	<0.001	0.58
	Often			Often	6 (9.0)			
	Seldom	6 (9.0)		Seldom	12 (17.9)			
	Never	60 (89.6)		Never	40 (59.7)			
Pharmacist-initiated therapy	Always	13 (19.4)	2.46±1.06	Always	21 (31.2)	2.09±0.95	0.002	0.35
	Often	26 (38.8)		Often	25 (37.3)			
	Seldom	12 (17.9)		Seldom	15 (22.4)			
	Never	16 (23.9)		Never	6 (9.0)			
Urine analysis	Always	1 (1.5)	3.90±0.46	Always	3 (4.5)	3.72±0.55	0.051	0.33
	Often	1 (1.5)		Often	14 (20.9)			
	Seldom	2 (3.0)		Seldom	30 (44.8)			
	Never	63 (94.0)		Never	20 (29.9)			
Administration of general injections as prescribed by your doctor	Always	1 (1.5)	3.70±0.65	Always	9 (13.4)	3.00±0.83	<0.001	0.84
	Often	4 (6.0)		Often	12 (17.9)			
	Seldom	9 (13.4)		Seldom	30 (44.8)			
	Never	53 (79.1)		Never	16 (23.9)			
Liaison with your medical aid or doctor to review/ update your chronic medicine authorisation	Always	1 (1.5)	3.40±0.8	Always	9 (13.4)	2.79±0.96	<0.001	0.64
	Often	10 (14.90		Often	12 (17.9)			
	Seldom	17 (25.4)		Seldom	30 (44.8)			
	Never	39 (58.2)		Never	16 (23.9)			

	EXPERIENCE			EXPECTATION				
Question	**Have you used this service?**	**n (%)**	**Mean ±SD**	**Will you use this service?**	**n (%)**	**Mean ±SD**	**Dependent *t*-test**	
							p-value	Cohen's *d*- value
Pharmacist- assisted medicine use management	Always	5 (7.5)	3.34±0.96	Always	10 (14.9)	2.63±1.04	<0.001	0.69
	Often	8 (11.9)		Often	23 (34.3)			
	Seldom	13 (19.4)		Seldom	16 (23.9)			
	Never	41 (61.2)		Never	16 (23.9)			
Do you regard the pharmacist as your partner in health?	Always	40 (59.7)	1.72±1.01	Always	42 (62.7)	1.58±0.87	0.201	0.13
	Often	12 (17.9)		Often	14 (20.9)			
	Seldom	9 (13.4)		Seldom	8 (11.9)			
	Never	6 (9.0)		Never	3 (4.5)			
If you utilise these services, will you be willing to pay a fee for them?	Always	46 (68.7)	1.51±0.88	Always	44 (65.7)	1.48±0.77	0.784	0.03
	Often	12 (17.9)		Often	16 (23.9)			
	Seldom	5 (7.5)		Seldom	5 (7.5)			
	Never	4 (6.0)		Never	2 (3.0)			

During the face-to-face interviews, participants had the opportunity to raise questions. There were 27 questions asked that were categorised as:

- Side-effect related (n=8, 29.6 %)
- Medicine use related (n=8, 29.6 %)
- Disease related (n=7, 25.9 %)
- Pharmacy services related (n=4, 14.9 %)

Responses were compared for different age groups, members of medical aids/ not, the amount of chronic conditions present at the time, preferred language and marital status. There were no statistically or practically significant differences or associations in these sub-groups.

8 Discussion

The results of the study indicated that the expectation of the elderly study population had expectations in terms of pharmaceutical services were not met, in fact, that they were statistically and practically significantly different from their actual experiences. The participants indicated that they were willing to pay for pharmaceutical services. Being ambulatory, literate pensioners, they have the time, money and ability to comprehend pharmaceutical care and the value of pharmaceutical services, yet they did not receive these expected pharmaceutical services.

In 2014, South Africa had 54 million citizens (Statistics South Africa, 2015), 3 080 registered community pharmacists and 920 institutional pharmacists (SAPC, 2015). The public healthcare system is responsible for the health of 85 % of the population (Mayosi et al., 2012) which means that private healthcare is only responsible for 15 % of the population. The majority of the participants in this study (n=41, 62.7 %) procured chronic, acute and over-the counter medicines from community pharmacies.

Health-related quality of life is defined by the World Health Organization as “a state of complete physical, mental, and social well-being not merely the absence of disease” and this includes the subjective measure of a “feeling of wellbeing” (WHO, 1997). Pharmacists have the responsibility not only to dispense medicines but to contribute to the improved health-related quality of life in the patient (Volume et al.,

2001). The elderly has more chronic diseases than younger generations, and they therefore need pharmaceutical services to service their specific medicine-related needs (Mangoni & Jackson, 2004).

The pharmacist experiences several barriers in the supply of pharmaceutical services. Pharmacists are trained to supply pharmaceutical services, yet they are mainly remunerated on product sales rather than services (SAPC, 2010). In 2012, only 25 % of the healthcare funders in South Africa considered the pharmacist as a valuable member of the healthcare professional team[48]. In the same year the Pharmacy Act (53 of 1974) was amended to introduce a fee-for-service model for several pharmaceutical services (South Africa, 1974). The only statistically and practically significant association in this study was that the population has and will be willing to pay for healthcare services at the pharmacy (p =0.201 and d =0.03). Yet, even in this population, there was a lack of supply of pharmaceutical services.

The root of the discrepancies between patient experience and expectations for a pharmacist may well be pharmacists themselves. New attitudes, confidence about their abilities and the understanding of their role in patient care can restore the professional image of the pharmacist in the eyes of the community and motivate the pharmacist to be an active member of the healthcare team (Shu Chuen Li, 2003).

9 Conclusions, limitations & recommendations for future research

Pharmacy, and specifically community pharmacy, is a dynamic profession. It developed from a medicine-selling, compounding, advisory profession to an interactive, individual-patient focused service industry. The community pharmacist should focus on the health-related quality of life of the individual patient (Kelly, 2012). Pharmacists need to identify the immediate healthcare needs of their specific community, with specific reference to vulnerable populations like the elderly. The pharmacist should be in a position to address these needs and become the go-to healthcare professional.

One of limitations of this study was that the study population was a high-income elderly population. The study can therefore not be generalised to the general elderly population in South Africa. The participants were also only English and/or Afrikaans speaking, therefor the study cannot be generalised across all the language groups. The population included only ambulatory participants, which prevents generalisation across the frail and handicapped elderly. The researcher depended on the perception of the participant with respect to their experiences and expectations of pharmaceutical care, which may have introduced recall bias.

Further studies amongst all language groups will be more generalisable. Other urban, independent and/or inner city old-age home studies will provide an interesting comparison in terms of pharmaceutical care needs and expectations. The research can also be extended to independently living elderly in a rural environment.

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3.3 Chapter summary

In this chapter, the objectives of the empirical study were reached and reported in two manuscripts. The population chosen has time and money to invest in their healthcare and yet their experiences of pharmaceutical services and pharmaceutical care shows that their expectations are not met.

CHAPTER 4: CONCLUSIONS AND RECOMMENDATIONS

This chapter contains conclusions to the literature study, as well as conclusions reached from the empirical investigation. The limitations of the study are discussed and recommendations are made.

4.1 Conclusions: Literature review

4.1.1 Objective 1:

Define the scope of practice of a pharmacist, locally and internationally and discuss pharmaceutical care as part thereof.

Table 4-1 shows that the scope of practice for pharmacists globally includes both pharmaceutical services and pharmaceutical care.

In South Africa, the scope of practice of the pharmacist includes both pharmaceutical services and pharmaceutical care (Pharmacy Act 53 of 1974). Pharmacy practice is underpinned by a philosophy of safe, rational and appropriate medicine usage (SAPC, 2010:2). The retail pharmacist fulfils the role of a cost-effective, affordable and accessible health educator (McGann, 2012:1; Shimane, 2013:620). The pharmacist, as medicine supplier, has a responsibility to assist in medicine management, education and care, to the greater benefit of the whole society (Wiedenmayer *et al*., 2006:9).

Pharmaceutical care was defined by Hepler and Strand (1990: 539) and Strand *et al.* (1992:549) as “the responsible provision of drug therapy for the purpose of achieving definite outcomes which improve the patient’s quality of life”, with the patient and patient: pharmacist relationship as the central concept. The South African Pharmaceutical Care Association (PCMA South Africa, 2014) prescribes to the international principles of pharmaceutical care: promoting successful therapeutic outcomes in managed care in a professional healthcare team. As far back as 1996, Bellingan and Wiseman (1996:24) advocated the promotion of pharmaceutical care as a primary goal for pharmacists. In 1999 researchers established that money and lives could be saved by pharmaceutical care interventions by pharmacists (Bernsten *et al*., 2001:75).

Table 4-1: Scope of practice of pharmacists in USA, South Africa, Canada and Australia

USA (Giberson *et al*., 2011:18)	South Africa (SAPC, 2010:227)	Canada (CPhA, 2015:1)	Australia (PSA, 2010:3)
Pharmaceutical care for selected patients	Take responsibility for the medicine-related needs of a patient, and make sure these needs are met (pharmaceutical care)	Prescribe drugs independently or in collaboration with other healthcare professional	Optimise health outcomes and minimise adverse drug reactions (pharmaceutical care)
Ensure control, preparation and availability of drugs	Preparation, distribution and supply of drugs	Therapeutically substitute drugs (pharmaceutical care)	Custodians of drugs
Supply healthcare information	Pharmaceutical research	Adapt or manage prescribed drugs	Preparation and distribution of drugs
Primary healthcare: disease prevention through public health education	Primary healthcare: promotion of public health in order to ensure general health	Order and interpret laboratory tests	Supply primary health care: educate the public to prevent disease
Ensure appropriate drug use through patient education	Registration of any drug	Administer vaccines	

Pharmaceutical care is recognised as an integrated function in the scope of practice of a pharmacist in South Africa (Bellingan & Wiseman 1996:26; Bernsten *et al*., 2001:75; Gous, 2011:1; Malan 2015:6) as well as internationally (Hepler & Strand 1990:539; WHO, 1988:7: Bootman *et al*., 1997:2089).

In South Africa, SAQA (South African Qualifications Authority, 2015) makes provision for pharmaceutical care as part of the registered qualification of the Bachelor of Pharmacy degree. Every pharmacist will leave the University as a qualified pharmaceutical care provider. This is in line with the British, American (USA), Singaporean, Australian and EU (European Union) qualification authorities for pharmacist's education (HMDOH, 2008:46; Wiedenmayer *et al*., 2006:25; National University of Singapore, 2015; PSA, 2010:64; European Commission, 2015).

The International Pharmaceutical Federation (FIP) supports the view that pharmacists should supply pharmaceutical care to promote improved health-related quality of life to patients (Wiedenmayer *et al*., 2006:25). This can be done as a public health service, or to individual patients. FIP regards pharmaceutical care as an integral part of the scope of practice of a pharmacist (Wiedenmayer *et al*., 2006:38).

4.1.2 Objective 2:

Determine the challenges in supplying pharmaceutical care internationally and locally, with specific focus on the elderly.

In South Africa, the Older Persons Act (13 of 2006) defines the elderly as males over 65 years of age and women over 60 years of age. In the United States of America, the elderly is defined as a citizen of sixty years or older (USA, Older Americans Act, 1965). The WHO supports the United Nation's definition of an elderly person as somebody of 60 years and older (WHO, 2014:1). For the purposes of this study, the elderly was defined as a person ≥65 years of age.

Table 2-1 gives an overview of the pharmaceutical care challenges as experienced in South Africa and it shows that similar challenges is experienced internationally.

A basic element of pharmaceutical care is that the pharmacist takes responsibility for rational drug use and improved health-related quality of life in the individual patient (Segal, 1997:47). Focus should be on identifying the frail, non-adherent, multidrug and/or multimorbid patient and applying pharmaceutical care to improve their health and reduce their adverse drug reactions (Franklin & van Mil, 2005:137). This study showed that this sample population did not receive such care.

Some of the challenges in supplying pharmaceutical care to an elderly population are described below:

- **Multiple healthcare professionals:** Elderly patients with multi-morbidities visit several healthcare practitioners that can result in polypharmacy, which in turn leads to adverse drug reactions (Nobili *et al.*, 2011:30; Salive, 2012:75; Woo & Leung, 2014:925). This study found that the primary healthcare professional was the general practitioner (n=55, 82.1%). Visits to the primary healthcare professional were twice a year, mainly routine visits for existing chronic diseases (n=36, 38.8%). Only eight participants (11.9%) visited two healthcare professionals in the past year, while no participant visited more than one healthcare professional in the past year.
- **Misunderstood role of pharmacists**: Physicians perceive pharmacists as medicine providers instead of members of the healthcare team. In most countries

this misconception is a barrier to the provision of pharmaceutical care (Sancar *et al*., 2013:245; Akram *et al*., 2012:318; Sánchez & de las Mercedes, 2013:1237; Mmuo *et al*., 2013:207). Pharmacists themselves consider pharmaceutical care training to be lacking (Scheerder *et al.,* 2008; Uema *et al*., 2007:214). Improved public education regarding the positive impact of pharmaceutical care on health related quality of life will increase the demand for pharmaceutical care (Akram *et al.,* 2012:321). In this study it was shown that the expectations of this sample population with regards to pharmaceutical care was not met:

Assessment phase (p=<0.001, d>1.01)

Care plan phase (p<0.001, d>1.41)

Follow-up phase (p<0.001, d>1.26)

- **Lack of remuneration:** The pharmaceutical care process is hampered by a lack of remuneration (Jones *et al*., 2005:1530). Resources, government policy and inadequate infrastructure further add to insufficient pharmaceutical care (Stiglingh, 1999:2; Gertner, 2010:120; Ghazal *et al*., 2014:68). If the public understand the role of pharmaceutical care in ongoing health related quality of life it would in turn motivate healthcare funders to improve remuneration for these services (Shu Chuen Li, 2003:95; Mushunje, 2012:134). This sample population, however showed willingness to pay for pharmaceutical care services (p=0.201 and d=0.03).

4.1.3 Objective 3

Determine the value and impact of pharmaceutical care to the elderly.

Pharmaceutical care programmes reduce the risk of adverse drug reactions in the elderly and improves compliance (Nash *et al.,* 2000: 3; Obreli-Neto *et al*, 2011: 649), leading to improved health-related quality of life in these patients. An increasing elderly population lead to an increase in frailty, multimorbidity and polypharmacy (Nobili *et al*., 2011:30) and therefore require individual attention to prevent drug-drug interactions and adverse drug reactions (Woo & Leung, 2014:925). One in four elderly Americans suffer from more than one chronic disease, and are prescribed multiple medicines, increasing their risk of treatment failure and death (Benjamin, 2010:626). In South Africa 51.8 % of the population over 50 years of age suffers from more than one chronic disease (Phaswana-Mafuya *et al.,* 2013:54). The benefits of pharmaceutical care and the positive effect of pharmaceutical care on the health-related

quality of life in patients with chronic conditions, and specifically the elderly, was proven in several studies (Hepler & Strand, 1990: 542; Mostert 2007; Strand *et al*, 2004:3989).

Pharmaceutical care:

- Resolves drug-therapy failures (Chua *et al.,* 2012:388)
- Improves compliance and adherence to treatment regimens (Tumkur *et al*., 2012:285; Drew & Scott, 2015:3)
- Reduces the incidence of adverse drug reactions (Jaehde *et al*., 2008:168; Liekweg *et al*., 2012:2677)
- Improves health-related quality of life (Dauti *et al.,* 2014:313-318; Milligan *et al*., 2015:1631-1641)
- Leads to a decrease in healthcare costs (Sabatè, 2003:2; Strand *et al*., 2004:3989)
    - Reduced hospitalisations (Boeckxstaens & De Graaf, 2011:363)
    - Reduced "hoarding" of medicines (Ayers *et al*., 2015:143)
    - Reduced amount of unnecessary drugs (Benjamin, 2010:626)
    - Reduced inappropriate prescribing (Galagher *et al*., 2007:114; Liu & Christensen, 2002:847; Cahir *et al*., 2010:543)
    - Reduced unnecessary and inappropriate over-the-counter medicine use (Bushardt & Jones, 2005:39).
    - Improves rational medicine use (Fried *et al*., 2008:1840)

The importance of pharmaceutical care as an essential element to establish healthcare professional therapeutic relationships and to improve the care given to the elderly was shown in a study by De Lyra *et al*. (2007:189).

4.2 Conclusions: Empirical study

4.2.1 Background information

The demographic information of the study population included 61.2 % female participants (n=41). The age group mostly represented was 70 - 79 years of age (n=40, 59.9 %). The general South African population over 65 years of age consists of more females than males (Statistics South Africa, 2011:27). The population was predominantly English speaking (n=50, 74.6%), which corresponds with South African statistics. In 2011, 77 % of wealthy South Africans spoke English as mother language (Statistics South Africa, 2011:65). Thirty-eight of

the participants were married (56.7 %, 26 were widowed (38.9 %) and three were divorced (4.5 %). Medical aid members were well represented (n=60, 89.6 %) and 86.6 % (n=58) had at least one chronic condition. This is higher than the South African average for this age group in 2011, where only 51.8 % of persons over 60 years of age reported a chronic condition.

To determine their perception of their own health a subjective question was asked: “Do you perceive your own health as: ‘Poor’, ‘Average’ or ‘Good’? The majority of the participants, 71.7 % (n=48) perceive themselves to be in “good health”.

The amount of chronic conditions reported are listed in the table below:

Table 4-2: Amount of chronic diseases reported

Amount of chronic diseases per participant	**n (%)**
None	8 (11.9 %)
One	21 (31.3 %)
Two	16 (23.9 %)
Three	15 (22.4 %)
Four	3 (4.5 %)
Five	4 (6.0 %)

There was no difference for chronic disease between genders ($p>0.05$). In this study, only four participants (6.0 %) took five medicines, while nobody took more than five. In the USA, it was found that 12 % of people over 65 years of age, took 10 or more medicines (Woodruff, 2010:3). In a Canadian study, elderly patients use an average of 15 medicines per day (Farrell *et al*., 2011:169).

The majority of participants use a specific retail pharmacy as the chronic medicine provider (n=39 58.9 %), and “any” retail pharmacy was used by three (4.5 %) of participants. Courier pharmacy delivered chronic medicine to 14 of the participants (20.9 %), while five (7.5 %) received their chronic medicines from a dispensing doctor and four (6.0 %) use a public hospital.

Medicine for acute and minor ailments were mainly obtained from specific retail pharmacies (n=36, 53.7 %) and “any” retail pharmacy (n=24, 35.8 %). Dispensing doctors supplied

medicines to three participants (4.5 %), two participants (3.0 %) used general stores and only one (1.5 %) participant used a public hospital for general medicines.

Community pharmacy was the primary provider of chronic medicines in this sample population.

General practitioners were the healthcare professional of choice for 55 (82.1%) of the participants. Private specialists (n= 12, 17.9 %), public hospital doctors (n=6, 9.0 %) and nurses in private clinics (n=1, 1.5 %) were the other primary healthcare professionals used by this population. The healthcare professional of choice is visited annually by six (9.0%) of the participants, twice a year by 26 (38.8 %), three times a year by 16 (23.9 %) and more often than three times per year by 18 (26.9 %) of the participants. The medicine usage of the study population: the amount and types of medicines used is shown in Table 4.3.

Table 4-3: Amount and type of medicines used

Type of medicine (n=378)	Amount of participants using this n (%)
Cardiovascular/ Blood pressure medicine	100 (26.5 %)
Vitamins and mineral supplements	73 (19.3 %)
Pain/ Arthritis medication	32 (8.5 %)
Cholesterol	29 (7.7 %)
Acute medicine e.g.: antibiotics	27 (7.1 %)
Other conditions	25 (6.6 %)
Anxiety/ Sedatives	23 (6.1 %)
Diabetes	21 (5.6 %)
Gastro-intestinal treatments	16 (4.2 %)
Hypothyroidism	9 (2.4 %)
Asthma/ COPD	7 (1.9 %)
Antidepressants	6 (1.6 %)
Hormone replacement therapy	5 (1.3 %)
Osteoporosis treatments	3 (0.8 %)
Laxatives	2 (0.5 %)

The information above shows a discrepancy to the chronic disease profiles of the elderly South Africans as reported by Steyn *et al*. (2006:211) which is lists cardiovascular disease first, then obstructive pulmonary disease, hypertension and diabetes mellitus. In contrast this population primarily used medicines for cardiovascular disease and hypertension, then vitamin and mineral supplements, followed by pain and arthritis medicines.

The study requested permission for the researcher to view all medicines in the participant's dwelling. The medicines were presented and the following observations were made:

- Expired medicines: n=8, 11.9%
- Incorrect labels: instructions, storage conditions and warnings: n=3, 4.5 %
- Medicines from third parties (other patients), not originally intended for use by this participant: n=1 (1.5 %)
- Excess of chronic medicines (hoarding): n=1 (1.5 %)
- Medicines stored in appropriate conditions: n=66 (98.5 %)

The conclusion is that this population is careful with their medicines, unlikely to interchange medicines with each other and are cognisant of storage conditions and expiry dates.

The results of the study show no specific demographic preferences for pharmacies/ pharmacists, expect that both male and female participants would prefer to see the same pharmacist with every visit (male: n=13, 50 %, female: n=25, 61.0 %).

A total of 27 questions were raised by the participants after completing the questionnaire. They were related to the side effects of medicines (n=8, 29.6 %), the use/ effect of medicines (n=8, 29.6 %), disease information (n=7, 25.9 %) and pharmaceutical services (n=4, 14.9 %). The few questions raised, could indicate recall bias in their reporting of pharmaceutical services experiences.

4.2.2 Objective 1

Determine the pharmaceutical care experiences and expectations for a specific elderly population.

This objective was addressed by Manuscript 1 which forms part of Chapter 3.

All the aspects of all three phases of pharmaceutical care are examined (See Manuscript 1: Tables I, II and III). There are statistically and practically significant differences in all the

aspects of all three phases of pharmaceutical care: the assessment phase, the care-plan phase as well as the follow-up phase. This population did not experience pharmaceutical care from their chronic medicine suppliers. They did indicate an expectation of such care. Bernstein *et al*. (2011:161) found the benefit from a pharmaceutical care programme amongst the elderly to be the participants' gain of knowledge regarding their medicines and use thereof. In this study, the population did not receive the pharmaceutical services and pharmaceutical care they expected. Their expectations of pharmaceutical services were statistically and practically significantly different from their actual experiences. The participants were willing to pay for pharmaceutical services. Being ambulatory, literate pensioners, they have the time, money and ability to comprehend pharmaceutical care and the value of pharmaceutical services, yet they did not receive it. Let us reflect again that the majority of the participants (n=41, 62.7 %) procured chronic, acute and over-the counter medicines from community pharmacies, where these services could be available.

This study highlights the shortcomings in the healthcare system to utilise pharmaceutical care to ensure rational and optimum medicine use in the elderly. Patient satisfaction with pharmacists' services increases with successful implementation of pharmaceutical care (Volume *et al*., 2001:415).

Pharmacists should not only dispense medicines, but also contribute to the improved health-related quality of life in the patient (Volume *et al*.,2001:412). The elderly has more chronic diseases than younger generations, and therefore needs pharmaceutical services that includes pharmaceutical care, to meet their specific medicine-related needs (Mangoni & Jackson, 2004:10; Bressler & Bahl, 2003:1565; Skowron *et al*., 2011:111).

4.2.3 Objective 2:

Determine the reported experiences and expectations of pharmaceutical services in a specific urban elderly population.

This objective was addressed by Manuscript 2 which forms part of Chapter 3:
Determine the healthcare and pharmaceutical services experiences at other healthcare practitioners, as reported by the study participants and compare it to the reported experiences of the participants at pharmacies.

All the pharmaceutical services showed statistically significant differences (p<0.05). See Manuscript 2, Table III. Effect size shows statistical association between only three of the pharmaceutical services at the pharmacy and other healthcare professionals (d≥0.08), which indicates that, at both, they were questioned on whether they were using any chronic medicines (d=0.26). An association between the instructions on medicine storage conditions (d=0.26) and the supply of written information about their conditions and/or their medications (d=0.42) also exists. These results could indicate insecurity regarding medicine use: Modig *et al*. (2012: 46) found that in the elderly, lack of information regarding medicines from their healthcare professional may cause anxiety in the elderly patient.

Determine the pharmacy-related experiences and expectations as reported by the study population.

Pharmacy-related experiences include the layout of the pharmacy and the general appearance, identification and accessibility of pharmacy personnel. See Manuscript 2, Table IV. Dependent *t*-tests were used to determine statistically and practically significant differences of the pharmacy-related experiences vs their expectations in this population. The biggest practically significant difference was found to be their expectation for a private/ semi-private counselling area (d=0.76), their desire to identify the pharmacist on duty with ease (d=0.55) and their expectation of sufficient seating while they wait to be served (d=0.50). There was no difference in responses from male and female respondents in this study. In Malaysia (Nagashekara *et al.,* 2012:142) 82 % of the general population were adequately satisfied with pharmacy-related experiences.

Determine the medicine-related experiences and expectations at their pharmacies as reported by the study population.

The interaction between the patient and the pharmacist was examined. Manuscript 2, Table V shows statistically and practically significant differences between the medicine-related experiences and expectations of these participants. It was found that they want to receive information about the effect of other medicines on their chronic condition/ medicines (d=1.94). They also expect to be asked about medicines left over from previous issues (d=1.77), and whether they suffer from any other chronic conditions (d=1.69). Kaae *et al*. (2012:856), interviewed customers at retail pharmacies in Denmark and found that only 42.9 % of them expected to be questioned

when purchasing medicine. In Nigeria (Oparah & Kikanme, 2006:509) it was found that consumers were satisfied with their pharmacists' professional and counselling service but they were not satisfied with the provision of the other services in community pharmacy. This study indicates that the elderly expects their medicine-related needs to be met and highlights an opportunity for the community pharmacist to explore new and existing services to enhance consumer loyalty.

Determine the healthcare-related experiences and expectations as reported by the study population, at their pharmacy.

Manuscript 2, Table VI, shows that there are statistically and practically significant differences in all the aspects of pharmacy health-related needs. The only statistically and practically significant association was their willingness to pay for healthcare services at the pharmacy *(p*=0.201 and *d*=0.03). This correlates with a study in Texas, USA (Xu, 2002:1283), where elderly patients, primarily using a single community pharmacy, showed a high rate of satisfaction with pharmaceutical services. In Australia (Peterson *et al*. 2010:674) and in Oman (Jose *et al*., 2015:639) patients expected community pharmacy to offer healthcare services.

The following conclusions can be reached from this study:

Kaae *et al*. (2012:860) suggested that pharmacists take the “when”, “where” and ”how-to” into consideration when they offer consultations on medicines and treatment regimens. In South Africa, pharmacy is an interactive, individual-patient focused service industry. The community pharmacist should focus on the health-related quality of life of the individual patient (Kelly, 2012:3; Grobbelaar, 2011:48). Pharmacists need to identify the immediate healthcare needs of their specific community, with specific reference to vulnerable populations like the elderly. Pharmacists should be in a position to address these needs and establish themselves as the “go-to” healthcare professional.

4.3 Limitation of this study

- The study population is a high-income elderly population therefore it cannot be applicable to the general elderly South African population.

- The inclusion criteria were for English and/or Afrikaans speaking persons, therefor the study cannot be generalised across all the language groups.

- This population included only ambulatory participants, which excludes the frail and handicapped elderly.

- Face-to-face interviews depended on the perception and recall of the participant with respect to their experiences and expectations of pharmaceutical services and pharmaceutical care, which may introduce recall bias.

4.4 Recommendations

Pharmacists experience several barriers in the supply of pharmaceutical services.

Remuneration:

Pharmacists are trained to supply pharmaceutical services, yet they are mainly remunerated on product sales rather than services (SAPC 2015:2; Mushunje 2012:134; Kassam 1996:402). In 2012, only 25 % of the healthcare funders in South Africa considered the pharmacist as a valuable member of the healthcare professional team (Mushunje *et al*. 2012:135). There was a statistically and practically significant association in this population in terms of willingness to pay for healthcare services at the pharmacy (p=0.201 and d=0.03), yet there was a lack of comprehensive pharmaceutical services. This study showed that is a willingness to pay for services, and pharmacists should explore this avenue.

Pharmacist expectations:

The root of the discrepancies between patient expectations and what they experience from a pharmacist, may well be the pharmacists themselves. New attitudes, confidence about their abilities, and the understanding of their role in patient care can restore the professional image of the pharmacist in the eyes of the community, and motivate the pharmacist to be an active member of the healthcare team (Shu Chuen Li, 2003:95; Mushunje, 2012:134).

De Castro & Correr (2007:1493) suggest that pharmacist education be focused on pharmaceutical care as well as the other pharmaceutical services.

Patient education/ awareness (Ellis *et al.*, 2000:1515; Mason, 2011:497):

It is also possible that patients are not aware of the pharmaceutical care process and the advantages it holds for their health-related quality of life. This study highlights the shortcomings in utilising pharmaceutical care to ensure rational and optimum medicine use in this population.

An action to be taken is that the public should be informed of the benefits of pharmaceutical care.

Further studies of the pharmaceutical care experiences and expectations amongst the elderly from all language groups, and different financial strata will supply a bigger picture of pharmaceutical care experiences and expectations in South Africa.

Similar studies in urban, independent and/ or inner city old-age homes will provide an interesting comparison in terms of pharmaceutical care needs and expectations. The research can also be extended to independently living elderly in a rural environment.

The study population is a high-income elderly population therefore it cannot be applicable to the general elderly South African population.

The inclusion criteria were for English and/or Afrikaans speaking persons, therefor the study cannot be generalised across all the language groups.

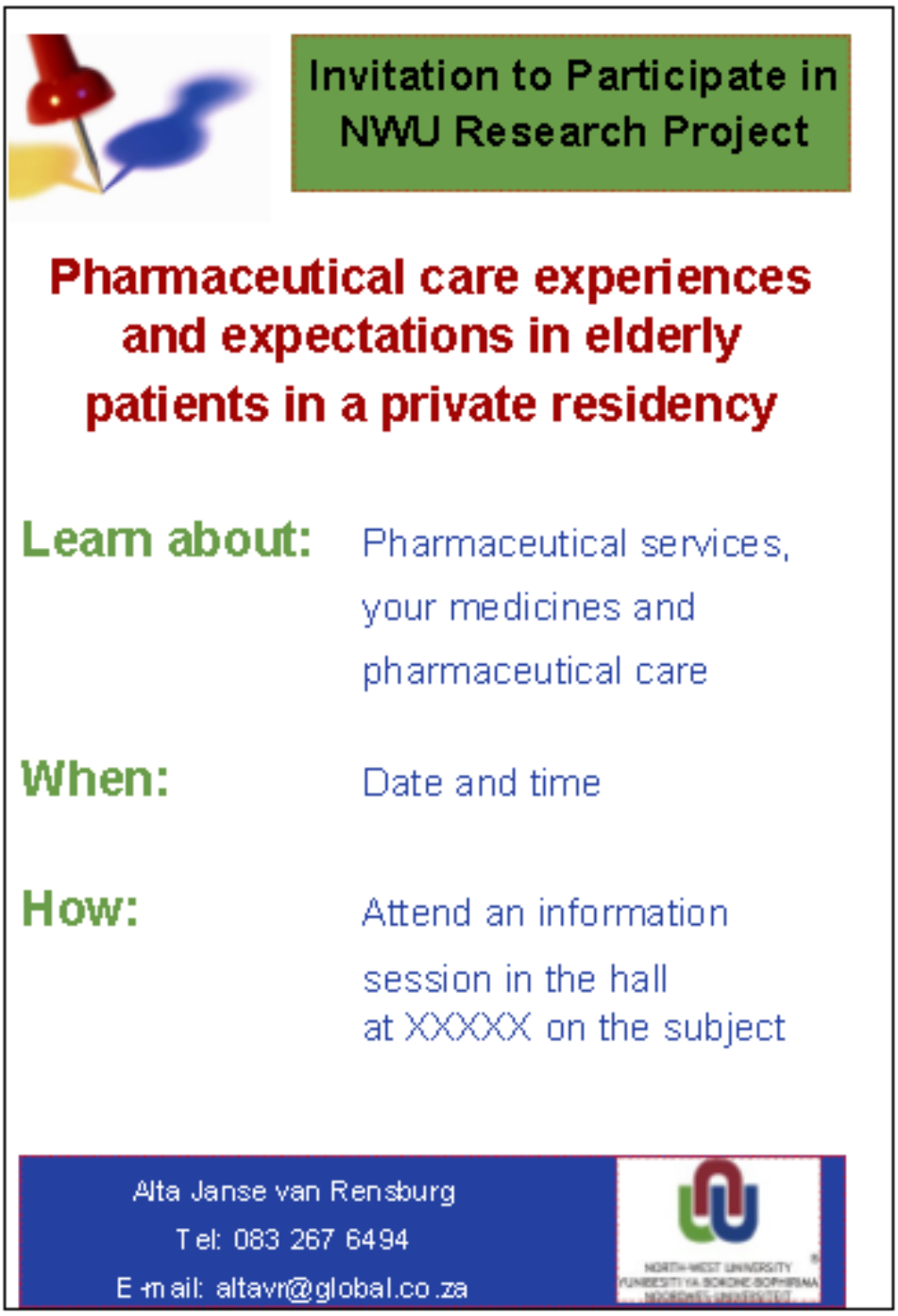
This population included only ambulatory participants, which excludes the frail and handicapped elderly.

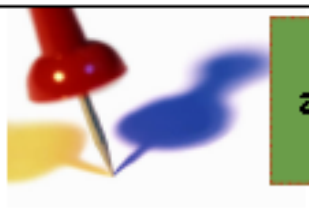
Face-to-face interviews depended on the perception and recall of the participant with respect to their experiences and expectations of pharmaceutical services and pharmaceutical care, which may introduce recall bias.

4.5 Chapter summary

In this chapter, the objectives of the literature and empirical studies were discussed and conclusions made from the results of these investigations. Recommendations were made based on these conclusions. This chapter also addressed the limitation of this study and made suggestions for future investigations.

ANNEXURE A: INVITATION TO RESIDENTS TO ATTEND AN INFORMATION SESSION





Uitnodiging om deel te neem aan 'n NWU-navorsingsprojek

Farmaseutiese sorgervarings en verwagtinge van ouer persone woonagtig in privaat residensie

Leer van: Farmaseutiese dienste, u eie medikasie en farmaseutiese sorg

Waneer: Datum en plek

Hoe: Woon 'n inligtingsessie by in die saal te XXXXX en neem deel aan 'n persoonlike onderhoud met die navorser

Alta Janse van Rensburg
Tel: 083 267 6494
E-pos: altavr@global.co.za

ANNEXURE B: AGENDA FOR CONTACT AND INFORMATION SESSION WITH RESIDENTS

Agenda

Initial contact and information meeting with retirement residence residents

Introduction of the researcher

Brief overview of study

Explain PHARMACEUTICAL CARE

Explain inclusion and exclusion criteria

Explain sampling procedure – not everyone can participate in the study

Explain informed consent and freedom to withdraw from study

Explain structured questionnaires

Explain confidentiality, anonymity and placement of box

Indicate the time limit to submit informed consent forms (signed/not signed)

Supply date of sample selection

Supply period wherein participants will be contacted for appointments

Explain administration of questionnaires

Assure residents that information is for RESEARCH purposes only

Explain the role of the Ethics Committee and study leaders

Explain responsibilities of the researcher

Explain expected benefits to participants

Explain possible risks

Supply contact details

Answer possible questions regarding research process

Agenda

Aanvanklike kontak- en inligtingsessie met inwoners van die residensie
Die navorser stel haarself voor

Studie-oorsig in breë trekke

Verduideliking van FARMASEUTESE SORG

Verduidelik in- en uitsluitingskriteria

Verduidelik steekproefprosedure – nie almal kan aan die studie deelneem nie

Verduidelik ingeligte toestemming en die reg om van die studie te onttrek

Verduidelik vooropgestelde vraelyste

Verduidelik vertroulikheid, anonimiteit en plasing van die boks

Dui die tydsverloop aan vir plasing van vorms in boks

Verskaf datum van steekproefneming

Verskaf tydgleuf waartydens deelnemers vir afsprake gekontak sal word

Verduidelik die prosedure vir die afneem van die vraelyste

Verduidelik dat alle inligting slegs vir NAVORSINGsdoeleindes is

Verduidelik die rol van die Etiekkomitee en studieleiers

Verduidelik verantwoordelikhede van navorser

Verduidelik die verwagte voordele van die studie

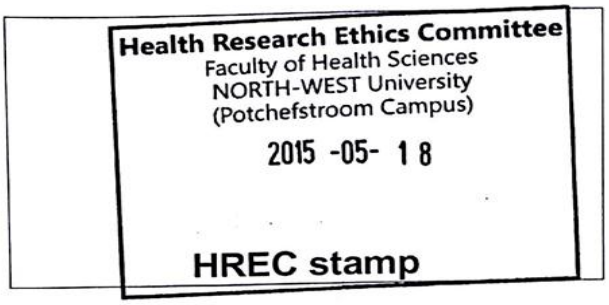
Verduidelik moontlike risiko's

Verskaf kontakbesonderhede

Antwoord vrae in verband met navorsingsproses

ANNEXURE C: INFORMATION LEAFLET AND INFORMED CONSENT

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOM CAMPUS



PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM FOR RESIDENTS OF GLENZICHT

TITLE OF THE RESEARCH PROJECT:

Pharmaceutical care experiences and expectations in elderly patients in a private residency

REFERENCE NUMBERS: NWU-00036-15-S1

PRINCIPAL INVESTIGATOR: Alta Janse van Rensburg

ADDRESS: 18 Witstinkhout Street, Bassonia, Ext1, Johannesburg

CONTACT NUMBER: Cell phone: 0832676494

You are being invited to take part in a research project that forms part of my dissertation for an MPharm degree at the North-West University (NWU) Potchefstroom Campus. Please take some time to read the information presented here, which will explain the details of this project. Please ask me any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Furthermore, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study **at any point**, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee of the Faculty of Health Sciences of the North-West University (NWU-00036-15-S1)** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki and the ethical guidelines of the National Health

Ethics Council. It might be necessary for the research ethics committee members or relevant authorities to inspect the research records.

- **What is this research study about?**
  - *This study will be conducted at your residence and will involve participation in a face-to-face interview with the researcher trained in using a structured (pre-set) questionnaire form. Eighty participants will be included in this study.*
  - *The objectives of this research are:*

    The general research aim of this study is to determine the experiences and expectations of pharmaceutical care in an urban elderly population.
    - *Pharmaceutical care is a process of meeting your medicine-related needs and problems in a responsible way. The goal of pharmaceutical care is to ensure that medicines are used in a sensible way to reduce, prevent or cure diseases. The aim of pharmaceutical care is to improve a patient's quality of life by fine-tuning medicine use to eliminate adverse reactions (like allergies or unexpected side-effects), medicine-interactions (when 2 or more medicines interact with each other in an unfavourable manner) and the unnecessary use of medicines.*
    - *Life expectancy in South Africa has increased from 47 years in 1960 to 60 years in 2012. This indicates that the elderly population will increase steadily every year.*
    - *The elderly has specific needs when it comes to medicine use. The way medicines are absorbed into the body, distributed throughout the body, and the manner in which the body utilises and excretes medicines differ between healthy youngsters, healthy elderly patients and the frail elderly person. Elderly persons also suffer from more chronic diseases and need more medicines than persons under the age of 50. This leads to a bigger chance of adverse reactions as well as a bigger chance of interactions between medicines.*
    - *The pharmacist is the healthcare provider with the most skill to prevent these effects and can anticipate drug-drug interactions in order to prevent them from happening.*
    - *The study is important as it will highlight the extent to elderly people experience pharmaceutical care, and to what extent they expect pharmaceutical care from their healthcare providers.*
    - *This study will enable the researcher to share the information gathered during this study, with other healthcare professionals, in order to improve the rational (correct medicine in the correct dosage for the correct disease) use of medicines in the elderly.*

Why have you been invited to participate?

- *You have been invited to participate because you reside at this specific residence.*

- *You must be available for an interview with the researcher in a selected time frame which will be indicated*
- *You have also complied with the following inclusion criteria:*
  - *You are a male or female over 65 years of age.*
  - *Able to provide informed consent.*
  - *You are not bedridden.*
  - *Able to communicate in English or Afrikaans.*
  - *Responsible for own medication procurement and administration.*
  - *Willing to be interviewed in own residence or at the clinic on the premises of the residence.*
  - *Willing to allow the interviewer access to their medications.*
  - *It does not matter where you procure your medicine. It may be from any available source: Private or chain pharmacies, government hospitals or clinics, dispensing doctors or military facilities*
- *You will be excluded if you are not a resident of this specific residence, or move to another location during the course of the study.*

- **What will your responsibilities be?**

  - *You will be expected to be available for a face-to-face interview at your residence or at the clinic, as per appointment that will be set up, if you decide to participate. The interview will be confidential and private, and no observer or interpreter will be present. The interview will be conducted by the researcher.*
  - *At this interview, you must be willing to show the researcher all the medicine you are taking at that stage. This is for research purposes only.*

- **Will you benefit from taking part in this research?**

  - *The direct benefits for you as a participant will be:*
  - *This study would not have specific direct benefits for the participants, however, the study will contribute to the enrichment of knowledge is the following aspects*
    - *Raised awareness of pharmaceutical care.*
    - *Awareness of pharmaceutical care will lead to better compliance and improved health literacy, which will, in turn, reduce unnecessary over-the-counter medicine use. Studies have proven that pharmaceutical care reduces hospital admissions due to adverse drug reactions and medicine interactions.*
    - *Pharmaceutical care reduces the number of drug-related problems and improves quality of life.*
    - *Pharmaceutical care reduces inappropriate medicine use. Continued assessment of your medicines and how to use it will improve your quality of life.*
    - *Continued pharmaceutical care is associated with maintaining quality of life. Participating in this study will increase your knowledge about pharmaceutical care and what to expect from your pharmacist.*

- *The researcher will attempt to address any medicine-related questions arising from the interview. This will be a private opportunity for the participants to raise medicine-related questions to a pharmacist.*

- *The indirect benefits will be:*
  - *A dissertation by the researcher on the subject, towards an MPharm degree in Pharmacy Practice at the North-West University.*
  - *The study will contribute to article(s) in peer-reviewed journals on the subject of the experiences and expectations of pharmaceutical care in an elderly population. This will, in turn, increase the awareness among healthcare professionals of the need of pharmaceutical care.*
  - *The researcher will present the results to a meeting of the local branch of the Pharmaceutical Society of South Africa, in order to create new awareness among pharmacists on the subject of pharmaceutical care, and particularly with a focus on the elderly.*
  - *The researcher will deliver a conference presentation on the subject, to reflect on the state of pharmaceutical care among the elderly in South Africa.*

- **Are there risks involved in your taking part in this research?**

  - *The risks in this study and the precautions taken are:*

Feeling of vulnerability when questioned about their diseases and medicines?	Assure the participant of anonymity, and his/her right to withdraw from the study at any chosen time. At this time, it will also be important to reassure the participant that his/her medicines will be listed for research purposes only
Privacy invaded?	The face-to-face interview will be conducted in the participant's own dwelling. No interpreter will be present:
Conflict of interest?	It will be stated at the initial contact session as well as at the start of the interview that no questions are intended to criticise the participant and/or his/her medicine prescriber or supplier. No answers will be traceable to the participant.
Professional conflict?	The residents procure their medicines independently from various sources. The nursing sister is a resident and she refers residents with other healthcare problems to their own doctors and specialists. The sister is aware of the research and introduced the researcher to the residents' committee. The committee has indicated a positive interest in the research, and has supplied written consent for the study to be conducted at this residence. No foreseen professional conflict.

  - *The benefits outweigh the risk.*

- **What will happen in the unlikely event of some form of discomfort occurring as a direct result of your taking part in this research study?**
  - *Should you have the need for further discussions after the face-to-face interview, an opportunity will be arranged for you to speak to the researcher or study leaders.*

- **Who will have access to the data?**
  - *Anonymity will be ensured:*
    The signed informed consent forms will be collected in a sealed box in the clinic at the residence. The box will be placed on today and collected by the researcher 14 days after this initial contact and information session. All forms and other data will be stored in a safe, secure locked area. (See DATA below.)
  - *Confidentiality will be ensured by:*
    Having the face-to-face interview in the private area you indicated.
    Reporting of findings will be anonymous by the researcher. The findings will be reported as percentages and portions. NO person will be mentioned by name.

  DATA:
  Only the researchers and the study leaders will have access to the personal data. Data will be entered into spreadsheets that contain no identifiable personal details of the participants.

  Forms will be kept safe and secure by locking hard copies in locked cupboards in the researcher's office and for electronic data it will be password protected.
  Once the data capturing process is completed, the forms will be moved to the research entity, Medicine Usage in South Africa (MUSA) at the NWU, Potchefstroom Campus. These documents will be kept for the regulatory five to seven years, where after the documents will be dealt with as per NWU policy.
  All electronic data related to this study will be protected on the personal (not shared), password protected computer of the researcher.
  Electronic files will also be stored in disk space, dedicated for research data, at MUSA. The confidentiality of this disk space will comply with NWU, Potchefstroom Campus policy.
  The face-to-face questionnaire forms will have NO data that could identify the participant.
  The research statistics, results and research report will not disclose any information that can link the participants to the study.
  The electronic data will be saved onto a memory stick, which will be kept in a safe in the office of the study leader and at the MUSA.

Will you be paid to take part in this study and are there any costs involved?

No you will/will not be paid to take part in the study, but refreshments will be served at this initial contact meeting, as well as at the feedback meeting, once the study is completed. There will therefore be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

- You can contact Alta Janse van Rensburg at cell phone number: 0832676494 if you have any further queries or encounter any problems.
- You can contact the Health Research Ethics Committee via Mrs Carolien van Zyl at 018 299 2094; carolien.vanzyl@nwu.ac.za if you have any concerns or complaints that have not been adequately addressed by the researcher.
- You will receive a copy of this information and consent form for your own records.

How will you know about the findings?

- The findings of the research will be shared with you by the researcher at a feedback meeting as soon as the study is completed.

Declaration by participant

By signing below, I ……..……. agree to take part in a research study entitled: Pharmaceutical care experiences and expectations in elderly patients in a private residency.

I declare that:

- I have read this information and consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions to the researcher and all my questions have been adequately answered.
- I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) .....…….. On (*date*) ……...….. 20….

....

Signature of participant **Signature of witness**

I would like to participate in the face-to-face interview at: (Tick the relevant option please)

My residence …….(Tick if YES)	At the clinic ……(Tick if YES)

➢ **Declaration by researcher**

I *Alta Janse van Rensburg* declare that:

- I explained the information in this document to ……..
- I encouraged him/her to ask questions and took adequate time to answer them.
- I am satisfied that he/she adequately understands all aspects of the research, as discussed above.
- I did not use an interpreter.

Signed at (*place*) .....….....…….. on (*date*) ……...….. 20....

....

Signature of researcher **Signature of witness**

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT
POTCHEFSTROOM CAMPUS

Health Research Ethics Committee
Faculty of Health Sciences
NORTH-WEST University
(Potchefstroom Campus)
2015 -05- 18
HREC-stempel

INLIGTING- EN TOESTEMMINGSBROSJURE VIR DEELNEMERS AAN STUDIE TE GLENZICHT

STUDIETITEL:

Farmaseutiesesorgervarings en verwagtinge van ouer persone in 'n privaat residensie

VERWYSINGSNOMMERS: NWU-00036-15-S1

HOOF NAVORSER: Alta Janse van Rensburg

ADRES: Witstinkhoutstraat 18, Bassonia, Ext1, Johannesburg

KONTAKNOMMER: Selfoon: 0832676494

U word uitgenooi om deel te neem aan 'n navorsingsprojek wat deel vorm van my verhandeling vir my MPharm-graad aan die Potchefstroomkampus van die Noordwes-Universiteit, NWU. Neem asseblief 'n paar minute om hierdie inligting te lees. Dit sal die besonderhede van hierdie projek verduidelik. U is welkom om vrae aan my te stel indien u nie alles verstaan nie. Dit is baie belangrik dat u die omvang van die navorsing ten volle verstaan. Hierdie brosjure sal ook verduidelik hoe u betrokke kan wees by hierdie navorsingsprojek. Onthou, u deelname is **volkome vrywillig** en dit staan u vry om nie deel te neem nie. Daar sal geen gevolge vir u wees as u sou kies om nie deel te neem nie. As u egter wil deelneem, is u welkom om steeds **te enige tyd** van die studie te onttrek.

Hierdie studie is goedgekeur deur die Gesondheidsnavorsingsetiekkomitee van die Fakulteit Gesondheidswetenskappe van die NWU (NWU-00036-15-S1). Die studie sal geskied volgens riglyne en beginsels soos voorgeskryf deur die internasionale Deklarasie van Helsinki en die etiese riglyne van die Nasionale

Gesondheidsnavorsingsetiekkomitee. Dit mag nodig wees vir die navorsingsetiekkomiteelede of relevante gesagsliggame om die navorsingsrekords na te gaan

- **Wat behels hierdie navorsingstudie?**
  - *Hierdie studie sal by hierdie residensie gedoen word en sal 'n persoonlike onderhoud met die navorser behels. Die navorser is opgelei om met 'n vooropgestelde vraelys vrae te vra. Tagtig deelnemers sal aan hierdie studie deelneem.*
  - *Die breë doel van die navorsing is om die farmaseutiesesorgervarings en verwagtinge van ouer persone in 'n privaat residensie te bepaal. Farmaseutise sorg is 'n proses waar u medisyne verwante behoeftes en medisyne verwante probleme op 'n verantwoordelike manier aangespreek word. Die doel van farmaseutiese sorg is om te verseker dat medisyne verantwoodrdelik gebruik word om siektetoestande te verbeter, te voorkom of te genees. Farmaseutiese sorg het ten doel om medisyne-interaksies (waneer 2 of meer medisynes met mekaar reageer on 'n ongewenste reaksie te veroorsaak) en ongewenste medisyne reaksies (soos allergieë en onverwagte newe-effekte) en die onnodige gebruik van medisynes uit te skakel deur die kontinue assessering van u medisyne gebruik.*
    - *Lewensverwagting in Suid Afrika het toegeneem van 47 jaar in 1960 tot 60 jaar in 2012. Dit is 'n aanduiding dat daar elke jaar meer en meer ouer persone sal wees.*
    - *Ouer persone het spesifieke medisyne-verwante behoeftes.Die absorpsie vanmedisyne in die liggaam, distribusie deur die liggaam en die manier waarop die liggaam medisyne verwerk en uitskei medisyne in ouer persone is anders as die in jong, gesonde persone, en ook ander as in verswakte ouer persone. Ouer persone het ook meer kroniese siektes, en gebruik meer medisyne as persone jonger as 50 jaar. Dit is 'n aanduiding dat ouer persone meer geneig sal wees tot ongunstige medisyne reaksies. Hulle sal ook makliker medisyne-interaksies ervaar.*
    - *Die apteker is die gesondheidsorgwerker met die beste vermoë om ongunstige medisyne reaksies te voorkom en om medisyne-interaksies te voorsien en te verhoed.*
    - *Hierdie studie is belangrik want dit sal die ware farmaseutiese sorg ervaring wat u gemeenskap ontvang uitlig. Dit sal ook lig werp op die farmaseutiese sorg verwagting van u gemeenskap.*
    - *Hierdie studie sal die navorser die geleentheid gee om die inligting wat tydens hierdie studie versamel word, met ander aptekers en gesondheidsorgwerkers te deel en sodoende 'n positiewe bydrae te lewer tot rationele (korrekte medisyne in korrekte dosering vir korrekte siekte-toestand) medisyne gebruik in ouer persone.*

- **Hoekom is u genooi om deel te neem?**

- *U is genooi omdat u spesifiek woonagtig is by hierdie residensie.*
- *U moet beskikbaar wees vir ’n onderhoud met die navorser gedurende soos gereel sal word*
  - *U voldoen ook aan die volgende vereistes:*
    - *U is 65 jaar of ouer.*
    - *U is in staat om ingeligte toestemming te gee.*
    - *U is mobiel.*
    - *U kan Afrikaans praat.*
    - *U is verantwoordelik vir u eie medisyne-aankope en -toediening.*
    - *U is gewillig om in u eie eenheid of in die kliniek ’n onderhoud toe te staan.*
    - *U is gewillig om al die medisyne wat u tans neem, aan die navorser te toon.*
    - *Dit maak nie saak waar u medisyne bekom nie. Dit mag enige bron wees: Privaat of ketting apteke, regeringshospitale of –klinieke, resepterende dokters of militêre hospitale of klinieke.*

    - *U sal uitgesluit wees indien u nie ’n inwoner van hierdie residensie is nie, of as u tydens die studie verhuis.*

Wat sal u verantwoordelikhede wees?

- *Daar sal van u verwag word om ’n persoonlike onderhoud toe te staan aan die navorser, in u eie eenheid, of in die kliniek op die datum soos gereël sal word, indien u besluit om deel te neem. Die onderhoud sal privaat en konfidensieel wees. Geen toesighouer of tolk sal teenwoordig wees nie. Die onderhoud sal deur die navorser gedoen word.*
- *Tydens hierdie onderhoud moet u gewillig wees om al die medisyne wat u op daardie datum neem, aan die navorser te toon.*

- **Sal u enige voordeel ontvang deur deel te neem aan hierdie studie?**

  - *Direkte voordele aan u as deelnemer:*
  - *Hierdie studie hou geen direkte voordele as sulks vir u nie, maar dit sal wel bydra tot beter kennis en ingligting aangaande die volgende:*
    - U sal hernieude bewustheid ten opsigte van farmaseutiese sorg hê.
    - Bewustheid van farmaseutiese sorg lei tot beter medisynegebruik en beter gesondheidskennis. Hierdie inligting sal weer teweeg bring dat u minder onnodige oor-die-toonbank-medikasie gebruik. Daar is ook met navorsing bewys dat hierdie kennis lei tot minder ongewenste medisynereaksies en ook minder hospitaliserings as gevolg van medisyne-interaksies.
    - Farmaseutiese sorg verminder die hoeveelheid medisyne-verwante probleme en verbeter dus lewensgehalte.
    - Farmaseutiese sorg verminder ongewenste medisyneverbruik. Volgehoue assessering van u medisyne, en hoe om dit te gebruik, sal dus tot beter lewensgehalte bydra.
    - Konstante farmaseutiese sorg dra by tot die handhawing van lewensgehalte. Deur aan hierdie studie deel te neem, verbeter u u kennis oor farmaseutiese sorg en wat om van u apteker te verwag.

- Die navorser sal probeer om u medisyne-verwante vrae, wat onstaan tydens die onderhoud, tydens die onderhoud te beantwoord,. Dit is ’n geleentheid om in privaatheid medisyne-verwante vrae aan ’n apteker te kan stel.

- *Indirekte voordeel sal wees:*
  - ’n Verhandeling, wat sal bydra tot ’n MPharm in Apteekpraktyk, sal deur die navorser behaal word.
  - Hierdie studie sal lei tot artikels oor die onderwerp in eweknie-geëvalueerde joernale. Hierdie artikels sal op hul beurt weer die aandag van gesondheidsorgverskaffers vestig op die noodsaaklikheid van farmaseutiese sorg, veral onder ouer persone.
  - Die navorser sal die uitslag van die studie aan die plaaslike tak van die Suid-Afrikaanse Aptekersvereniging voorlê om die apteker, spesifiek, se aandag te vestig op die behoefte van ouer mense aan farmaseutiese sorg.
  - Die navorser sal ’n konferensievoorlegging doen oor die onderwerp en sodoende die kalklig stel op farmaseutiese sorg onder ouer mense in Suid-Afrika.

- **Is daar risiko’s verbonde aan my deelname?**
  - *Die risiko’s en voorsorg lyk soos volg:*

U mag uitgelewer voel as u uitgevra word oor u medisynes en siektetoestande.	Ons verseker u van anonimiteit en u reg om te enige tyd van die studie te onttrek. Ons verseker u ook dat die medisyne slegs vir navorsingsdoeleindes gelys word.
U mag voel dat u privaatheid geskend word.	Die persoonlike onderhoud word in u eie eenheid/ die privaatheid van die kliniek gehou. Geen tolk of toesighouer is teenwoordig nie.
U mag voel dat daar belangekonflik is.	Ons sal in die aanvanklike kontaksessie, sowel as tydens die onderhoud, weer noem dat geen kritiek bedoel word met ons vrae nie. Geen kritiek teenoor u of u gesondheidsorg verskaffer sal gelewer word nie. Hierdie vrae is bloot vir navorsing en sal nie na u toe kan teruggelei word nie.
Is daar professionele konflik?	U as inwoners skaf u medisyne aan van verskeie bronne. Die verpleegster by die kliniek is ’n inwoner van die oord. Sy verwys steeds inwoners na hul onderskeie dokters en spesialiste toe. Die suster is bewus van die navorsingsprojek en het die navorser aan die inwonerskomitee voorgestel. Die komitee is positief oor die navorsingsprojek en het ook geskrewe toestemming verskaf vir die studie by hierdie aftreeoord. Geen professionele konflik word voorsien nie.

  - *Die voordele is meer as die moontlike risiko.*

- **Wat gebeur indien daar moontlik tog ’n mate van ongemak is as gevolg van my deelname aan hierdie studie?**
  - *Indien u ’n behoefte het aan verdere bespreking na die persoonlike onderhoud met die navorser, sal daar vir u gereël word om weer met die navorser, of studieleiers in gesprek te tree.*

- **Wie het almal toegang tot die data?**
  - *U sal verseker wees van anonimiteit:*
    Die getekende ingeligte toestemmingsvorms sal in ’n *geseëlde boks versamel word. Hierdie boks sal in die kliniek geplaas word na vandag se kontak sessie. Die boks met getekende vorms sal deur die navorser self gehaal word 14 dae na hierdie aanvanklike kontaksessie. Alle vorms en ander papier-data sal in ’n veilige, toegesluite area bewaar word. (Sien DATA hieronder.)*
- *Vertroulikheid word verseker deur:*
  Private, persoonlike onderhoud met die navorser op die afgesonderde plek van u keuse.
  Die resultate van die studie sal deur die navorser bekend gemaak word sonder dat ENIGE persoonlike besonderhede van die deelnemers gesien kan word.
- *DATA:*
  Slegs die studieleiers en die navorser sal toegang hê tot die persoonlike data. Data van die persoonlike onderhoude sal in tabelle ingelees word sonder enige persoonlike identifiseerbare inligting.
  Vorms sal veilig bewaar word in ’n toegesluite kas in die navorser se kantoor en alle elektroniese data sal met wagwoorde beskerm word.
  Sodra die datavaslegging deur die navorser voltooi is, word die vorms gestuur na die navorsingsentiteit, Medisynegebruik in Suid-Afrika (MUSA) op die Potchefstroomkampus van die Noordwes-Universiteit. Hierdie dokumente sal vir die voorgeskrewe vyf tot sewe jaar geberg word, soos deur die beleid van die NWU bepaal.
  Alle elektroniese data wat met hierdie studie verband hou, sal op die navorser se persoonlike (nie-gedeelde) rekenaar gestoor word en met wagwoorde beskerm word.
  Elektroniese data sal ook by MUSA geberg word op disk-spasie wat vir navorsingsdata geoormerk is. Die vertroulikheid van hierdie disk-spasie voldoen aan die NWU-beleid.
  Die vooropgestelde vorms vir die persoonlike onderhoud het GEEN spasie vir persoonlike data wat die deelnemer kan identifiseer nie.
  Die navorsingstatistiek, -resultate en -verslag sal geen inligting verskaf wat die deelnemers identifiseerbaar maak nie.
  Die elektroniese data sal ook op ’n datastokkie gestoor word. Die stokkie sal op ’n veilige plek in die studie-leier se kantoor, by MUSA, gestoor by word.

Word u betaal vir deelname, en is daar enige kostes vir u?
Nee, u sal nie betaal word vir u deelname nie, maar daar sal verversings bedien word by die aanvanklike kontaksessie, sowel as by die terugvoergeleentheid. Daar is geen kostes vir u sak as u sou deelneem nie.

Is daar enige iets anders wat u moet weet of doen?

- U kan vir Alta Janse van Rensburg kontak by selfoonnommer, 0832676494 indien u enige verdere navrae het, of as u ’n probleem ondervind.
- U kan die Gesondheidsorgetiekkomitee via mev Carolien van Zyl by 018 299 2094 kontak of via carolien.vanzyl@nwu.ac.za indien u enige klagtes of bekommernisse het wat nie deur die navorser aangespreek is nie.

- U sal ’n afskrif van hierdie inligting- en toestemmingsvorm ontvang vir u eie rekords.

Hoe sal ek weet wat die resultate van die studie is?

- Die resultate van die studie sal aan u deurgegee word deur die navorser. ’n Terugvoersessie sal gereël word sodra die studie afgehandel is.

Verklaring deur deelnnemer
Deur hieronder te teken, verklaar ek, ……..…… my bereidwilligheid om deel te neem aan die studie genaamd: Farmaseutiesesorgervarings en -verwagtinge van ouer persone in ’n privaat residensie

Ek verklaar dat:

- Ek hierdie inligting- en toestemmingsvorm gelees het en dat dit geskryf is in ’n taal wat ek vlot praat en verstaan.
- Ek geleentheid gehad het om vrae aan die navorser te stel en dat al my vrae bevredigend beantwoord is.
- Ek verstaan dat my deelname aan hierdie studie **vrywillig** is en dat geen druk op my uitgeoefen is om deel te neem nie.
- Ek mag kies om die studie ter enige tyd te verlaat sonder enige negatiewe nagevolge.
- Ek mag deur die navorser gevra word om die studie te verlaat as dit in my beste belang is, of as ek nie die studieplan volg soos aanvanklik ooreengekom nie.

Geteken te (*plek*) .....…..…….. op (*datum*) …...…….. 20....

....
Handtekening van deelnemer **Handtekening van getuie**

Ek sal graag aan die persoonlike onderhoud wil deelneem te…(Tik asb u keuse)

My wooneenheid .....(Tik as JA)	In die kliniek .....(Tik as JA))

➢ **Verklaring deur navorser**
Ek, *Alta Janse van Rensburg, verklaar dat ek*:

- Die inligting in hierdie dokument aan ……verduidelik het.
- Ek het hom/haar aangemoedig om vrae te vrae en het voldoende moeite gedoen om hierdie vrae te beantwoord.
- Ek is tevrede dat hy/sy die aspekte van die navorsing, soos bo genoem, voldoende verstaan.
- Ek het nie ’n tolk gebruik nie.

Geteken te (*plek*) .....…….. op (*datum*) ……...…….. 20....

....
Handtekening van navorser **Handtekening van getuie**

ANNEXURE D: STRUCTURED INTERVIEW

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Medicine Usage in South Africa
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Structured interview (English)

A: Personal information

1. Gender	1. MALE	2. FEMALE		
2. Age (Year):	1. ≥60 to ≤69	2. ≥70 to ≤79	3. 79+	
3. Home language:	1. ENGLISH	2. AFRIKAANS	3. OTHER	
4. Marital status:	1. MARRIED	2. DIVORCED	3. WIDOWED	4. OTHER
5. Member of a medical aid:	1. YES	2. NO		

B: General health

1. How would you evaluate your own health at the moment?

1. Excellent	2. Good	3. Average	4. Poor

Motivation: _____

2. Do you suffer from a chronic disease?	1. YES	2. NO

3. If yes, please indicate which. You can indicate more than one, if necessary.

1. Arthritis	
2. Hypertension	
3. Hypercholesterolemia	
4. Diabetes	
5. Hypothyroidism	
6. Depression	
7. Chronic obstructive pulmonary disease	
8. Asthma	
9. Other:	
10.	
11.	

4. Where do you obtain your chronic medicine? (Please tick if relevant, more than one may apply)

1. Courier pharmacy	2. Specific retail pharmacy	3. Different retail pharmacies
4. Public hospital	5. Dispensing doctor	6. Military hospital
7. Other		

5. Where do you obtain medicines for minor ailments? (Please tick if relevant)

1. Courier pharmacy	2. Specific retail pharmacy	3. Different retail pharmacies
4. Public hospital	5. Dispensing doctor	6. Military hospital
7. General shop/ Supermarket	8. Hospital outpatients	6. Friends and family

6. Do you have any medicine allergies?	1. YES	2. NO

7. Which? 1. _____

8. Other allergies? 1._____

9. Have you ever had an adverse reaction to medicine?	1. YES	2. NO

10. What happened? 1. _____

C: Physician information

1. Who is your primary healthcare professional? (Please tick if relevant)

1. General practitioner	2. Private specialist	3. Public hospital doctor	4. Nurse in private clinic
5. Military doctor	6. Specialist at public hospital	7 Military nurse	8. Other

3. How often do you visit this healthcare practitioner?

1. 1x per year	2. 2x per year	3. 3x per year	4. OTHER

D: Medicine information

1. Did you visit a pharmacy in the past year for…? (More than one may apply) (Please tick if relevant)

1. For chronic medicines	2. For OTC medicines	3. For acute prescription medicines	4. For advice
5. For advertised specials	6.Primary healthcare e.g. BP check	7.Other	8.OTHER

	Please tick the appropriate column	
Which medicines are you currently taking?	Everyday	For acute condition
1.	1.	2.
2.	1.	2.
3.	1.	2.
4.	1.	2.
5.	1.	2.
6.	1.	2.
7.	1.	2.
8.	1.	2.
9.	1.	2.
10	1.	2.
11.	1.	2.

3. Can you tell the difference between your medicines?	1. YES	2. NO

4. If you have a question about your medicine, who do you ask? (More than 1 may apply)

1 Doctor	2. Nurse	3. Pharmacist	4. Friend/Family	5. Other

5. Do you always remember to take your chronic medicines?	1. YES	2. NO

6. If not, what do you do then?

1._____

7. When you receive a prescription or medicine from your doctor, do they supply the following?

	Always 1	Often 2	Seldom 3	Never 4
1. Do they ask you about other medicines you take?				
2. Do they ask you about other medical conditions you have?				
3. Do they explain what medicine they are prescribing or supplying?				
4. Do they explain the purpose of the medicine?				
5. Do you understand the terminology they use?				
6. Do they explain to you how to take/use your medicine?				
7. Do they explain to you how to store your medicines?				
8. Do they explain possible side-effects and what to do if you experience them?				
9. Do you receive any brochures/written information about your medicine/disease?				

8. Observations (Condition of medicines, labelling, dosages, issue and expiry dates):

1. All medicines within expiry dates?	1. YES	2. NO
2. Medicines are labelled correctly?	1. YES	2. NO
3. Medicines are kept under correct conditions?	1. YES	2. NO
4. Medicines are intended for use by this participant?	1. YES	2. NO
5. Chronic medicines are dated for current month period?	1. YES	2. NO
6. Dosages on labels are appropriate?	1. YES	2. NO
7.	1. YES	2. NO
8.	1. YES	2. NO
9.	1. YES	2. NO
10.	1. YES	2. NO

E: Experience and expectation analysis

1: When you visit a pharmacy, do you prefer…

1.Pharmacist gender:	1.Male	2.Female	3. Indifferent	
2. Language:	1. Your home language		2. Any language you can understand	
3. Do you prefer the pharmacist to be:	1. Under 40 years	2. 40-50 years	3. 50+ years of age	4. Indifferent
4. Do you prefer to first speak to	1. Pharmacist	2. Pharmacist assistant	3. Front shop assistant	4. Indifferent
5. Do you prefer to see the same pharmacist with every visit?	1. YES	2. NO	3. Indifferent	
6. Do you prefer a pharmacy that supplies a delivery service?	1. YES	2. NO	3. Indifferent	

To the following questions please answer: Always, often, seldom or never.

Experience analysis					Expectation analysis			
Always 1	**Often 2**	**Seldom 3**	**Never 4**	**Question**	**Always 5**	**Often 6**	**Seldom 7**	**Never 8**
Do you receive this?				**2. When at the pharmacy (pharmacy and pharmacist-related needs):**	**Do you expect this?**			
				1. Is the person serving you identified with a name tag?				
				2. Can you identify (see who is) the responsible pharmacist on duty?				
				3. Are you given an opportunity to speak to the pharmacist regarding your medicine needs, even when you do not want to purchase anything?				
				4. Can the pharmacist sufficiently address your question?				
				5. Is there a private/semi-private area available for speaking to the pharmacist?				
				6. Is there sufficient seating space available for elderly persons while they wait for their medicines?				
				7. Do you prefer the pharmacy to have a delivery service?				
				8. Can you contact the pharmacist telephonically to discuss your medicine-related needs?				

Do you receive this?				3. When you purchase medicines at a pharmacy (medicine-related needs):	Do you expect this?			
				1. Are you questioned about other medicines you take?				
				2. Are you questioned about chronic diseases you have?				
				3. Are you questioned about allergies you might have?				
				4. Are you told what medicine you receive?				
				5. Do they tell you the purpose of the medicine?				
				6. Do you understand the terminology they use?				
				7. Do they tell you how to take the medicine?				
				8. Do they tell you how to store the medicine?				
				9. Are you told what to do if you skip a dose/take an extra dose by accident?				

				10. Are the possible side effects, and what to do about it, explained to you?				
				11. When you collect/receive chronic medicines, are you asked about medicines left over from previous issues?				
				12. Do you receive information on the effect that other medicines might have on your chronic medicines/condition?				
				13. Do you know who to ask if you have any questions regarding medicines?				
				14. Does the pharmacist help you to manage your medicine usage?				
				15. Do you receive any brochures/written information about your condition/medicine?				

Have you utilised this?				4. Pharmacy health services (Does your community pharmacy supply any of the following services?):	Would you utilise this?			
				1. Blood cholesterol monitoring?				
				2. Blood glucose monitoring?				
				3. Blood pressure monitoring?				
				4. Peak flow measurement??				
				5. Immunisation service, e.g. flu vaccinations?				
				6. A call-out service?				
				7. Pharmacist initiated therapy?				
				8. Urinalysis?				
				9. Administration of general injections as prescribed by your doctor				
				10. Liaise with your med aid or doctor to review/update your chronic medicine?				
				11. Pharmacist-assisted medicine use management?				
				12. Do you regard the pharmacist as your partner in health?				
				13. If you utilise these services, would you be willing to pay a fee for them?				

F: Pharmaceutical care analysis

Experience analysis					Expectation analysis			
Always 1	Often 2	Seldom 3	Never 4	Question	Always 5	Often 6	Seldom 7	Never 8
I do receive this				**Pharmaceutical care (To attempt to prevent possible side-effects, interactions and to get optimal results from treatment):**	**I do need this**			
				1. Assessment: Does your pharmacist, with every visit…				
				1. Assess your medication required?				
				2. Asses your current chronic medications and health history?				
				3. Assess your current acute medications?				
				4. Analyse your personal, medicine and disease information?				
				5. Identify potential and current drug-therapy problems?				
				6. Contact other health professionals if required?				
				7. Document your details and medicine information?				

Experience analysis					Expectation analysis			
Always 1	Often 2	Seldom 3	Never 4	Question	Always 5	Often 6	Seldom 7	Never 8
I do receive this				**Care plan (In conjunction with patient) and intervention**	**I do need this**			
2. Care plan: Does your pharmacist, with every visit…								
				1. Prioritise possible drug-therapy problems?				
				2. Set goals for your medical condition, prevention?				
				3. Set goal criteria for your treatment (e.g. reduce blood glucose to under 7)?				
				4. Does the pharmacist research your medicine and disease information if required?				
				5. Does the pharmacist suggest therapy as required?				
				6. If needed, does the pharmacist refer to other healthcare professionals?				
				7. Do you receive counselling about your medicines?				
				8. Are you provided with literature about your treatment/condition?				
				9. Are the care plan and interventions documented?				

Experience analysis					Expectation analysis			
Always 1	Often 2	Seldom 3	Never 4	Question	Always 5	Often 6	Seldom 7	Never 8
I do receive this				3. Follow-up	I do need this			
				1. Does the pharmacist contact you at agreed intervals after implementing a care plan?				
				2. Does the pharmacist contact you at agreed intervals after dispensing a new medicine to you?				
				3. Is the outcome of the care process determined and documented?				
				4. If goals are not met, is the care plan process repeated?				
				5. Do you know whether the follow-up process is documented by the pharmacist?				

G: Participant questions

1. Do you have any questions?

A: About your medicine?
1.
2.
B: About the study?
1.
2.
C: About any other health matter?
1.
2.

Thank you for your participation!

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Tel: 018 018 299-2288
Fax: 018 0872314105
Email: martie.lubbe@nwu.ac.za

Vooropgestelde vraelys

A: Persoonlike inligting

1. Geslag:	1. MANLIK	2. VROULIK		
2. Ouderdom (Jaar):	1. ≥60 tot ≤69	2. ≥70 tot ≤79	3. 79+	
3. Huistaal:	1. ENGELS	2. AFRIKAANS	3. ANDER	
4. Huwelikstaat:	1. GETROUD	2. GESKEI	3.WEDUWEE/WEWENAAR	4. ANDER
5. Lid van mediese fonds:	1. JA	2. NEE		

B: ALGEMENE GESONDHEID

1. Hoe beskou u u eie gesondheid op die oomblik?

1. Uitstekend	2. Goed	3. Gemiddeld	4. Swak

Hoekom? _____

2. Het u ’n kroniese siekte?	1. JA	2. NEE

3. Indien ja, dui asseblief aan watter. U kan meer as een aandui indien nodig.

1. Artritis	
2. Hipertensie	
3. Hipercholesterolemie	
4. Diabetes	
5. Hipotiroïdisme	
6. Depressie	
7. Kroniese obstruktiewe lugwegsiekte	
8. Asma	
9. Ander:	
10.	
11.	

4. Waar verkry u kroniese medikasie? (Tik asb almal wat verband hou – meer as een is aanvaarbaar)

1. Koerier-apteek	2. Spesifieke kleinhandelsapteek	3. Verskeie kleinhandelsapteke
4. Staatshospitaal	5. Resepterende dokter	6. Militêre hospitaal
7. Ander		

5. Waar koop u medikasie vir minder ernstige siektes? (Tik asb almal wat verband hou))

1. Koerierapteek	2. Spesifieke kleinhandelsapteek	3. Verskeie kleinhandelsapteke
4. Staatshospitaal	5. Resepterende dokter	6. Militêre hospitaal
7. Algemene winkel/ Supermark	8. Hospitaal-buitepasiënte	6. Vriende en familie

6. Het u enige medisyne-allergieë?	1. JA	2. NEE

7. Watter? 1. _____

8. Enige ander allergieë? 1._____

9. Het u al 'n ongewenste reaksie op medisyne gehad?	1. JA	2. NEE

10. Wat het gebeur? 1. _____

C: Geneesheerinligting

1. Wie is verantwoordelik vir u primêre gesondheidsorg? (Tik asb alle verwante opsies)

1. Algemene praktisyn	2. Privaat spesialis	3. Dokter by staatshospitaal	4. Verpleegster by privaat kliniek
5. Militêre dokter	6. Staatspesialis	7 Militêre verpleegster	8.Ander

3. Hoe dikwels besoek u hierdie primêre gesondheidsverskaffer?

1. 1x per jaar	2. 2x per jaar	3. 3x per jaar	4.Ander

D: Medisyne inligting

1. Het u ŉ apteek besoek in die afgelope jaar vir…? (Tik asb alle relevante opsies)

1. Kroniese medisyne	2. ODT-medisyne	3. Akute voorskrifmedisyne	4. Raad
5. Spesiale geadverteerde aanbiedings	6. Primêre sorg bv. bloeddruklesing	7. Ander	8. Ander

	Tik asb die antwoord wat verband hou	
Watter medisyne neem u tans?	Daagliks	Vir akute siekte
1.	1.	2.
2.	1.	2.
3.	1.	2.
4.	1.	2.
5.	1.	2.
6.	1.	2.
7.	1.	2.
8.	1.	2.
9.	1.	2.
10	1.	2.
11.	1.	2.

3. Kan u die verskillende medisynes uitken?	1. JA	2. NEE

4. As u ’n vraag het i.v.m. medisyne, wie vra u? (Tik asb alles wat verband hou)

1 Dokter	2. Verpleegster	3. Apteker	4. Vriend/ Familie	5. Ander

5. Onthou u altyd om u kroniese medisyne te neem?	1. JA	2. NEE

6. Indien nie, wat doen u dan?

1._____

7. Indien u ’n voorskrif van u dokter ontvang, word die volgende bespreek?

	Altyd 1	Gereeld 2	Selde 3	Nooit 4
1. Vra hulle of u ander medisyne gebruik?				
2. Vra hulle uit i.v.m. ander siektetoestande wat u mag hê?				
3. Verduidelik hulle watter medisyne hulle voorskryf/verskaf?				
4. Verduidelik hulle die doel van die medisyne?				
5. Verstaan u die terme wat hulle gebruik?				
6. Verduidelik hulle hoe u die medisyne moet gebruik?				
7. Verduidelik hulle hoe die medisyne gebêre moet word?				
8. Verduidelik hulle moontlike newe-effekte en wat om te doen as u dit ervaar?				
9. Ontvang u enige brosjures/geskrewe Inligting i.v.m. u medisyne/siekte?				

8. Waarneming: (Toestand van medisyne, etikettering, dosering, resepteer- en vervaldatums)

1. Alle medisyne binne vervaldatums?	1. JA	2. NEE
2. Medisyne korrek geëtiketteer?	1. JA	2. NEE
3. Word medisyne korrek gebêre?	1. JA	2. NEE
4. Is die medisyne bedoel vir hierdie deelnemer?	1. JA	2. NEE
5. Is kroniese medisyne in hierdie maand uitgereik?	1. JA	2. NEE
6. Is die doserings op die medisyne relevant?	1. JA	2. NEE
7.	1. JA	2. NEE
8.	1. JA	2. NEE
9.	1. JA	2. NEE
10.	1. JA	2. NEE

E: ONDERVINDING EN VEWAGTING ANALISE

1: Indien u ’n apteek besoek verwag u…

1. Geslag van apteker:	1.Manlik		2.Vroulik	3.Maak nie saak nie
2. Taal:	1. My huistaal		2. Enige taal wat ek kan verstaan	
3. Verkies u die apteker se ouderdom as:	1. Onder 40 jaar	2. 40-50 jaar	3. 50+ jaar	4. Maak nie saak nie
4. Praat u eerder met:	1. Apteker	2. Apteker-assistent	3.Voorwinkel-assistent	4. Maak nie saak nie
5. Verkies u om elke keer met dieselfde apteker te praat?	1. JA		2. NEE	3. Maak nie saak nie
6. Verkies u ’n apteek wat aflewerings doen?	1. JA		2. NEE	3. Maak nie saak nie

Antwoord asb. die volgende vrae met: Altyd, Gereeld, Selde, of Nooit.

Ondervindingsanalise					Verwagtingsanalise			
Altyd 1	**Gereeld 2**	**Selde 3**	**Nooit 4**	**Vraag**	**Altyd 5**	**Gereeld 6**	**Selde 7**	**Nooit 8**
Ontvang u…?				**2. By die apteek (Apteek- en apteekverwante behoeftes):**	**Verwag u…?**			
				1. Het die persoon wat u help ŉ naamplaatjie aan?				
				2. Kan u sien (identifiseer) wie die verantwoordelike apteker is?				
				3. Kry u geleentheid om met die apteker te praat oor u medisynebehoeftes, al koop u nie medisyne nie				
				4. Beantwoord die apteker u vrae bevredigend?				
				5. Is daar ŉ privaat/semi-privaat area beskikbaar waar u met die apteker kan praat?				
				6. Is daar voldoende sitplek vir ouer persone terwyl hulle vir medisyne wag?				
				7. Verkies u dat die apteek ŉ afleweringsdiens het?				
				8. Kan u die apteker telefonies kontak indien u ŉ medisyne-verwante vraag het?				

Ontvang u…?				3. As u medisyne by die apteek koop (medisyne-verwante behoeftes):	Verwag u…?			
				1. Vra hulle of u ander medisyne neem?				
				2. Vra hulle of u aan enige kroniese siektes ly?				
				3. Vra hulle oor moontlike allergieë?				
				4. Verduidelik hulle watter medisyne u ontvang?				
				5. Vertel hulle u hoekom u die medisyne neem?				
				6. Verstaan u die terme wat hulle gebruik?				
				7. Verduidelik hulle hoe u die medisyne moet gebruik?				
				8. Verduidelik hulle hoe die medisyne gestoor moet word?				
				9. Verduidelik hulle wat om te doen as u vergeet/ekstra medisyne neem?				

				10. Verduidelik hulle moontlike newe-effekte en wat om te doen as u dit ervaar?				
				11. As u kroniese medisyne ontvang/gaan haal, vra hulle of u nog medikasie oor het van die vorige maand?				
				12. Ontvang u inligting i.v.m. die uitwerking van ander medisyne op u kroniese medisyne/siekte?				
				13. Weet u wie om te vra indien u enige medisynenavraag het?				
				14. Help die apteker u met u medisyneverbruik-bestuur?				
				15. Ontvang u enige brosjures/geskrewe inligting i.v.m. u medisyne/siekte?				

Het u al hierdie gebruik?				4. Apteek se gesondheidsdienste (Het u gemeenskapsapteek enige van die volgende?):	Sou u hierdie wou gebruik?			
				1. Bloed-cholesterol-monitering?				
				2. Bloed-glukose-monitering?				
				3. Bloeddruk-monitering?				
				4. Piekvloei-meting?				
				5. Immunisasie dienste bv.: griepinspuitings?				
				6. Na-ure-uitroepdiens?				
				7. Apteker-geïnisieerde terapie?				
				8. Urienanalise				
				9. Algemene inspuitdiens vir medisyne deur jou dokter voorgeskryf?				
				10. Skakel met mediese fonds of dokter om kroniese medisyne te hersien/opdateer?				
				11. Apteker help met medisynegebruiksbestuur?				
				12. Beskou u die apteker as u vennoot in gesondheidsorg?				
				13. Indien u hierdie dienste gebruik, sal u bereid wees om ’n fooi daarvoor te betaal?				

F: FARMASEUTIESE SORG-ANALISE

Ondervindingsanalise					Verwagtingsanalise			
Altyd 1	Gereeld 2	Selde 3	Nooit 4	Vraag	Altyd 5	Gereeld 6	Selde 7	Nooit 8
Ontvang ek…				**Farmaseutiese sorg (voorkoming van moontlike newe-effekte, interaksies en om optimale resultate te behaal met medisyne behandeling):**	**Het ek 'n behoefte aan…**			
1. Bepaling: Met elke besoek, doen u apteker…								
				1. Assesseer die medisyne wat u nodig het?				
				2. Assesseer u huidige kroniese medisyne en gesondheidsgeskiedenis?				
				3. Assesseer u huidige akute medisyne?				
				4. Analiseer u persoonlike-, medisyne- en siekte-besonderhede?				
				5. Identifiseer potensiële en huidige medisyne-terapie-probleme?				
				6. Kontak ander gesondheidsorgverskaffers indien nodig?				
				7. Dokumenteer u besonderhede en medisyne?				

Ondervindingsanalise					Verwagtingsanalise			
Altyd 1	Gereeld 2	Selde 3	Nooit 4	Vraag	Altyd 5	Gereeld 6	Selde 7	Nooit 8
Gebeur…				**2. Sorgplan (in samewerking met pasiënt) en ingrepe:**	**Het ek 'n behoefte aan…**			
				1. Word moontlike medisyne-terapie-probleme geprioriseer?				
				2. Stel ons doelwitte vir my siekte/voorkoming?				
				3. Stel ons doelwitte vir my behandeling (bv.: bloedsuiker moet < 7)?				
				4. Doen die apteker navorsing i.v.m. jou siekte/medisyne indien nodig?				
				5. Stel die apteker medisyne/ingrepe voor indien nodig?				
				6. Indien nodig, verwys die apteker jou na ander gesondheidsorgverskaffers?				
				7. Ontvang u advies i.v.m. u medisyne?				
				8. Ontvang u brosjures/geskrewe Inligting i.v.m. u medisyne/siekte?				
				9. Word die sorgplan en ingrepe gedokumenteer?				

Ondervindingsanalise					**Verwagtingsanalise**			
Altyd 1	**Gereeld 2**	**Selde 3**	**Nooit 4**	**Vraag**	**Altyd 5**	**Gereeld 6**	**Selde 7**	**Nooit 8**
Ontvang ek…				**3. Opvolg**	**Het ek 'n behoefte aan…**			
				1. Kontak die apteker u gereeld in voorafbeplande tydgleuwe nadat 'n sorgplan ontwikkel is?				
				2. Kontak die apteker u gereeld in voorafbeplande tydgleuwe nadat nuwe medisyne aan u geresepteer is				
				3. Word die resultate van die sorgproses bepaal en gedokumenteer?				
				4. Indien die beplande resultate nie behaal word nie, word die sorgplan herhaal?				
				5. Weet u of die apteker die opvolg dokumenteer?				

G: Deelnemervrae

2. Het u enige vrae?

A: I.v.m. u medisyne?
1.
2.
B: I.v.m. hierdie studie?
3.
4.
C: I.v.m. enige ander gesondheidsaspek?
5.
6.

Baie dankie vir u deelname!

ANNEXURE E: PROOF OF SUBMISSION MANUSCRIPT 1

Dear Mrs Kotze,

Thank you for submitting your manuscript, "An elderly, urban population: experiences and expectations of pharmaceutical care", to Drugs & Aging

The submission id is: DRAA-D-16-00085
Please refer to this number in any future correspondence.

During the review process, you can keep track of the status of your manuscript by accessing the following web site:

http://draa.edmgr.com/

Your username is: Irma Kotze
Your password is: available at this link
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With kind regards,

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ANNEXURE F: PROOF OF SUBMISSION MANUSCRIPT 2

Dear Mrs. Kotzé,

We have received your article "An elderly, urban population: Their experiences and expectations of pharmaceutical services" for consideration for publication in Health SA Gesondheid-Journal of Interdisciplinary Health Sciences.
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ANNEXURE G: AUTHOR GUIDELINES: DRUGS AND AGING

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- Review Article - Word count up to 6000. Provides an authoritative, balanced, comprehensive, fully referenced and critical review of the literature.
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Reference citations in the text should be identified by numbers in square brackets. Some examples:

1. Negotiation research spans many disciplines [3].
2. This result was later contradicted by Becker and Seligman [5].
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- Book chapter

  Wyllie AH, Kerr JFR, Currie AR. Cell death: the significance of apoptosis. In: Bourne GH, Danielli JF, Jeon KW, editors. International review of cytology. London: Academic; 1980. pp. 251–306.

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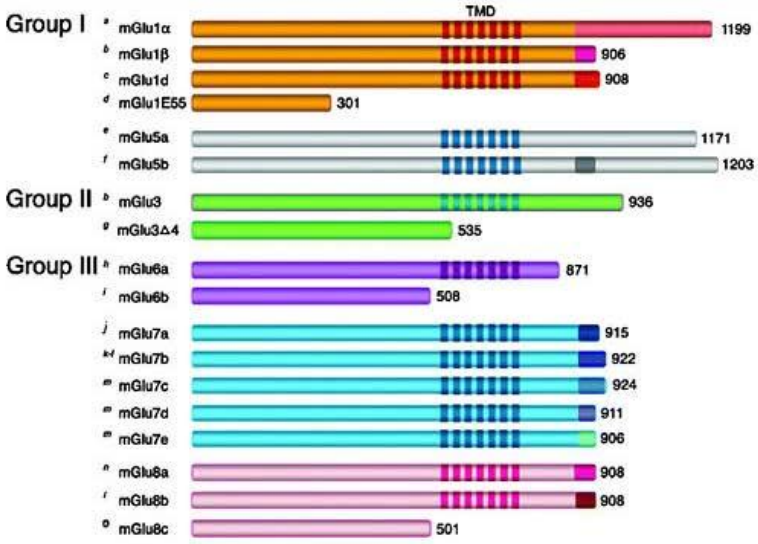

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AUTHOR INFORMATION PACK

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To Whom It Might Concern

CONFIRMATION OF LANGUAGE EDITING

I hereby confirm that I, Elzet Blaauw, have edited the dissertation *Pharmaceutical care experiences and expectation in elderly patients in a private residency* to be submitted in partial fulfillment towards the degree MPharm at the North-West University by Alta Janse van Rensburg.

In addition to editing, I have also suggested certain changes with regards to formulation. These suggestions and all changes have been done with the track changes function in MS Word and can be requested if necessary.

I confirm that I am a professional language practitioner. I have obtained an MPhil degree in translation and editing (cum laude, 2012) from Stellenbosch University and I have three years' experience editing postgraduate research documents.

Please do not hesitate to contact me with any further queries.

Kind regards

Elzet Blaauw