


# Indigenous safety measures of communally used plant medicine in a rural KhoiSan community

**SL Mashego**

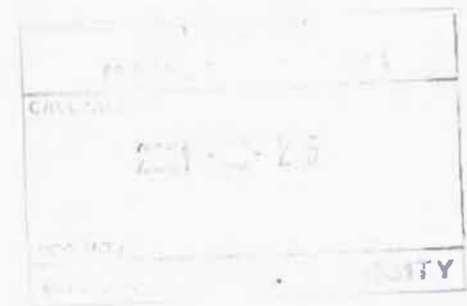
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## Declaration

I hereby solemnly declare that this dissertation presents work carried out by myself and to the best of my knowledge does not contain any material written by another person except where due reference is made. I declare that all sources used in this project are acknowledged in the reference list.



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Simangaliso Lesley Mashego

October 2018

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## Abstract

Medicinal plants play an integral part in meeting the health care needs of most of the African population, especially those in rural areas. Additionally, there is a growing demand for medicinal plants especially in urban areas “*because most conventional medicine does not work on most people who take them*” (Masango & Mbarika, 2015:49). Even though there is an increased demand for medicinal plants, the loss of oral platforms of transferring indigenous knowledge on the safe and correct use of plant medicine from practitioner to trainee or from parent to child, has resulted in this knowledge being known by fewer people. Therefore this increases the number of people who use plant medicine incorrectly and could lead to cases of adverse or acute poisoning. The purpose of this research was therefore to investigate indigenous safety measures of communally used plant medicine in a rural KhoiSan community in the Northern Cape.

In order to meet the aim and objectives of the research, an ethnobotanical research approach was followed where a quantitative descriptive design was adopted. Data on indigenous measures of ensuring safety of communally used plant medicine was collected through ethnographic methods such as semi-structured interviews and participant observation from 17 members of the KhoiSan Medicine Men Committee. The data was categorized and analysed using statistical formulae such as Frequency of Citation and Informant Consensus Factor.

The research focused on ten communally used medicinal plants and five of the ten medicinal plants were reported to be “strong” (*Sterk* in Afrikaans) and “less safe” by the participants. There was a high level of agreement from the participants because the Frequency of Citation revealed that five of the ten medicinal plants reported in this research received a 100% (17) citation. These plants were also found in the gardens or yards of all participants, plants such as Wilderkeur, Wildeals, Wynruit, Kruistemint and !Xobagabhe. Adding to the previously mentioned plants with a 100% FC, Bloudissel also received a 100% FC and was present in all the yards of the participants’ homes. Furthermore, in terms of assessing the level of agreement on the Informant Consensus Factor, Wildekeur displayed an ICF of 1 for cancerous illnesses and the same plant further displayed an ICF of 0.86 when used in combination with Wildeals and Wynruit to treat respiratory illness and 0.88 when combined with Rooistorm to treat renal illnesses. Another plant which displayed an ICF of 1 is Bloudissel for the treatment of STIs.



It was further identified that if these plant medicines that are referred to as strong and if consumed in high quantities they may cause adverse effects such as dizziness, vomiting, diarrhoea and poisoning. The safety measures identified in this research include the identification of the correct plant for a particular illness, use of the correct plant part, correct preparation methods, right dosage and storage.

In conclusion, this research confirmed that indigenous communities have measures employed to ensure the safety of the plant medicine they use to combat various illnesses and this research is one of a few researches to give focus on such aspects of African indigenous health. There is a paucity of research that acknowledge how indigenous communities ensure the safety of the medicinal plants they use and instead pharmacological studies disregard such measures, hence the contribution of this research.

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## List of Acronyms and Abbreviations

SA	South Africa
DST	Department of Science and Technology
IKS	Indigenous Knowledge Systems
IK	Indigenous Knowledge
KMMC	KhoiSan Medicine Men Committee
[NEMBA]	National Environmental Management: Biodiversity Act
PHC	Primary Health Care
WHO	World Health Organisation
WIPO	World Intellectual Property Organisation

# Chapter 1

## Overview of the Research

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### 1.1. Introduction to the Research

Plants have been a source of medicine used by communities around the world in the treatment of various illnesses and ailments since time immemorial (Das & Sarkhel, 2016:956). It has been established that approximately 80 percent of the developing world's population depend on medicinal plants for their primary health care needs (World Health Organisation [WHO], 2013:26). Peltzer and Pengpid (2015:210) concur with the previous statement by reporting that 80 percent of the rural Asian populations rely mainly on medicinal plants for their primary health care needs. And this is the same for African countries where medicinal plants are the main source of medicine used to control of illnesses in rural communities. Ndzimande *et al.* (2014:519) advances that most rural dwellers in Africa do not have access to conventional health care; hence they rely solely on their Indigenous Health Care Systems.

The above assertions highlight the fact that medicinal plants are an integral part of health care provision, especially for rural communities in Africa. For instance Mander *et al.* (2007:190) maintain that indigenous medicinal plants as part of African indigenous healthcare systems are the primary source of healthcare for more than 72 percent of South Africans. This popularity could be attributed to the fact that these plants are trusted for their natural therapeutic effects in the treatment of various ailments. Masango and Mbarika (2015:48-49) argue that there is a growing demand for medicinal plants, especially in urban areas “*because most conventional drugs do not work on most people who take them*” (Masango & Mbarika, 2015:49). Masango and Mbarika (2015:45) further contend that people in industrial countries such as the United Kingdom, United States of America and Canada spend billions of dollars on medicinal plants as part of the Complementary and Alternative Medicine because these have less or no side effects compared to conventional drugs.

This argument is supported by empirical evidence presented by Komoreng *et al.* (2017:12) that conventional drugs cannot treat some of the illnesses presented by people in South Africa. Such an illness is Lymphatic Filariasis, a disease characterized by thickening and

hardening of the skin due to accumulation of lymph. This disease is hard to treat in conventional medicine (Komereng *et al.*, 2017:12). Taaka (2016:82) has also confirmed the efficacy of a long trusted triple combination concoction used to treat common cold and influenza like symptoms through in vitro tests. It can be deduced from the above empirical reports that there is a shift from over-reliance on conventional drugs which have adverse side effects (Masango & Mbarika, 2015:45) to more natural therapies which have been trusted by indigenous communities since time immemorial. Additionally, these plants are more accessible than conventional drugs as they are cheaply found in informal *Muthi* markets, could be picked in the veld or cultivated at home and they are part of indigenous culture hence their high use, especially in the KhoiSan community (Davids *et al.*, 2016:762).

Therefore, according to the indications above, the worldwide increased use of medicinal plants is attributed to accessibility, affordability, strong link to culture and the fact that they are safer than conventional drugs with fewer reported side effects. However, this increased demand results in consumers buying herbal products or medicinal plants in *Muthi* markets or collecting plants in the veld for self-medication (Muweh, 2011:103) without having adequate information on their proper and systematic use. This is not only the reality of rural dwellers as Masango and Mbarika (2015:45-46) reported that the popularity of medicinal plants is increasing even in developed countries because people are looking for cheaper and safer medical alternatives. In contrast to the previous statement, Marcus and Grollman (2016:16) argue that the notion that medicinal plants are safer because they are natural is untrue as there are plants which are highly toxic and their uninformed use should be prohibited. The previous authors identified a plant (*Aristolochia sp.*) that has been in use for more than 2000 years in Asia to be highly toxic and its use results in renal failure, intestinal and upper urinary tract complications (Marcus & Grollman, 2016:16).

Concurrently, Kamsu-Foguema and Foguem (2014:129) identified a number of African plants including some of the most widely used South African medicinal plants such as Umckaloabo (*Pelargonium sidoides*) can cause a number of complications if used incorrectly. Issues of side effects resulting from the use of medicinal plants can be accounted to overuse or misuse of medicinal plants. This is supported by Vončina *et al.* (2014:266) who found that adverse effects arising from the use of medicinal plants can be attributed to misuse and lack of correct knowledge in terms of the identification of the correct plant, preparation and administration procedures. Therefore medicinal plants which have the potential to cause harm or have side effects when consumed or applied can be considered unsafe to consumers,



specifically those with limited knowledge about the correct use. Moreira *et al.* (2014:249) concur that safety in medication is the likelihood of a therapeutic plant medicine not to cause harm when administered for a particular condition.

Lynn (2011:153) posits that the safety of medication is dependent on correct administration in any case whether in conventional or indigenous health care. Lynn further advanced that correct administration depends on the application of the right medication, right patient/illness, right dose, and right route of administration and preparation of the medication (Lynn, 2011:153). It can therefore be deduced that the assertions by Lynn are critical as measures that ensure the safety of medication. van Wyk *et al.* (2009:16) further argued that the method of preparing plant medicine is critical and there are specific activities which may include first identification of the right plant and which art to use, specific time for preparing the remedy and adding specific solvents such as water or alcohol. These activities could serve to neutralize certain toxins (van Wyk *et al.*, 2009:16).

Based on the above arguments it can be inferred that indigenous communities have their methods of ensuring the safety of medicinal plants. Mphuthi (2015:107) asserts that indigenous communities have unique ways of preparing medicinal plants in order to achieve the required therapeutic effects. In the clinical ethnography section Taaka's (2016:52) research found that indigenous communities have their specific processes of preparing medication which is ordered, logical and systematic from the time of harvesting to the administration routes of the final product. Both the previous authors validated the indigenous knowledge of a KhoiSan community exactly as it is practiced in the community and their results proved the safety and efficacy of communally used medicinal plants.

In light of the above assertions, it was clear that there is an urgent need for research that investigates indigenous measures of ensuring the safe use of medicinal plants. And this was in line with both Mphuthi (2015:72) and Taaka (2016:16) who emphasise the importance of adhering to correct indigenous preparation and administration methods which is embedded in the community's indigenous knowledge system/s. However, there is a scarcity of research which investigates how indigenous communities ensure the safety of the medicine they use, especially of the KhoiSan community. In support, Hulley *et al.* (2016:84) highlight that the KhoiSan indigenous knowledge on medicinal plants is poorly documented.

This observation further highlighted the need to investigate indigenous ways of ensuring medicinal plant safety, especially in the realization that the indigenous knowledge on

medicinal plant use is slowly but certainly diminishing (Upreti *et al.*, 2012:2). In support, Tibiri *et al.* (2015:296) posit that this knowledge is at risk due to the oral nature of transferring indigenous knowledge on medicinal plant use from practitioner to trainee or from parent to child wherein the correct knowledge is now known by fewer people as oral platforms are diminishing.

The World Health Organization (WHO, 2011:8) recognizes indigenous medicinal plants as key in actualising universal health, especially in rural communities such as this KhoiSan community which has been identified as a site for this investigation. The WHO further recommended that its member states should develop inventories of this pivotal knowledge from communities such that the oral is not lost. The member states should develop and apply scientific measures to evaluate the safety and efficacy of medicinal plant products (WHO, 2010:64). South Africa (SA) has responded to this call through its draft policy on African Traditional Medicine of 2008 that emphasises that the formation of a *pharmacopoeia* is the starting point in the process of regulating and integration of indigenous health in the National Health System (Department of Health, 2008). The WHO's (WHO, 2013:30) Traditional Medicine Strategy 2014-2023 further emphasises the importance of ascertaining the safety and efficacy of medicinal plants and therefore it is imperative for the researcher to investigate the indigenous measures of ensuring safety of communally used medicinal plants of the KhoiSan community in the Northern Cape, South Africa.

## 1.2. Rationale

A previous project by the researcher indicated that there are toxic medicinal plants used in the KhoiSan community, but this community had ways of ensuring their safe use (Mashego, 2016:30) and this finding resulted in the interest to investigate indigenous ways of ensuring safety. Marcus and Grollman (2016:16) reported that even though most cases go unreported, misuse of medicinal plants is a problem in South Africa resulting in a number of people being hospitalized with acute poisoning or renal failure. However, if utilised safely and correctly medicinal plants have a potential of bridging the gap between those who do not have access or do not want to use the western health care system or those who want to make use of both health care systems. Hence, this project investigated the indigenous measures used to ensure



safety of communally-used medicinal plants thereby promoting the safe and effective use of medicinal plants. This is in line with the WHO Traditional Medicine Strategy 2014-2023 (WHO, 2013:11) whose goal is to support Member States to harness the potential contribution of indigenous health care systems to the health of the global and local population.

### **1.3. Problem Statement**

The loss of oral platforms of transferring indigenous knowledge on medicinal plants from practitioner to trainee or from parent to child has resulted in the correct knowledge being known by fewer people (Tibiri *et al.*, 2015:294). Additionally, the vital knowledge of how indigenous communities ensure safety of communally used plant medicine is undocumented, specifically for the rural KhoiSan community that is the site of this research. However, even though the platforms of knowledge transfer are decreasing, the demand for plant medicine is ever increasing due to the mistrust and inaccessibility of conventional drugs (Masango & Mbarika, 2015:45). Therefore this invariably increases the number of people who use plant medicine incorrectly and may lead to cases of adverse or acute poisoning (Marcus & Grollman, 2016:16).

Consequently, this research endeavoured to investigate indigenous measures of ensuring safety of communally used plant medicine. This was pursued through the identification of communally used medicinal plants and description of their indigenous safety measures. This research further ascertained the indigenous measures that are utilized by the KhoiSan community to ensure safety of communally used medicinal plants.

### **1.4. Research Aim**

The aim of this research was to investigate indigenous safety measures of communally used plant medicine in a rural KhoiSan community in the Northern Cape in South Africa.

## **1.5. Research Objectives**

- a) Describe the indigenous safety measures of ten communally used medicinal plants in terms of plant name, part used, formulation, preparation methods, dosage, administration routes, toxicity and illness treated for each plant in a rural KhoiSan community.
- b) Identify the most toxic communally used medicinal plants in the rural KhoiSan community.
- c) Ascertain indigenous safety measures of the identified toxic medicinal plants in the community.

## **1.6. Research Questions**

- a) What are the indigenous safety measures of ten communally used medicinal plants?
- b) Which of the communally used medicinal plants are considered toxic?
- c) How does the community ensure the safety of the identified toxic medicinal plants?

## **1.7. Definition of Concepts**

*Indigenous knowledge:* This is defined as local knowledge that is unique to a given culture or society and it is developed from observation and constant experimentation resulting from the responses of local people to their environment (Das & Sarkhel, 2016:956). Additionally, IK is the basis for decision-making with regards daily needs such as the identification and safe use of therapeutic plants. In support, Masango and Nyasse (2015:53) describes indigenous knowledge as a holistic interpretation of life that is developed over time and it is deeply embedded in a particular cultural framework shared by a specific society having the same geographic and ethnic origin. In this research indigenous knowledge is understanding, expertise and skills that are passed down from generation to generation through oral traditional platforms from parent to child or through apprenticeship and are rooted in the worldviews and experiences of a particular community.

*Indigenous Health:* Africans have a different conceptualisation of health which is in stark contrast to the Euro-Western's view of health. According to White (2015:2) African indigenous communities' health is not limited to the physical or body organs and their proper functioning as the case in Euro-Western ontology. White (2015:2) further asserts that good health to the African means a balance and harmony between physical, mental, spiritual and emotional dimensions of an individual and also in relation to family, community and the environment. Gabie (2014:55) adds to the submission that indigenous people like the KhoiSan view health holistically and further highlights that their lives are interconnected with the environment and their spiritual world. Therefore, it can be concluded that the use of medicinal plants in such a community is aimed at bringing harmony and balance in the physical, mental, emotional, communal and spiritual aspects of an individual, family or community.

*Communal:* According to Merriam-Webster (2017) communal means "shared or used by members of a group or community." In the context of this research communal refers to the indigenous knowledge on medicinal plants used and shared in the KhoiSan community.

*Medicinal plants:* Indigenous medicinal plants also referred to as herbal medicine, botanical medicine or phytomedicines is perceived by Sharad *et al.* (2011:103) as the use of a plant's seeds, fruits, leaves, roots, bark, stem, flowers or whole plant for medicinal purposes. Sharad *et al.* (2011:3) further posit that the utilization of plants for medicinal purposes has a long history that predates conventional western medicine. In this research communally used medicinal plants refer to those plants known and used in the community either in single part, combined or whole plant. These plants are trusted for their natural therapeutic effects.

*Ubuntu:* Letseka (2012:48) advance that Ubuntu is a humanistic orientation towards other beings and covers connectedness among community members, compassion respect and human dignity. While Gade (2012:485) defines Ubuntu as a human ethic or a moral quality of a person.

*Epistemology:* Moser (2010:1) asserts that epistemology is the theory of knowledge incorporating the philosophical study of the origin, and what is considered as knowledge. Higgs (2007:674) concurs with the previous author and further assert that an African indigenous epistemology is characterised by its communal nature and this supports the stance held in the Pienaar's (2017:85) African Indigenous Health Research Framework.



*Safety:* According to Moreira *et al.* (2014:249) safety in medication is the likelihood of a therapeutic plant medicine not causing harm when administered for a particular condition. Lynn (2011:153) suggests that the safety of medication is dependent on the application of the following: the right medication (identification of the correct plant and the correct part), right patient/illness, right dose, and right route of administration and preparation of the medication (Lynn, 2011:153). The submissions by Lynn are viewed in this research as measures of ensuring the safety of medication. This is further supported by van Wyk *et al.*'s (2009:16) observation that the method of preparing plant medicine is critical and there are specific activities which may include first identification of the right plant and which part to use, specific time for preparing the remedy and adding specific solvents such as water or alcohol. These activities could serve to neutralize certain toxins (van Wyk *et al.*, 2009:16).

*Toxicity:* Toxicity is defined as the ability of a plant medicine to cause adverse effects after being consumed or applied (Cope *et al.*, 2004:70). The toxic effects of plant medicine is relatively dependent on the dosage, routes through which the medicine is administered and the duration or frequency of exposure (Moreira, 2014:250). In comparison with arguments by van Wyk *et al.* (2009:16), the toxic effects of plants are also dependent on how the plant medicine is prepared.

*Safety measures:* In light of the definition of Safety and Toxicity, safety measures in this research refer to those methods put in place by indigenous communities to avoid any adverse effects of plant medicine. These measures include the identification of the correct plant, for the correct illness, using the correct plant part, preparation methods, dosage, route/s of administration and formulation.

*Ethnobotany:* According to Caruso (2015:7) ethnobotany is the study of the relationship between people and plants. The same author further indicates that ethnobotany is epistemologically, theoretically, and methodologically embedded between the social and the natural sciences, and draws upon qualitative and quantitative research methods. The previous author is supported by Hoffman and Gallaher (2007:203) who contend that an ethnobotanist may use ethnographic methods of data collection and then quantify the data through statistical inferences. This research is essentially an ethnobotany enquiry aimed at investigating indigenous knowledge used to ensure the safety of medicinal plants used by a rural KhoiSan community.

Considering the above concepts, the process of inquiry conscientiously considers the social and epistemological realities of the indigenous people, which in this case are the KhoiSan people in the Northern Cape (Chilisa, 2012:40). So, the researcher acknowledges indigenous knowledge on medicinal plants in this community is communally and collectively constructed and developed. This means that these communities have their own views on the safety and efficacy of the medicinal plants that they use. This research benefits from the discussion of African Indigenous Health by White (2015:2) and Gabie (2014:55) supporting the philosophical stance adopted in the research.

The philosophical stance of this research is drawn from Pienaar's (2017:85) African Indigenous Health Research Framework which proposes for the researcher to acknowledge the fact that indigenous health practices have withstood the test of time since colonization and other forms of systematic oppression. Further, Pienaar (2017:85) argues that the researcher should not undermine indigenous worldviews and epistemologies in their method of enquiry and the product should reflect the realities of the community. This argument is strongly supported by Chilisa (2012:40) who adds the dimension of an overarching worldview regulating the health dimensions of communities. Hence the researcher acknowledges that indigenous communities have extensive knowledge about the plants they use and research conducted on them should reflect the social and epistemological realities of these communities.

## **1.8. Division of Chapters**



Chapter 1 Overview of the research

Chapter 2 Literature Review

Chapter 3 Research Methodology

Chapter 4 Data presentation and discussion of results

Chapter 5 Outcome; conclusions and recommendations of the research

## **1.9. Summary**

This chapter provided an overview of the research with a clear statement of the problem and the objectives. The next chapter focuses on the review of literature relating to the research.



# Chapter 2

## Literature Review

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### 2.1. Introduction

The previous chapter gave overview and rational of the research and highlighted the phenomenon under inquiry with the background, problem and aim clearly stated. In light of scarcity of literature explicitly investigating indigenous measures of ensuring safety of communally used medicinal plants, this section provides a comprehensive review of literature related to the topic. It commences by reviewing literature on the increasing trends and demand for medicinal plants globally and locally in order to highlight the importance of such a research project. In response to the increased demand of this therapy, the researcher reviewed literature pertaining to issues of safety of medicinal plants. Adding to that, literature on preparation, dosage and administration of medicinal plants was reviewed and to bring it back to the context of this research studies on KhoiSan medicinal plants was also discussed.

### 2.2. Popularity of Medicinal Plants

According to Antwi-Baffour *et al.* (2014:49) the WHO has identified indigenous medicine as a guaranteed alternative means to achieve universal healthcare coverage to the world's population. Additionally, medicinal plants play a fundamental role in meeting the health needs of 80 percent rural communities in developing countries in the absence of conventional medicine (Antwi-Baffour *et al.*, 2014:49; Mwaka *et al.*, 2015:505). A systematic review by Peltzer and Pengpid (2015:215) affirmed the popularity of Chinese Traditional Medicine (CTM) of which medicinal plants are a component of, by reporting that CTM plays an important role in the provision of health care for chronic conditions such as cancer, asthma, HIV hypertension and mental illness in the Southeast Asian nations region. For instance, the previous authors reported that 76 percent of diabetic patients admitted to using CTM in Sri Lanka to reduce blood sugar level. Tandon and Yadav (2016:42) reported that a long trusted

treatment for anal fistula using medicinal plants was more preferable to patients than the invasive surgical treatment of the illness in conventional western medicine.

On the other hand, the popularity of medicinal plants in the treatment of common illnesses in Africa is accounted to affordability and accessibility of medicinal plants, either as prescribed by indigenous health practitioners or through self-medication (Ndzimande *et al.*, 2014:520). This is further supported in Nakapipi *et al.* (2011:69) who posit that modern medicines are expensive for most African communities, especially rural communities such as the community in this research, hence the use of medicinal plants because they can be cultivated at home, gathered from the field or purchased at herbal markets or prescribed by practitioners at little cost. However, the wide use of indigenous medicinal plants in Africa is not only limited to affordability and accessibility, but it should be acknowledged that they form a part of a wider belief system and it is culturally relevant to the users (Muweh, 2011:4). Masango and Mbarika (2015:49) attach the popularity of medicinal plants even in developed countries such as the UK, USA and Canada to the lack of trust in conventional drugs which have high side effects opposed to medicinal plants.

With that said, it is important to note that the use of medicinal plants in African communities is deeply rooted in the indigenous health care sciences which guide the methods of treatment. This statement is supported by Mphuthi (2015:2) who suggests that the aim of indigenous healing practices is to bring balance in the health continuum. And this is the basic foundation of indigenous health care. Mphuthi (2015:41), further highlights that the safety and efficacy of medicinal plants depends on the indigenous knowledge of the community and that preparation and administration of medicine is critical in this regard. This is an important finding which acknowledges the measures which guide the correct use of medicinal plants held in the community and it aligns the research with indigenous practices. This is in line with assertions by Chilisa (2012:40) and Pienaar (2017:97) who emphasise the importance of research that reflects and acknowledges indigenous epistemologies.

### **2.3. The Safety of Communally used Medicinal Plants**

In light of the above assertions, there is a worldwide increase use of medicinal plants which is attributed to accessibility, affordability, strong link to culture and the fact that they are safer



than conventional drugs with fewer side effects. However, this increased demand results in consumers buying herbal products or medicinal plants in Muthi markets or collecting plants in the veld for self-medication without having adequate information on their proper use (Muweh, 2011:4).

This is not only the reality of rural dwellers, but Masango and Mbarika (2015:45-46) reported that the popularity of medicinal plants is increasing also in developed countries as well because people are looking for cheaper and safer medical alternatives. In contrast to the previous statement, Marcus and Grollman (2016:16) argue that the notion that medicinal plants are safer because they are natural is untrue as there are plants which are highly toxic and their use should be prohibited. The previous authors identified a plant (*Aristolochia* sp.) that has been in use for more than 2000 years in Asia to be highly toxic and its use results in renal failure, intestinal and upper urinary tract complications (Marcus and Grollman, 2016:16).

Concurrently, Kamsu-Foguema and Foguem (2014:129) identified a number of African plants, including some of the most widely used South African medicinal plants such as Umckaloabo (*Pelargonium sidoides*), can cause a number of complications if used incorrectly. Issues of side effects resulting from the use of medicinal plants can be connected to overuse or misuse of medicinal plants. This is supported by Vončina *et al.* (2014:266) who found that adverse effects arising from the use of medicinal plants can be accounted to misuse and lack of correct knowledge in terms of the identification of the correct plant, preparation and administration route. Lynn (2011:153) posits that the safety of medication is dependent on correct administration in any case whether in conventional or indigenous health care. Lynn further advanced that correct administration depends on the application of the right medication, right patient/illness, right dose, and right route of administration and preparation of the medication (Lynn, 2011:153).

Considering the arguments posed by the previous authors, it has become evident that it is important to investigate and document and promote the correct indigenous knowledge on medicinal plants in order to curb issues of misuse. Kamsu-Foguema and Foguem (2014:130) suggested that there is a need to understand local cultural and social realities in order to establish a strong quality control management model. This is in line with the aim of the research as it is intended to investigate how indigenous communities ensure safety of the medicinal plants they use. Countries such as China and India have succeeded in incorporating

their indigenous healthcare system in the conventional healthcare system through investigating and advancing indigenous healing practices as they are understood and practiced in the local communities instead of focusing on isolating active ingredients for drug development (Zhang *et al.*, 2012:522; Nasri & Shirzad, 2013:22).

For instance, the Ayurveda medicine system has a well-documented process of ensuring the safety of plant medicine termed Sodhana which is defined as the process of separating toxins in medicine through methods such as grinding, washing, distilling and heating (Honwad & Mahagonkar, 2012:51). This process dates back to the 8<sup>th</sup> Century and was first designed for drugs of mineral origin, but it has over the year been used and developed for the purification of plant medicine (Maurya *et al.*, 2015:188). Maurya *et al.* (2015:194) further emphasise that even a strong poison can be converted to excellent medicine if prepared and administered correctly. This affirms the fact that indigenous communities have measures they employ to ensure the safety of the plant medicine they use. However, the literature on African indigenous measures is limited or denounced by scholars as non-existent (Mabona & van Vuuren, 2013:179).

#### **2.4. Preparation, Dosage and Administration of Medicinal Plants**

Correct administration of medication in any case whether in conventional or indigenous health care depends on the application of the right medication, right patient/illness, right dose, and right route of administration and preparation of the medication (Lynn, 2011:153; Taaka, 2016:80). This has a direct impact on the safety of that particular medicine, hence preparation, dosage, identification and route of administration of medicinal plants have been identified in the WHO's Guidelines on safety monitoring of herbal medicines in pharmacovigilance systems as key areas which may result in the unsafe use of medicinal plants by consumers (WHO, 2004:1). This is supported by Mosihuzzaman and Choudhary (2008:2198) who further emphasise that indigenous communities have their methods of ensuring safety and effective use of medicinal plants which is based on the long history of use.

Mosihuzzaman and Choudhary (2008:2196) provided a comprehensive analysis of studies proving the safety and efficacy of medicinal plants internationally (the Ayurveda, Unani and



Traditional Chinese Medicine systems) and it can be deduced that the Asian indigenous healthcare systems still follow indigenous forms of administering medicinal plants, even though there are herbal products which are extracts, the traditional use of medicinal plants is highly recognised and acknowledged throughout literature. The previous argument is supported by Chotchoungchatchai *et al.* (2012:199) who reported utilization of medicinal plants at Kabchoeng Hospital in Thailand preparation, dosage and administration routes of different medicinal plants was prescribed to patients in the hospital and the formulations were said to be safe and effective. This proves that indigenous communities have specific ways of preparing their medicines which in turn ensures their safety as confirmed by Maurya *et al.* (2015:190).

On the contrary, there is a lack of agreement within African literature in terms of standard preparation and dosage of medicinal plant formulations. For instance, Bunalema *et al.* (2014:1003) found that there were variations in dosage certain plant formulations between indigenous health practitioners in Uganda and recommended that there is a need for *in vivo* and *in vitro* studies to determine safe and effective doses in order to standardise the formulations like the Asian indigenous healthcare systems discussed above.

Preparation methods include boiling, infusion, poultice, burning or roasting plant part and chewing the raw plant. Such methods require the supervision of a knowledgeable person because some plants might be poisonous (Uprety *et al.*, 2012:5). In line with the previous author Mphuthi (2015:76) and Taaka (2016:78) proved that indigenous communities such as the KhoiSan, have systematic ways of preparing plant medicine which they proved the safety and efficacy of medicinal plant formulations as it is prepared and administered in the community. Even though these authors proved the safety and efficacy of medicinal plants used in this community, there was no direct observation of the indigenous measures employed to ensure safe use of medicinal plants.

Therefore in conclusion, it is noteworthy that the use of medicinal plants is rooted in indigenous worldviews and that it is based on a long history of use. Additionally, the therapeutic use of plants is holistic in nature which integrates lifestyle, mental, physical, emotional and spiritual dimensions in the healing processes (Nasri, & Shirzad, 2013:22). Hence it is important to understand how indigenous communities prepare the medicinal plants they use in order to promote their safe use as the indigenous platforms of transferring this vital knowledge are diminishing (Uprety *et al.*, 2012:2).

## 2.5. KhoiSan Medicinal Plant Use

Before delving into the literature on KhoiSan medicinal plant use, it is important to mention that indigenous communities such as the community under inquiry have their own theories and concepts of prevention, diagnosis, improvement and treatment of illness in indigenous healthcare which take a holistic approach which incorporates the restoration of mental, physical, emotional and communal health of the individual (WHO, 2000:5; Absolon, 2010:75). In addition, Absolon's Indigenous wholistic theory acknowledges indigenous worldviews which posits that man, nature and the spiritual world are interconnected (Absolon, 2010:76). This is a theory that is rooted in indigenous epistemologies, worldviews and traditions in the methods of data collection.

According to White (2015:2) African indigenous communities' health is not limited to the physical or body organs and their proper functioning as the case in Euro-Western ontology. White (2015:2) further asserts that good health to the African means a balance and harmony between physical, mental, spiritual and emotional dimensions of an individual and also in relation to family, community and the environment. So it is important to understand the use of medicinal plants in Africa is rooted in what Taaka *et al.* (2013:127) elucidated as the African spiritual holism. Atindanhila and Thompson (2011:459) further explain that the holistic approach to healing is not limited to an individual's physical illness but to bring harmony and good health to the community as a whole.

Gabie (2014:55) adds to the submissions that indigenous people like the KhoiSan view health holistically and further highlights that their lives are interconnected with the environment and their spiritual world. Therefore, it can be concluded that the use of medicinal plants in such a community is aimed at bringing harmony and balance in the physical, mental, emotional, communal and spiritual aspects of an individual, family or community. The metaphysical approach to healing is however refuted in Western healing paradigms and is often referred to as non-scientific and primitive (Atindanhila & Thompson, 2011:461).

Consequently, the WHO (2000:5) recommended that when reviewing the literature on medicinal plants, the theories and concepts of the individual practice of indigenous healthcare, as well as the cultural background of the community in a research must be considered. Contrary to Atindanhila and Thompson's (2011:461) assertions, Pienaar (2015:62) argues that indigenous scientific methods are not inferior to western scientific



methods as they are also systematic, logical and it is based on observations, experiments and the formulation of patents. Therefore in order to achieve the goal of integrating indigenous health into the national health system by letting both indigenous and western co-exist in the country it is important to acknowledge indigenous health as a legitimate system that has contributed and continues to provide health care services to indigenous African communities (Taaka *et al.* 2013:127). In the subsequent paragraphs the researcher reviewed what other scholars found on medicinal plant use by the KhoiSan peoples.

van Wyk (2008:334) mentioned that there are three major categories of indigenous healthcare practitioners in the KhoiSan culture which are the diviner (!gai aup) who treats serious illnesses, the herbalist (bossiedokter) who treats minor and chronic illnesses and the poison or snake doctor who specialises in the treatment of snake bites. This research also includes practitioners such as the indigenous birth attendants as part of the research participants and this actually proves that there are more categories which are worth mentioning in such projects.

The use of plants for therapeutic purposes in KhoiSan communities is poorly documented as van Wyk (2008:331) pointed out that though there is an abundance of literature on KhoiSan culture and general use of plants for utilities and hunting poison, there is little research on their use of medicinal plants. A recent research by de Beer and van Wyk (2011:741) affirmed the earlier claims by van Wyk that there is a paucity of literature about the indigenous knowledge on medicinal plant use by the KhoiSan community. The above assertions prove that such a project is necessary not only for the KhoiSan community but for the KhoiSan culture as a whole.

The issue of inadequate studies documenting KhoiSan indigenous knowledge on medicinal plants can never be over emphasised, for instance, there are a few references of medicinal plants used by the KhoiSan in a review of South African medicinal plants used anthelmintic (Aremu *et al.*, 2012:139). However, there are studies which are worth noting, for instance, de Beer and van Wyk (2011:748) documented indigenous knowledge on medicinal plant use by KhoiSan people of Agter-Hantam in the Northern Cape. Their research findings revealed 14 new species records of useful plants, 20 new indigenous language names, and 99 new uses for 46 of the plant species recorded. Nortje and van Wyk (2015:205) documented medicinal plant knowledge KhoiSan people living in Kamiesberg, Namaqualand and this research also



highlighted the need for robust recording of KhoiSan medicinal plants knowledge as numerous species are newly reported and new medicinal plant usage.

Additionally, there is a need for a shift in the focus of research done on medicinal plants because currently the focus is on drug development, plant conservation, assessing and verification of safety and efficacy (e.g. Aremu *et al.*, 2012), while others focus the documentation of the knowledge itself but little is done on understanding the indigenous practices in order to improve and promote the correct use medicinal plants.

However, there are studies which acknowledge the practices of indigenous communities and there by attempt to verify existing indigenous health science using Western scientific methods such as *in vivo* and *in vitro* (Mphuthi, 2015:8; Taaka, 2016:7) to provide evidence that can be used in the rationalization of the two systems coexisting in South Africa. In 2016 Mashego (2016:8) documented medicinal plant use in the community under inquiry and reported 35 medicinal plants used for the treatment and prevention of various ailments.

Even though both authors reported how the indigenous community prepare the plant medicine which was subjected to *in vivo* and *in vitro* testing for antiviral properties (Taaka, 2016; Mphuthi, 2015), measure of ensuring safety were not explored. The mini-dissertation by Mashego (2016) inspired the pursuit of indigenous measures of ensuring safety because there are medicinal plants that were described as toxic or had the potential to cause harm if incorrectly prepared and administered.

The gap that has been identified in the above literature, specifically on KhoiSan medicinal plant use, is that even though the authors documented the pivotal knowledge of these communities, the final reports do not explicitly deal with indigenous measures of ensuring safe use of medicinal plants. Instead, most studies focus more on the documentation and classification of plants while others focus on searching for plants which may have a potential for drug development. Furthermore, the above literature emphasises the need to record indigenous medicinal plant knowledge at local level in order to unveil new medicinal plant species and understand how indigenous communities use their medicinal plants and this justifies the need to investigate the phenomenon under inquiry.

## **2.6. Summary**

The literature has shown that there is an increasing preference for more natural therapeutics like medicinal plants due to the limited side effects as compared to those experienced in conventional medicine or Western drugs. It is also noteworthy that the use of medicinal plants in indigenous communities especially in Africa is deeply rooted in the cultural beliefs of the people and their use dates back to precolonial era. Therefore it is important to understand that the preference of indigenous healing practices displayed by indigenous communities is not merely a matter of ease of access and affordability of the practice but it is a part of their lives, traditions and world views.

The following chapter provides a comprehensive discussion of the methodology followed in this research.

# Chapter 3

## Research Methodology

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### 3.1. Introduction

In the previous chapter a comprehensive review of literature relevant to the measures of ensuring safety practices related to plant medicine was presented. The literature review highlighted gaps and the general paucity of studies which focus on how indigenous communities ensure the safety of medicinal plants they use, specifically those used by KhoiSan communities. This shortage of literature further justified the need for this research in the rural KhoiSan community in the Northern Cape. To address the purpose of this research, indigenous measures of ensuring safety of communally used plant medicine in a rural KhoiSan community were examined.

In order for this to be achieved a quantitative descriptive design was adopted under ethnobotanical approach and the research privileged an indigenous philosophical grounding based on African Indigenous Health Research Framework. Furthermore, the research used a semi-structured instrument which was derived from the Essential Drugs List for data collection based on ethnographic methods such as semi-structured individual interview and participant observation methods (Department of Health, 2014:20; Martin, 1995:110). A total population sample was used for this project where all members of the KhoiSan Medicine Men Committee which comprises of 23 members would have participated but only 17 members were part of the research. The committee was targeted due to the fact that the members are experts in medicinal plant use as they are practitioners and some are knowledge holders with extensive insight in this regard. Lastly, the data analysis, validation process and ethical considerations that were adhered to in the research are presented in this chapter.

### 3.2. Philosophical Grounding

This research follows Pienaar's (2017:85) African Indigenous Health Research Framework which asserts that research in indigenous health must be grounded in indigenous worldviews



such as caring and sharing which is the spirit of Ubuntu. This is in line with the WHO's (2005:5) recommendation that researchers should acknowledge the beliefs of the community and their epistemologies. The researcher, as an African who has grown up under similar worldviews held in the KhoiSan community, acknowledges that healing in the African indigenous context is not limited to an individual's physical health but also extends to the family, community and the environment. This standpoint is supported by White (2015:2) who observes that health in the African context goes beyond the physical and body organ functioning.

Similarly Avoseh (2012:237) proposed a Framework for Adult Education which also posit that knowledge in Africa is stored and transferred in the community at different intervals. Both frameworks advance spirituality, communal and environmental interconnectedness and interdependence (Avoseh, 2012:237; Pienaar, 2017:85). Therefore placing the African indigenous community as being aware of its surrounding and phenomena that occur round them. So the responses and interpretation to social and environmental occurrences should therefore be accepted as valid knowledge.

Hence the aim of this research was not to validate indigenous knowledge of the KhoiSan community through western paradigms of knowledge but to interrogate and elucidate a long standing body of knowledge through systematically and rigorously investigating and reporting indigenous practices exactly as they are practised in the community. The previous statement is supported by Chilisa (2012:40) who advances that research should reflect the social and epistemological realities of the community under inquiry. Due to the above assertions the following concepts underpin this research:

*Ubuntu*: in this research Ubuntu is the spirit of sharing and caring in the African context (Pienaar, 2017:95), understood as the act of caring for each other and sharing knowledge about medicinal plants to ensure the good health of others. This is denoted in the title of this research by the phrase 'communally used plants'. Gade (2012:485) on the other had defines Ubuntu as a human ethic or a moral quality of a person.

*Epistemology*: according to Pienaar (2017:95) "knowledge is generated in the community." It must be noted that the stance taken in this research aligns with the aim of the research which is to investigate how indigenous communities ensure safety of medicinal plants, hence the description of indigenous knowledge on communally used medicinal plants, identification of medicinal plants that are perceived as toxic and measures to ensure their safe use. This

means the researcher acknowledges the fact that the community have their own knowledge for identifying medicinal plants and ensuring their safe use.

Such a stance is supported by Abdi (2008:319) who argues that the quality of knowledge and scholarship is not dependent on whether it is textually located or orally produced. Therefore it is important to accord African indigenous knowledge on medicinal plants the same respect as Asian system such as the Ayurveda and Traditional Chinese Medicine as valid knowledge. Higgs (2007:674) further emphasise the importance of acknowledging the communal nature of African societies and that “epistemic authorities” such as knowledge holders and expert practitioners as research partners and not merely as research subjects.

### **3.3. Research Design**

A research design is an overall plan that connects theoretical research problems to a more achievable and relevant empirical research (Saunders *et al.*, 2012:72). This is an ethnobotanical research, where the researcher adopts a quantitative descriptive design, but data was collected through ethnographic methods such as semi-structured interviews and participant observation (Martin, 1995:11; Victor *et al.*, 2004:16). The data was categorized and analysed using statistical formulae such as Frequency of Citation and Informant Consensus Factor (Ishtiaq *et al.*, 2015:203). Therefore this is a quantitative ethnobotanical research that used ethnographic methods of data collection where the data was quantified and statistical inferences were presented using tables, graphs and charts (Hoffman & Gallaher, 2007:202).

### **3.4. Population and Sampling**

#### **3.4.1. Research Area**

This project was based in a rural town situated on the edge of the Ghaap Plateau in the Northern Cape Province of South Africa. It must be mentioned that this community is only referred to as a rural KhoiSan community in the Northern Cape as part of the anonymity



clause affirmed in the research process. Such predicaments are highlighted by Martin (1995:106) that some communities request the researcher not to identify the village and instead use a pseudonym.

### 3.4.2. Target Population

The population of this research was all members of the rural KhoiSan community who have extensive knowledge on medicinal plant and are KhoiSan descendants. Therefore the population in this research was members of the KhoiSan Medicine Men Committee (KMMC) comprising of 23 indigenous health practitioners. It must be clarified that the committee includes both men and women and that the “Men” in KhoiSan Medicine Men Committee is not gender specific.

### 3.4.3. Sample

A total population sampling technique under non-probability sampling was followed in this research to identify members of the Medicine Men Committee who are specifically targeted due to their expertise in medicinal plant use. This is done to maximize research time and resources, as it is pointed out by Guimbo *et al.*, (2011:236) of key informants who are the oldest (not limited to) or longest term residents in an area. However, due to unavailability of other participants and three being excluded for having been part of the pilot study the final sample consisted of 17 participants who are knowledge holders and indigenous health practitioners.



## 3.5. Data Collection Methods

Semi-structured individual interviews were conducted with knowledge holders and indigenous health practitioners who are members of the KhoiSan Medicine Men Committee in Afrikaans which is the home language of the participants. Hoffman and Gallaher (2007:202) emphasise the importance of using ethnographic methods such as semi-structured



interviews, participant observation for collection of data to give meaning to the numbers and statistics thereof. The rationale of using semi-structured interview was that the researcher wanted to allow the participants to express themselves without limiting their responses by way of structured questions. This concurs with Albuquerque *et al.* (2006:54) allows the researcher to gather a great deal of data which can then be quantified when analysing.

In addition, field observations were conducted with participants who are key informants in the research. This included collection of the medicinal plants in the garden or field and the subsequent preparation of each collected medicinal plant. This gave the researcher an opportunity to systematically observe and start analysing the data and confirm data from other participants. This is supported by Hoffman and Gallaher (2007:203) who posit that this reduces researcher subjectivity and permits the researcher to compare participants' statements and their actions.

It must be further highlighted that the field observations were meant for observing the indigenous knowledge provided in the semi-structured interviews not for voucher specimen collection (see 3.11). Therefore the results of the field observation are similar to those of the semi-structured interviews. This can also be attributed to the fact that all the participants had some of the medicinal plants in their gardens and some stored in their homes.

With the permission of Chief Adam Kok and the participants, the researcher took pictures of the plants for validity purposes, i.e., pictures of the plants were shown to other participants who were not in the field or do not have those medicinal plants in their gardens and this supported the Informant Consensus Factor (ICF) (Ishtiaq *et al.*, 2015:203).

### **3.6. Data Collection Tools**

Semi-structured questionnaire was developed in line with the research questions to meet the objectives. According to Martin (1995:121) semi-structured questionnaire allow participants to describe their indigenous knowledge and observations allow researchers to see them put that knowledge into practice. Hence semi-structured questionnaire were used in this research in order to allow the participants to give full descriptions about the medicinal plants that they use to treat specific ailments. The data collected was categorized according to each plant

cited; meaning that each plant cited for a particular use was a category and this made it possible for statistical analysis (Martin, 1995:121; Hofman & Galler 2007:203).

Also, a checklist was developed from the responses in the individual interviews and was used during participant observation, while a voice recorder, cellular phone and a laptop were used to record all the interviews and informal discussions during participant observation and field walks or garden observations with the consent of the participants (Sivasankari *et al.*, 2014:409). Additionally, a notebook was used to take field notes during and a cellular phone was used to take pictures of the medicinal plants during the field observations with the consent of the chief and all the participants.

### **3.7. Tool Adjustment**

The semi-structured questionnaire was deduced from Martin's (1995:120) and the Essential Medicines List used in the Department of Health (2014:20) which is a document comprising a list of essential medicines used by healthcare workers in Primary Health Care (PHC) services (clinics, community health centres and gateway clinics at hospitals) to provide medicines and drugs used to manage conditions frequently presented at this level. So, a semi-structured questionnaire of medicinal plants used by indigenous healthcare practitioners and knowledge holders in the KMMC was used in the data collection process.

The semi-structured questionnaire was first formulated in English then translated by a language expert into Afrikaans which is the common language in the community. After the translation into Afrikaans the semi-structured questionnaire was given to an Afrikaans language specialist to translate back to English in order to establish consistencies.

### **3.8. Data Analysis**

The data collected was categorized according to each medicinal plant mentioned with its specific indigenous use which are the Local name of the particular plant, ailment treated, part/s used and the form which the particular plant is administered, preparation and dosage



methods and toxic perception, where each plant cited became a category (Saunders *et al.* 2012:475; Martin, 1995:121; Hofman & Galler 2007:203). The data collected from each participant was categorized according to the above mentioned parameters and was quantified using Ishtiaq *et al.* (2015:203) Frequency of Citation which was calculated by counting how many times each category was cited by each participant. Informant Consensus Factor (ICF) is a formula that was used to calculate the consensus between participants with regard to each remedy reported and the illness treated. The ICF is  $nur-nt/nur-1$  where  $nur$  = is number of used citations in each category and  $nt$  is the number of species used for specific disease.

### 3.9. Reliability and Validity

According to Saunders *et al.* (2012:192) reliability refers to whether or not the data collection techniques and analytic techniques used in this research would yield consistent findings if they were repeated on another occasion or if they were replicated by a different researcher.

Reliability of this research was ensured by using two micro-statistical tools outlined in (Ishtiaq *et al.*, 2015:203) which are Frequency of Citation (CF) and the Informant Consensus Factor (ICF) with the use of a personal computer. In support, Gerique (2006:11) asserts that statistically analysed numerical data allows the researcher to affirm the reliability of the collected data and thereby increase the scientific rigor of the research.

**Frequency of citation (FC):** Information of specific plant species reported by participants with respect to indigenous medicinal information determined frequency of citation.

**Informant consensus factor (ICF):** ICF was calculated for ailments to identify the agreements of the informants on the reported remedies.

ICF was calculated as:

$$ICF = (nur-nt)/(nur-1)$$

Where  $nur$  is number of used citations in each category and  $nt$  is the number of species used for specific disease.

**Validity:** There are various forms of validity used to ensure the quality of the research project and are discussed below. Furthermore, data from field observation confirmed the data collected in the interviews in terms of the identified medicinal plants and their indigenous knowledge (Saunders *et al.*, 2012:351).

**Face validity:** Is the extent to which an instrument is subjectively viewed to answer the questions it was set to answer in this case, does it meet the objectives of the research by listing communally used medicinal plants used in the community and the indigenous knowledge associated with the indigenous safety measures used in the community. This also means that it should be easy for someone who is not a research methodology expert to reach the same results purported in the research.

**Content validity:** content validity unlike face validity requires the use of recognized experts in the field of research such as ethnobotany/phytomedicine researchers and health professionals to assess whether the instrument has been deduced from ethnobotanical instruments and merged with the conventional Essential Medicine List and whether it is applicable in meeting the aims and objectives of the research.

**Construct validity:** construct validity is the measurement of whether the instrument does measure the intended aim and objectives of this research which is to investigate the indigenous measures of ensuring safety of communally used medicinal plants. This was ensured through a pilot study (see section 3.9.1 & 4.2) in order to ensure that the concepts in the instrument are a reflection of the community's constructs of safety measures.

### 3.9.1. Pilot study

The tool was piloted with three members of the KMMC due to the unavailability of a community with representative characteristics of the sample, specifically Afrikaans speaking KhoiSan community who have extensive knowledge on medicinal plants. This was done in order to assess the validity of the questions asked in the semi-structured questionnaire and the subsequent reliability of the data found in the research (Saunders *et al.*, 2012:451; Kotbari, 2004:63). The purpose of the pilot was to assess whether the instrument would yield the required data to meet the aim of this research and reveal the indigenous safety measures of communally used plant medicine. This then resulted in the instrument being readjusted as



there was only one weak aspect of the tool which was the concept of toxicity which was then changed to strong (Sterk) (see section 4.2).

### 3.9.2. Triangulation

According to Denscombe (2010:346) triangulation involves the practice of viewing a research from more than one perspective in order to validate the findings. In order to validate the findings in this research, firstly the researcher randomly interviewed three members of the community who is not part of the sample. So, the researcher randomly picked individuals in the community and asked them if they knew any of the ten communally used medicinal plants found in this research (from the participants) and by showing them pictures of the medicinal plants and if they answered in the affirmative then this meant the findings are valid which is referred to as informant triangulation.

Secondly, the researcher screened data from previous similar studies, especially those investigating indigenous medicinal plants use which is referred to as time triangulation (Denscombe, 2010:347). The researcher focused on studies that discussed indigenous preparation and administration methods in their findings for instance van Wyk *et al.* (2009:16).

### 3.10. Ethical Implications

Ethics in research refers to behavioural standards Research ethics refers to the standards of behaviour that guide the researcher's conduct regarding the rights of the participants whom the project is conducted with (Saunders *et al.*, 2012:226). The researcher adhered to research the institution's research ethics throughout the project. Therefore, following ethical considerations will be applied in this research:

**Permission:** The researcher obtained ethical clearance from the North-West University (Mafikeng Campus). A memorandum of understanding between Seboka Research Team under the leadership of Professor Pienaar and the Griekwa Royal House was given to the chief, Chief Adam Kok 5th, who signed the letter in approval.

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**Protocols:** the researcher adhered to the indigenous protocols held in the community. The researcher did not face any challenges entering the Chief's house as the Chief and researcher already had a rapport established in the previous visit in August 2015 for a 3rd year class project and also the researcher did his undergraduate BIKS research project in the same community in October, 2016 so he has extensive rapport with the community. Lastly, the researcher did not wear a hat in the house and had a jacket which is a standard dress code.

**Informed consent:** Before the data collection process commences the researcher will acquire and engage in a verbal and written informed consent agreement with the participants. Furthermore, the researcher explained in detail the purpose of the project and possible benefits of the research to the participants verbally and in writing. Finally, it was stipulated that the participants have a right to dissociate at any time.

**Confidentiality and anonymity:** It was clearly stipulated to the participants that their identities will be withheld and only code names will be used, for instance P1 and P2.

It must be further noted that this research is dealing with IK on medicinal plants which have intellectual property rights implications. So, the data collected in this research was not made public outside the research' scope, meaning that only the student researcher and supervisor have access to the primary data as a measure to avoid misappropriation.

Once the completion of the research project is completed, a copy of the dissertation will be presented to the community and handed to the Chief.

### **3.11. Intellectual Property Rights**

According to the World Intellectual Property Organization (WIPO, 2016) intellectual property protection guards ownership and use rights for concepts and ideas through mechanisms such as patents, trademarks, copyright, trade secrets, and know-how agreements. In this case the indigenous knowledge on medicinal plants is owned by the community and the researcher made it clear to the community that this project is for academic purpose only. The researcher further adhered to a request from the community not to take the plants to a herbarium because the knowledge provided in this research is the community's intellectual property which should be protected.

It was further be made clear to the community that the results of this research would be published in academic journal/s and consent sought. It was on this basis that the community and the researcher agreed that identifying the plants at a herbarium will make it easy for outsiders to misappropriate their intellectual property rights. This is in line with the Department of Science and Technology's Indigenous knowledge Systems Research Ethics Policy and the National Environmental Management: Biodiversity Act of 2004 (DST, 2017:11; NEMBA, 2004:22) who suggest that findings may be published with the joint ownership with the community.

The participants were informed that the recorded information during interviews would be kept safe at North West University and only the researcher and supervisors have access to it. Lastly, should there be any commercialization or further use of the information found in this research, change of intent would be made and negotiations of Access to Benefit Sharing agreements would be made in accordance with the National Environmental Management: Biodiversity [NEMBA] Act of 2004 (NEMBA, 2004:22).

### **3.12. Summary**

The chapter gave insight of the methodology used to achieve the aim of the research. Where the whole research process was described including how reliability and validity were ensured and the ethical implications that were adhered to in this project. The subsequent chapter provides the findings realised in the research.



# Chapter 4

## Data Presentation and Discussion of Results

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### 4.1. Introduction

The previous chapter comprised a comprehensive discussion of the methodology employed in this research and outlined each step taken with reference to the relevant literature. This chapter presents the data and discussions of the results obtained. As elaborated in chapter three, this is an ethnobotanical research which followed a quantitative descriptive design with the aim of investigating indigenous safety measures of communally used plant medicines in one rural KhoiSan community of the Northern Cape. Additionally, a semi-structured questionnaire was used to collect data from 17 participants and the data was analysed using two statistical formulae (Frequency of Citation and Informant Consensus Factor) in order to assess the agreement between the participants (Martin, 1995:121; Ishtiaq *et al.*, 2015:203). As a result, descriptive statistics were used to report the results thereof and address the aim and objectives of the research. Before presenting the results of this research project, results from the pilot study are presented and the modification of the instrument is highlighted.

### 4.2. Pilot Study Results

The purpose of the pilot study as stated in chapter three (section 3.9.1.) was to assess whether the instrument would yield the required data to meet the aim of this research and reveal the indigenous safety measures of communally used plant medicine, in order to assess the validity of the questions asked in the semi-structured questionnaire and the subsequent reliability of the data found in the research. Therefore three participants (members of the KMMC) were interviewed. These participants were selected on the basis of the target population of the main research project in terms of having extensive knowledge on medicinal plants and must be of KhoiSan origin (section 3.4.2.). The three participants who were part of the pilot study were excluded from the main research.

#### 4.2.1. Demographic Information of the Participants

There were two male (67%) and one female (33%) participants in the pilot were one was a practitioner and the other two were knowledge holders and all participants were pensioners aged 65-75.

#### 4.2.2. Results of the Pilot Study

The results of the pilot study were consistent with the results from the main research were all ten medicinal plants were cited (refer to table 4.2) with plants such as Wilderkeur, Wildeals, Wynruit, Kruistemint and !Xobagabhe having a 100 % Frequency of Citation, same plants displayed a high ICF which affirmed the high level of agreement. Furthermore, in terms of identification of toxic plants the participants responded “the plants we use are not poisonous and do not kill people, they heal people” this meant that the concept of ‘toxic plants’ in this community was perceived as those plants that cause severe effects and may result in death when consumed. This came after the researcher explained to the participants the meaning of toxic in the context of the research however; the participants insisted that the plants are not poisonous or toxic.

#### 4.2.3. Amendments made resulting from the Pilot Study

As a result of the realisation in the pilot study, the researcher had to rephrase the following question in the instrument:

English: Which of these plants do you consider Strong or less safe (Toxic)?

Afrikaans: Watter plante van die genoemde sal u as sterk (Giftig) of minder veilig klassifiseer?

This was the only amendment made as it was the only weak aspect of the tool and this became an important finding in the research where the concept of toxicity was then changed to strong (Sterk).

### 4.3. Data Presentation

The data is presented in the following order: a description of the participants' demographic information; a list of ten KhoiSan medicinal plants is presented in Table 2, which contains a detailed description of Local plant name, Part used, Preparation method, Dosage and Illness treated. Visual presentations and statistical descriptions of the data are presented in Table 2 and this was determined by the use of the Frequency of Citation in terms of which plant is most cited. In the process, the presentation assesses the level of agreement between the participants in relation to which plant part is frequently used, and in which form the plant medicine is mostly administered and the dosage.

#### 4.3.1. Demographic Information

In order to describe the demographic information of the participants, data obtained from the data collection instrument (Appendices 3a & 3b) addressing the following characteristics: Gender, Age group, Employment status and whether participant is a Knowledge Holder or an Indigenous Health Practitioner is presented below.

The data was obtained from 17 participants from a total population sample of 23 members of the KhoiSan Medicine Men Committee at 74% response rate and all participants were of KhoiSan descent (Griqua). This shows that 76% (13) of the participants were female and 24% (4) were male. It must be further noted that the majority of the participants were elders aged between two 65 and 101 and there was only one participant aged 35-45 age group and all the participants were knowledgeable in medicinal plant use. All of the 17 participants were knowledge holders who possess extensive knowledge through using medicinal plants and the others were practitioners. The main knowledge on medicinal plants is held by elders (Table 1), and this affirms the fact that this knowledge is fast disappearing. Subsequently the age of the knowledge holders also confirms the urgency of documenting this vital knowledge before it goes extinct.



Table 4.1 Demographic Information

Participants	Gender	Age group	Knowledge Holder	Practitioner Information	Employment
P 1	Female	95-105	Yes	No	Pensioner
P 2	Female	85-95	Yes	No	Pensioner
P 3	Female	85-95	Yes	No	Pensioner
P 4	Female	85-95	Yes	No	Pensioner
P 5	Female	85-95	Yes	No	Pensioner
P 6	Female	55-65	Yes	No	Pensioner
P 7	Female	65-75	Yes	No	Pensioner
P 8	Female	85-95	No	Yes	Pensioner
P 9	Female	55-65	No	Yes	Pensioner
P 10	Female	65-75	Yes	No	Pensioner
P 11	Female	55-65	Yes	No	Pensioner
P 12	Female	65-75	Yes	No	Pensioner
P 13	Female	55-65	Yes	No	Pensioner
P 14	Male	55-65	Yes	No	Pensioner
P 15	Male	35-45	Yes	No	Unemployed
P 16	Male	65-75	No	Yes	Pensioner
P17	Male	55-65	No	Yes	Pensioner

#### 4.3.2. KhoiSan Medicinal Plants

The first objective of the research was to describe the indigenous safety measures of ten communally used medicinal plants focusing on: Local Plant Name, Part/s used, Form, Preparation methods, Dosage and Illness treated. These plant were the most preferred plants in the community hence the research focused on only these ten. The second objective was to identify medicinal plants that are considered toxic or less safe. Both objectives are addressed concurrently in the results because the research found that the measures applied to ensure safety in this community are the same as the day to day use of medicinal plants but the main difference lies in the dosage and the frequency of medicine administration. Of the ten medicinal plants, five were identified to be less safe and the other five were reported not to

have any recorded harmful effects, if overdosed. All the ten plants were used to treat various ailments through 26 medicinal preparations.

Table 4.2 KhoiSan Medicinal Plants

Local plant name	Part/s used	Preparation Methods	Form	Dosage	Illness treated
1. !Xobhagabe (G)/Wildemint (A)	Leaves	Fresh leaves are immersed in hot water or put in tea.	Taken as tea/infusion	Full cup	Regulates blood pressure. Treats Menstrual pains, headaches
2. Bloudissel	Roots	Roots are cooked with water or donkey milk	Decoction	Half cup once a day	Sexually Transmitted Infections (STIs) and toothache Infection
3. Dawietjie	Roots	Roots are cooked with water	Decoction	Half cup for adults, 1 Teaspoon children	Treat stomach cramps and convulsions in children
4. Grasshout	Roots	The roots may be crashed to powder or cooked with water	Decoction, Powder or Directly consumed	Half cup of decoction, teaspoon of the powder	Decoction is a purgative or detoxing agent used to treat gastrointestinal problems. The powder added to bath water to protect from evil spirits in children and a lucky charm for adults. A small piece of the root may be chewed and swallowed for stomach pains and food poisoning.
5. Krustemint/Griqua tea	Leaves	Fresh leaves are immersed in hot water or put in tea.	Taken as tea/infusion	Full cup	Regulates blood pressure. Treats flatulence especially in children and can also be used as a mouth freshener when leaves are chewed.
6. Rooiorm	Roots	Roots are crushed to powder, 1 table spoon is added to 5 litre of warm water	Infusion	Half cup	Kidney cleanser
7. Swartstorm	Roots	Dry root is burned and smoke is inhaled	Inhalant		Treat headache and for spiritual purposes like curse lightning and divination.
8. Wilde als	Leaves	Cooked with water	Decoction	Half cup twice a day	Respiratory illnesses, flu, fever
9. Wildekeur/Kankerbos	Leaves Some use the roots	Cooked with water	Decoction	Half cup twice a day	Cleanses the kidneys, bladder and womb, it is also an immune booster, treats hypertension, respiratory illnesses and prevents cancer.
10. Wynruit	Leaves	Cooked with water	Decoction	Half cup twice a day	Respiratory illnesses, flu, fever and cold



### 4.3.3. Frequency of Citation

Subsequently, there was a high level of agreement among the participants because the Frequency of Citation revealed that five of the ten medicinal plants reported in this research received a 100% (17) citation. These plants also were also found in the gardens or yards of all participants, including plants such as Wilderkeur, Wildeals, Wynruit, Kruistemint and !Xobagabhe. Adding to the previously mentioned plants with a 100% FC, Bloudissel also received a 100% FC and was also present in all the yards of the participants' homes. However, some of the participants claimed that they do not have knowledge of how they were used, while plants such as Rooistorm, Swartstorm and Grashout were cited by 12 (71%) participants and Dawietjie was at 10 (59%) (Table 4.3) and this illustrates that these plants are valuable in the treatment of various illnesses. However, it must be mentioned that only two participants reported how Swartstorm was used while the other ten reported that they did not know how the plant is used.

Table 4.3 Frequency of Citation

Local plant name	Frequency of Citation
!Xobhagabe (G)/Wildemint (A)	17
Bloudissel	17
Dawietjie	10
Grasshout	12
Krustemint/Griqua tea	17
Rooistorm	12
Swartstorm	12 (2)
Wilde als	17
Wildekeur/ Kankerbos	17
Wynruit	17

### 4.3.4. Plant Parts used in Preparation of Plant Medicine

As identified throughout the research with the support of literature, selection of the correct plant part is vital in ensuring that the prepared plant medicine is safe.

Knowledge holders and indigenous health practitioners of the rural KhoiSan community of the Northern Cape reported using various parts of plants to treat different ailments (Figure 1).



The plant parts used in the preparation of plant medicine to treat various health problems include leaves, roots, bulbs, seeds, fruits, bark and flowers prepared in different methods which are presented in the subsequent section. Of 26 plant medicine preparations reported in this research, the most frequently utilized plant part in the preparation of remedies was leaves and roots that accounted for 14 (54%) and 12 (46%) preparations, respectively (Figure 1).

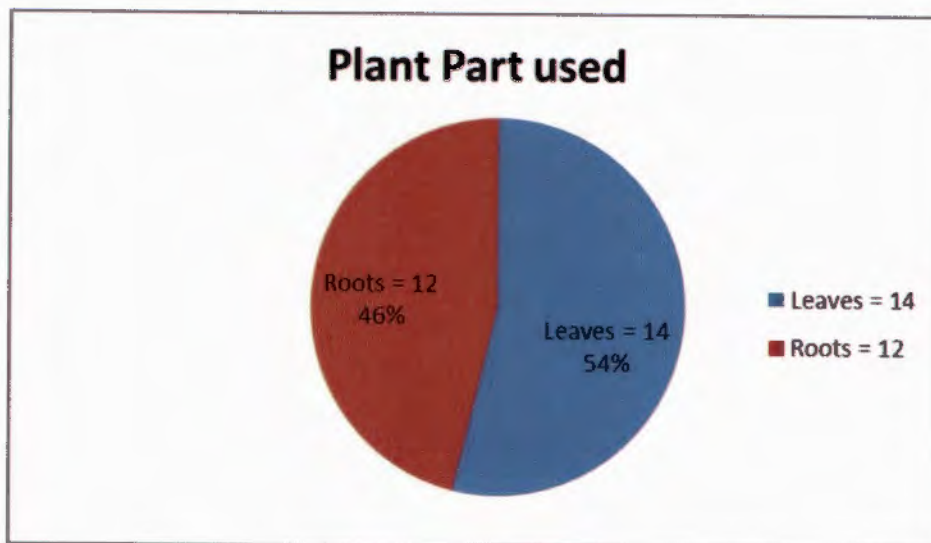


Figure 4.1 Plant Part Used

#### 4.3.5. Methods of Plant Medicine Preparation

The method in which a plant medicine is prepared has an effect on the instigation or mitigation of the toxicity of that particular plant medicine. Below is the presentation and description of the preferred preparation methods. Different methods of preparation of the plant medicine were utilised by the practitioners and knowledge holders and practitioners of the research area to treat an array of ailments (Figure 2). Most of the collected medicinal plants were prepared in decoction form, where the plant part is cooked in water or milk accounting for 14 (54%), followed by crushing and pounding method at 5 (19%), while infusion (plant part is immersed in water) accounted for 15% (4). Instances where the plant part is directly consumed without processing were reported at 8% (2) and inhalant (smoke) accounted for 4% (1) of the preparation methods.

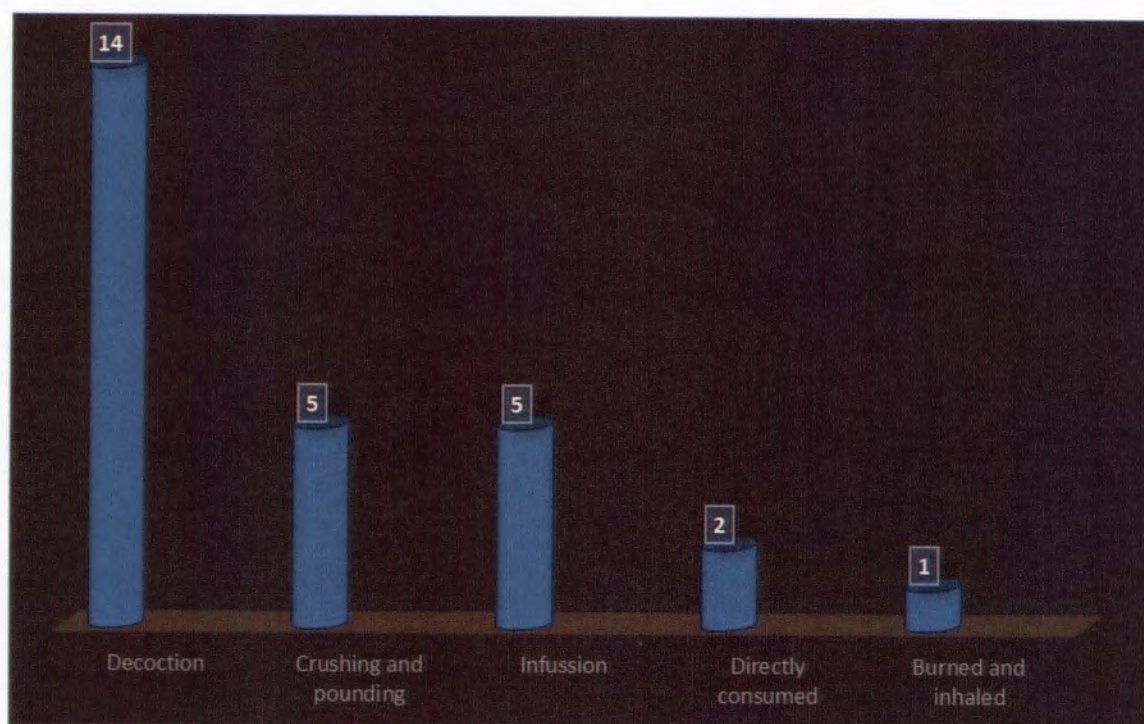
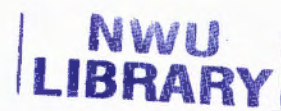


Figure 4.2 Methods of Preparation (Number of citations)

#### 4.3.6. Dosage of Plant Medicine



There was a high level of consensus among the participants in terms of the amount of plant medicine administered as well as the frequency of administration of a particular plant medicine. Most of the plant medicines which accounted for 24 (92%) were administered to health care users depending on the patient's level of strength (including body weight, age and gender) and severity of the illness. However, of all the decoction and infusion preparations there was a standardized unit of measurement for the plant medicine to half cup (125 ml) once a day and this was cited by 16 of the participants, especially decoctions and infusions of the five plants that were identified as strong (toxic in their interpretation). However, when the health care user is too weak or the illness is severe, the start-up dose is a quarter of a cup (60 ml) which increases the better the user gets towards recuperation. Only one participant was cited to have administered one full cup of the strong plant medicine.



#### 4.3.7. Informant Consensus Factor

Informant Consensus Factor (as discussed in chapter 3) is a formula used to calculate the consensus between participants with regard to each plant medicine reported and the illness treated. The ICF is  $nur-nt/nur-1$  where *nur* is number of used citations in each category and *nt* is the number of species used for each specific disease. Plants exhibiting ICF between 0.5 and 1 are considered more prevalent while those below 0.5 are less prevalent. The ICF also determines the importance of a particular plant (Ishtiaq *et al.*, 2015; Ahmed & Murtaza, 2015) where a high ICF indicates the effectiveness of the plant in treating that particular illness.

Wildekeur displayed an ICF of 1 for cancerous illnesses and the same plant further displayed an ICF of 0.86 when used in combination with Wildeals and Wynruit to treat respiratory illness and 0.88 when combined with Rooistorm to treat renal illnesses. Another plant which displayed an ICF of 1 is Bloudissel for the treatment of STIs, while plants such as Kruistemint and !Xobhagabe (for high blood pressure) and Dawietjie and Grashout (for the treatment of gastrointestinal issues) displayed a 0.92 ICF. Lastly, Swartstorm displayed an ICF of 1 for spiritual use such as inducing lightning and the plant is also used in divination. It must be mentioned that only two participants reported about the use of this plant, Swartstorm, while ten others reported not having knowledge about the plant's use but they knew the plant.

Table 4.3 Informant Consensus Factor

Illness reported	Number of citation ( <i>nur</i> )	Number of plants used ( <i>nt</i> )	ICF
1. Respiratory illnesses: flu, colds, fever	17	3 (Wildeals, Wynruit & Wildekeur)	0.88
2. Blood pressure	17	2 (!Xobhagabe & Kruistemint)	0.94
3. Renal illnesses	8	2 (Wildekeur & Rooistorm)	0.86
4. Cancerous illnesses	15	1 (Wildekeur)	1
5. STIs	17	1 (Bloudissel)	1



6. Gastrointestinal ailments	14	2 (Dawietjie & Grashout)	0.92
7. Spiritual use Induce lightning and Divination	2	1 (Swartstorm)	1

#### 4.4. Discussion of Results

The aim of this research was to investigate indigenous safety measures for communally used plant medicine. Aligning to literature, safety in medication is the likelihood of a therapeutic plant medicine not causing harm when administered for a particular condition and the safety of medication is dependent on the application of the following: the right medication (identification of the correct plant and the correct part), right patient/illness, right dose, and right route of administration and preparation of the medication (Moreira *et al.* 2014:249; Lynn, 2011:153).

The findings in this research revealed that measures of ensuring safety of medicinal plants that are considered strong or toxic in the community are in the day to day practices of normal or safe plant medicine preparations. However, the research also found that safety measures are not limited to plant medicine that are consumed or applied to heal physical illness. The research identified that there are plants that are used spiritually and these should be handled with care. Further, the community has its own conception of toxicity where they refer to plants that may cause harm after being consumed, applied or inhaled. The community refers to such plants in their local language Afrikaans as *Sterk* which translates to 'strong.' Therefore, medicinal plants that are strong in this research refer to those medicinal plants which may cause adverse effects such as vomiting, dizziness, diarrhea and even lightning if they are misused.

The philosophical grounding in this research requires the researcher to acknowledge the social and epistemological realities of the community hence the safety measures extended to measures such as not closing the lid of the pot that the plant medicine is prepared in. Furthermore, the participants also mentioned they did not close the pit in the ground after digging up the roots of a plant as this would result in the health care user not getting healed

by the prepared medicine. This indicates the holistic nature of indigenous health practices where spiritual aspects are inseparable and indistinguishable from the healing process.

The holistic nature in indigenous health care systems is also evident in the use of the plant Swartstorm which even though it is used to treat headaches, the plant also has spiritual use to induce lightning and in divination. This evidence on Swartstorm provides the rationale behind the findings that only two participants had knowledge about the plant because this is specialized knowledge privy to practitioners.

#### **4.4.1. Indigenous Safety Measures**

The Frequency of Citation and Informant Consensus Factor has been established to ascertain the level of agreement from the participants. The aim of this research was to investigate indigenous measures of ensuring safety of communally used medicinal plants in a rural community of the Northern Cape. The research focused on ten communally used medicinal plants and five of the ten medicinal plants were reported to be “less safe” by the participants. And these plant medicines are referred to as less safe in that if consumed in high quantities they may cause adverse effect such as dizziness, vomiting, diarrhoea and poisoning. The indigenous KhoiSan community has measures to ensure that these plants are used safely.

The safety measures cited in this research include the identification of the correct plant for a particular illness, use of the correct plant part, correct preparation methods, right dosage. Hence the safety measures are discussed in relation to those aspects.

#### **4.4.2. Identification of the Correct Plant for a Particular Illness**

Identification of the correct plant is detrimental as there are plants which may look the same but the incorrectly identified might be toxic. Also, it should be acknowledged that local plant names differ from community to community, implying that the same plant might have a different name from one community to another or might have the same name but referring to different plants.



#### 4.4.3. Preparation Methods

In terms of preparation the research established that the most common mode of plant medicine preparation was cooking the plant part in water or with milk for a few minutes till the medicine is concentrated. The medicine was cooked in a pot or tin cup for a few minutes and not for too long as that would make the medicine too concentrated and for those plants that were identified as strong or less safe that might result in the medicine becoming toxic. It was further discovered in this research that infusion of the dry, fresh or crushed plant part was immersed in warm or hot water to extract the therapeutic effects and this was the second most popular mode of preparation.

Additionally, the roots of Rooistorm were crushed into powder and were immersed in warm water and only one table spoon is added to five litres of warm water. This is a clear indication that this plant is indeed strong hence small quantities of the powder added to large quantities of water. The roots of Grashout are crushed into powder and were used as a purgative when cooked for a few minutes and directly consuming a small piece of the root treats stomach pain. However, Grashout was also identified as less safe therefore it is only taken in small doses and should not be boiled too long.

#### 4.4.4. Dosage of Plant Medicine

The dose is strictly dependant on the severity of the illness or strength, age and gender of the user. When administering plant medicine to a severely ill health care user, the dose starts at a lesser dose and gradually increases (starts at  $\frac{1}{4}$  cup=60 ml,  $\frac{1}{2}$  cup=125 ml and full cup=250 ml). This shows that the community have an understanding of the importance of dosage as a measure to ensure safety of communally used plant medicine.

#### 4.4.5. Spiritual Measures

The research has also found that there are measures of ensuring safety which are spiritual in nature and should be adhered to in order to ensure that the plant medicine prepared is



effective and does not cause further harm to the user. These measures include not closing the lid of the pot when cooking the medicine which is prepared in and not closing the hole in the ground after digging up a root. It is believed that by closing the lid of the pot or closing the hole encloses the illness on the body of the health care user and the illness will not leave the body and thereby further harm the user and this applies to all the plant medicines found in this research.

However, there are plants which have spiritual use and therefore need to be handled with care by experts and if used by lay person it should be by prescription from a practitioner. Swartstorm is a plant that was reported as used for the treatment of headaches by burning a piece of the root and inhaling the smoke. This plant however has further use such as inducing lightning and it is also used in divination hence the need for health care users to adhere to only burning the tip of a small piece to treat headaches which is usually a once-off procedure and the same piece can be reused.

#### **4.5. Summary**

This chapter presented demographic information of the participants together with the descriptions of the measures used to ensure the safety communally used KhoiSan medicinal plants and lastly, discussion of the research findings. The following chapter presents the outcomes of the research and inferences made about these outcomes. Finally, conclusions and recommendations of the research are presented.

# Chapter 5

## Outcome, Conclusions and Recommendations of the Research

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### 5.1. Introduction

Following the discussion of the findings in the previous chapter, in this chapter a synopsis of the outcome of the research is provided followed by the inferences, limitations and recommendations. The table below presents a synopsis of the outcome of the research which answers the research objectives of this research. These outcomes were achieved using a quantitative descriptive design under ethnobotany research approach where data was collected using ethnographic methods such as observations and a semi-structured questionnaire. The data was analysed using statistical formulae to produce descriptive statistics (Martin, 1995:121; Hofman & Galler 2007:203). After the realisation of the research outcomes, conclusions were made by linking the outcomes to the aim of the research and also to clarify the meanings of these outcomes.

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### 5.2. Research Outcome

Table 5.1 shows the outcome of the research, which are conclusions or insights drawn from this research project.

Table 5.1 Research Outcome

Objective of the research	Outcome
a) Describe the indigenous safety measures of ten communally used medicinal plants in terms of plant name, part used, formulation, preparation methods, dosage, administration routes, storage,	<b>General safety measures (5 safe plants)</b> <ol style="list-style-type: none"><li>1. Identification of the correct plant.</li><li>2. A dose of ½ cup to full cup depending on the user's age.</li><li>3. Taken 2-3 times a day</li><li>4. Cooked for ± 10 minutes (caution: the longer the</li></ol>

<p>“toxicity” and illness treated for each plant in a rural KhoiSan community.</p>	<p>medicine is cooked the stronger it becomes).</p> <ol style="list-style-type: none"> <li>Leaves should be removed from decoction after preparation to avoid over concentration which will make medicine strong or “toxic”.</li> <li>Store in a cool place or fridge to avoid fermentation.</li> </ol>
<p>b) Identify one of the most toxic communally used medicinal plants in the rural KhoiSan community.</p> <p>The community identified more than one plant</p>	<p><b>Conceptualization of “Toxic” in the community</b></p> <p>The community refers to such plants in their local language Afrikaans as <i>Sterk</i> which translates to strong. Therefore, medicinal plants that are ‘strong’ in this research refer to those medicinal plants which may cause adverse effects such as vomiting, dizziness, diarrhea and even lightning when misused. Those plants are: Bloudissel, Dawietjie, Grashout, Rooistorm and Swartstorm.</p>
<p>c) Ascertain indigenous safety measures of the identified toxic medicinal plant in the community.</p>	<p><b>Special safety measures for strong plants</b></p> <ol style="list-style-type: none"> <li>Must be prepared by a <i>knowledgeable person</i>.</li> <li>Correct <i>identification</i>.</li> <li><i>Plant part/s (Roots) is measured</i> according to the user’s index finger and the number of pieces depends on the size of the pot used to prepare or the amount of water added.</li> <li>The <i>dose</i> is strictly dependant on the severity of the illness or strength, age and gender of the user. Starts at a lesser dose and gradually increase dosage (starts at ¼ cup=60 ml, ½ cup=125 ml and full cup=250 ml). The plant part is measured by <i>user’s index finger</i> for roots and a <i>palm full</i> for leaves.</li> <li>The <i>higher the dose the less frequent</i> the medicine is taken in a day.</li> <li>Preparation: Cook or immerse for ± 10 minutes till medicine is <i>concentrated (should not be over cooked)</i> as that makes it too strong or “toxic”).</li> <li>Prepared medicine should be <i>stored in a cool place</i></li> </ol>



	<p>in the room (e.g. under a high raised bed or fridge).</p> <p>8. When storing the prepared medicine the <i>plant parts should be removed</i> from decoction or infusion.</p> <p>9. Spiritual measures of ensuring safety such as: <i>Not closing the pot lid and not closing the hole in the ground</i> after harvesting the roots of a plant.</p> <p>10. Plants such as Swartstorm have spiritual use (induce lightning and divination) therefore need to be <i>handled by experts</i>. Plant is used for spiritual forces of <i>healing (Ukuthwasa)</i> and spiritual forces of <i>darkness (Ubuthakathi)</i>.</p>
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### 5.3. Conclusions Made from the Outcome of the Research

Safety in medication is the likelihood of a therapeutic plant medicine not causing harm when administered for a particular condition and there are plants which are not safe for human consumption but closely resemble communally used medicinal plants (Ndhlala *et al.*, 2011:839). Therefore it is important to *identify the correct plant* to avoid harm. On the other hand, the knowledge on medicinal plants is held mostly by the *elders in the community* and this is a disturbing factor as there was only one participant within the age group of 35-45 identified in this research. This is an indication that there is lack of cross-generational transfer of knowledge and this is a cause for concern as this knowledge is in danger of going extinct (Inta *et al.*, 2013:351). Furthermore, even though this participant was part of the committee, there was evidence that they have not fully grasped the medical knowledge as it was this participant who differed from the rest about the dosage of one of the plant medicine that was considered less safe. However, this participant is a knowledge holder and not a practitioner who prescribes medication to a large number of health care users.

The rationale for the deviation can also be attributed to the fact that *issues of dosage* depend on the age, gender and body mass of the health care user and the severity of the illness. This is one of the major findings in this research which proves that the ongoing misconceptions that there is no standard dosage in indigenous health care system. In essence, in this administration of medication, there is very clear evidence that this is prescribed to suit the

needs of the health care user. Furthermore, this also contrasts with the conventional health care practice where one dose is prescribed for different people regardless of the elements considered in indigenous health care system.

Related to issues of dosage, is the frequency of *medicine administration*. Dosage is also dependant on the severity of the illness hence it was found in the research that the frequencies at which the medicine is taken depends on the health care user's state of health. However, even though this depends on the health state of the user, it is important to adhere to prescribed frequencies from a practitioner or knowledge holder. Additionally, the frequency of administration of the medicine is also dependant on the dose because the participants indicated that the higher the dose the less frequent the medicine should be taken in a day, especially for Bloudissel and Rooistorm.

In terms of preparation, the research identified that the most common mode of *plant medicine preparation* was cooking the plant part in water or with milk for a few minutes till the medicine is concentrated. This was done to extract the therapeutic components of the plant and the medicine was cooked in a pot or tin cup for a few minutes and not for too long as that would make the medicine too concentrated. Additionally, water was the main medium used in cooking the plant medicine while donkey milk was used in the preparation of Bloudissel which was identified as one of the less safe plants in the community. Such preparation of Bloudissel can be deduced as a special safety measure to reduce the toxicity of the plant. This is supported by findings from other studies such as van Wyk *et al.*, (2009:16) who concurred that the addition of other solvents such as milk or alcohol may serve to neutralize the toxins in the plant.

Furthermore, infusion was the second most popular method of preparation where the plant part is immersed in warm or hot water. It was established that the roots of Rooistorm were crushed into powder and were immersed in warm water and only one table spoon is added to five litres of warm water. This is a clear indication that this plant is indeed strong hence the very small quantities of the powder added to large quantities of water which in turn reduce or neutralize the toxins in the plant. It must be further noted that even though the infusion contains a lot of water, the dosage is still half a cup.

The roots of Grashout are crushed into powder and were used as a purgative when cooked for a few minutes and directly consuming a small piece of the root treats stomach pain. However, Grashout was also identified as less safe therefore it is taken in small doses and should not be



boiled for too long because this would then make it toxic. It was reported that if over cooked and overdosed the plant medicine causes diarrhoea. This finding confirms that the community knows the side effects that could arise as a result of misuse or incorrect administration of the medication.

The *storage of plant medicine* came out as one of the key measures as there was a high level of agreement from participants that medication such as decoctions and infusions should be stored in cool places or in a fridge. Additionally, it was indicated that after cooking or immersing the plant parts in water or milk for the required time, the plant part should be removed and the prepared medication stored in a separate container. This was done to prevent over concentration and fermentation of the medicine which might make it toxic because the longer the plant part stays in the medicine the more concentrated it becomes. There was further agreement among the participants that another option was cooking or infusing enough for a single dose and the plant parts can be stored for reuse at a later stage when needed. Such a course depends on the plant medicine in use because there are *those plants which must be prepared by a knowledgeable person* because they are considered strong and thereby *need special preparation*. This is not limited to the KhoiSan community in the Northern Cape, but a research conducted across four provinces in South Africa also found communities using toxic plants which needed special preparation measures by an expert otherwise they become lethal concoctions (Komoreng *et al.*, 2017:13).

Adding to that, using the correct plant part is vital because plants have different active ingredients in different parts of the same plant therefore it is important to know which part to use. Plant parts that are mostly used in this research are the leaves followed by the roots. This is due to the fact that only ten medicinal plants were the focus of this research hence only two plant parts were cited for all 26 plant medicine preparations. The *leaves were mostly used from those plants which were considered safe while the roots were from those considered less safe*. Komoreng *et al.* (2017:14) also reported that participants in their research believed that underground plant parts contain the most concentrations of healing agents and this can also be aligned to the rationale in the KhoiSan community that the roots of plants that are considered strong are used. On the other hand, other studies indicate that the use of roots poses a threat to the survival of some medicinal plants and thereby discourage the use of roots (Semenya *et al.*, 2012:653).



Additionally, the use of the leaves does not affect the growth of the medicinal plant as much as the roots. However, it must be highlighted that this community has *special ways of harvesting plant parts* which do not harm the plant and they do not over harvest. A previous research in the same community by Taaka (2016:34) found that the community has specific ways of harvesting which are conservative. This concurs with the findings in this research where participants prescribed only a handful *of leaves and that roots are measured according to one's index finger* to determine the size of the piece.

In light of the above inferences, it can be confirmed that the aim of the research was met where indigenous measures of ensuring safety of communally used plant medicine was investigated. However, there are additional measures which are *spiritual in nature*, for instance not closing the lid of the pot when cooking the medicine and not closing the hole in the ground after digging up a root as it is believed that the health care user will not get healthy if this is not adhered to. An additional point inferred here is that the hole is not closed to alert other community practitioners that there has been a harvest made in recent times: any additional harvest when the hole is still open is therefore discouraged. This further proves the holistic nature of indigenous healing as it is not limited to the physical but the spiritual realm is also included in the healing process.

Adding to the *spiritual measures*, the research found that there is a plant that is used spiritually and this plant was also identified as less safe. Swartstorm was reported for treating headaches when the root is burned and the smoke is inhaled. However, this plant is also used for divination to sense out the direction from which trouble will come. Also this plant is used in practices of darkness such as inducing lightning to strike and kill enemies. 'Swartstorm' is an Afrikaans word which directly translates to Black-thunder, and this means the plant was named after its dark use. This explains why only two participants who were practitioners had knowledge about the use of this plant because they are authorities or experts in this regard.

Furthermore, the use of plants such as Swartstorm illuminates the fact that there are two uses of plants in African indigenous health care systems practices: the use of plants for *healing (Ukuthwasa)* and the use of plants for darkness (*Ubuthakathi*) and this was clearly indicated in the findings of this research. Also, the fact that this is sacred knowledge can be attributed to the reason why the other ten participants refrained from disclosing the spiritual knowledge about this plant. Lastly, this research acknowledges the epistemological underpinnings of the community and thereby sees this as a significant finding.

In sum, this research has proved that indigenous communities have measures employed to ensure the medicinal plants they use to combat various illnesses and this research is one of a few research to give focus on such aspects of indigenous health. There is a paucity of studies that acknowledge how indigenous communities ensure the safety of the medicinal plants they use and instead pharmacological scholars Mabona and van Vuuren (2013:179) disregard such measures. However, studies by Semenya *et al.* (2012:653); Mphuthi, (2015:212) and Taaka (2016:80) acknowledge the communities' methods of preparation, dosage and storage which are key measures. Mulaudzi *et al.* (2015); Mphuthi (2015:212) and Taaka (2016:57) further conducted pharmacological verification of the plant medicines as they are prepared in the community.

Evidently some safety measures discussed by the previous authors, also confirmed in this research, concur with measures employed in the Indian Ayurveda system reported by Mourya *et al.* (2015: 189). The last author asserts the safety measures (Sodhana) entails boiling of the highly toxic medicinal plants for three hours, drying it and re-boiling it for three consecutive days.

#### **5.4. Limitations**

- There was a challenge in finding a community that resembles the one under research for a pilot research in terms of people with knowledge on medicinal plants. This led to the researcher conducting the pilot research with three members of the KMMC who were subsequently excluded from participating in the actual research.
- The researcher planned to have a total sample of 23 participants of the KMMC but ended up with a sample of 17 participants due to the unavailability of three members and exclusion of the other three who participated in the pilot research.



## **5.5. Recommendations**

The following recommendations emanated from this research project and they are discussed in relation to indigenous health care practice, education and further research:

### **5.5.1. Recommendations for Indigenous Health Care Practice**

- Considering the fact that there is an increasing demand for medicinal plants, indigenous health practitioners should make an initiative to create awareness about the safe use of medicinal plants in the communities they serve.

### **5.5.2. Recommendations for Education**

- In light of the fact that this knowledge is mostly held by elders, it is recommended that practitioners and local schools form a partnership that facilitates the transfer of indigenous knowledge to the younger generation.
- Universities offering programmes in health sciences should include courses on indigenous health sciences which would result in graduates who have an informed understanding and appreciation of indigenous health care system.

### **5.5.3. Recommendations for Further Research**

- The research found that indeed indigenous communities do have measures of ensuring the safety of plant medicine they use even though most researchers continue disregarding the existence of such measures. Further research should be pursued on a bigger scale or from different KhoiSan communities and other communities throughout South Africa to compile a safety guide and essential plant medicine list.



## 5.6. Conclusion

In this chapter the researcher presented the overall summary of the research outcomes and inferences resulting from the outcomes together with the limitations experienced during the research process. Also, recommendations for indigenous health care practice, education and further research were presented. In drawing this project to close, it was evident that the community is rich in medicinal plant knowledge and that indigenous measures of ensuring the safety of the medicinal plants used for therapeutic purposes exist in the KhoiSan community.

Therefore there is a need for research that acknowledge how different indigenous communities ensure the safety of the medicinal plants they use. This should be done in order to formulate comprehensive and community relevant safety guide and essential indigenous medicines list which can be used in health education programs that will prevent the misuse of medicinal plants and thereby avoid cases of poisoning.

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## Appendices

### Appendix 1: Ethics Certificate

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File Edit View Window Help



**NORTH-WEST UNIVERSITY**  
**YUNIBESITHI YA BOKONE-BOPHIRIMA**  
**NOORDWES-UNIVERSITEIT**

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**Research Ethics Regulatory Committee**  
Tel: +27 18 299 4849  
Email: [Ethics@nwu.ac.za](mailto:Ethics@nwu.ac.za)

#### ETHICS APPROVAL CERTIFICATE OF PROJECT

Based on approval by the **Health Science Ethics Committee (FAST-HSEC)** on 03/03/2018 after being reviewed at the meeting held on 27/02/2018, the North-West University Research Ethics Regulatory Committee (NWU-RERC) hereby **approves** your project as indicated below. This implies that the NWU-RERC grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the project may be initiated, using the ethics number below.

**Project title:** Indigenous safety measures of communally used plant medicine in a rural KhoiSan Community

**Project Leader:** Professor AJ Pienaar  
**Student:** SL Meshego (24872237)

**Ethics number:**

N	W	U	-	0	0	7	2	5	-	1	7	-	A	9
Institution			Project Number						Year		Stage			

Legend: S = Submission, R = Re-Submission, P = Provisional Authorisation, A = Authorisation

**Application Type:** Single study

**Commencement date:** 2018-03-01      **Expiry date:** 2021-03-31      **Risk:** Minimal

**Special conditions of the approval (if applicable):**

- Translation of the informed consent document to the languages applicable to the study participants should be submitted to the HSEC (if applicable).

8.27 x 11.89 in

## Appendix 2: Consent Form



NORTH-WEST UNIVERSITY  
YUNIBESITHI YA BOKONE-BOPHIRIMA  
NOORDWES-UNIVERSITEIT  
MAFIKENG CAMPUS

### INDIGENOUS KNOWLEDGE SYSTEMS (IKS) CENTRE

#### Consent Form for Interview

I am **Simangaliso Lesley Mashego**, a registered student in the Master's student in Indigenous Knowledge Systems at North-West University, Mafikeng campus under the supervision of **Professor A.J. Pienaar**.

The proposed research topic is: **Indigenous safety measures of communally used plant-medicine in a rural KhoiSan community.**

#### The purpose of the research

Indigenous communities have a long history of using medicinal plants to meet their health needs and the knowledge about the correct and safe use of these medicinal plants has been passed down from generation to generation. However, due to the diminishing platforms of knowledge transfer the correct knowledge is privy to a few people and this may result in people misusing or using the medicinal plants incorrectly. These may result in adverse or acute poisoning hence this research is aimed at investigating how indigenous communities ensure safety of the medicinal plants they use.

#### The objectives of the study are:

- a) Describe the indigenous safety measures of ten communally used medicinal plants in terms of plant name, part used, formulation, preparation methods, dosage, administration routes, toxicity and illness treated for each plant in a rural KhoiSan community.
- b) Identify the most toxic communally used medicinal plants in the rural KhoiSan community.
- c) Ascertain indigenous safety measures of the identified toxic medicinal plants in the community.

We are hereby seeking your consent to participate in the research process regarding your



indigenous knowledge on the use of medicinal plants which is in line with the above topic and objectives. You will be interviewed for approximately 45-60 minutes and the information will be recorded with an audio recorder (tape recorder, cell phone &/laptop). The information will be used for academic purposes only, where the findings will be published in an academic journal. You will be provided with a copy of the research instruments intended for this research and should you require any further information, please do not hesitate to contact the student or the supervisor.

There are no risks associated with taking part in this research. The benefits involved with participating in this study to the community are that this vital indigenous knowledge will be preserved and the information shared will help further research that may promote the safe use of medicinal plants. Lastly, the identity of the participants will be kept confidential as only code names such as Participant A or B will be used.

**Interviewee:**

I have read and understand the information relating the above study and have discussed and been briefed about the objectives and methods of this study and I am satisfied with the answers given. I understand that taking part in the study is voluntary and I have the right to withdraw from the study at any time without fear of any consequences. I also understand that my participation in this study is confidential and that all information derived from this interview will remain anonymous and will only be used for academic purposes.

Thank you for your time and participation in this study.



Researcher's Name:.....

Supervisor's Name:.....

Signature:.....

Signature:.....

Date:.....

Date:.....

Contacts: lesmash88@gmail.com

Contacts: abel.pienaar@gmail.com

: 073 762 0899

: 082 680 7642

Participant's Name:.....

Signature:.....

Date:.....



### Appendix 3a: Instrument (English)

#### Semi-structured questionnaire for Indigenous health practitioners and Knowledge Holders

North-West University, Faculty of Agriculture, Science and Technology, Indigenous Knowledge Systems Centre

##### Part 1: Demographic Information

Participant code: .....

Participant category: Knowledge holder ☐ Practitioner ☐

Gender: Male ☐ Female ☐

Experience - How long have you been a practitioner?.....  
.....

Educational information - What grade/standard did you attended?.....

Are you employed?.....

How long have you been a practitioner?.....

Age group: 18-35 ☐ 35-45 ☐ 55-65 ☐ 65-75 ☐ 75-85 ☐ 85-95 ☐  
95-105 ☐

##### Part 2: Data about 10 communally used medicinal plants (Objective 1&2)

What are the names of the medicinal plants you use for the treatment of illnesses in the community?

Plant 1-10 (Name):.....

Which illness do you use it for?.....

.....  
.....  
.....

Which part/s do you use?

In what form is the plant medicine administered?

How do you prepare it?

In what dosage is the plant medicine taken?

How frequent should the plant medicine be taken?

Where should the plant medicine be stored?

For how long should the plant medicine be stored and used?

Do you consider any other safety measures in the preparation, usage or storage of this plant medicine?

.....  
.....  
Which of these plants do you consider Strong or less safe (Toxic)?  
.....  
.....  
.....

**Part 3: Data about indigenous safety measures for Strong plants (Objective 3)**

What measures do you employ to ensure this plant medicine is safe?  
.....  
.....  
.....

What is added in the preparation?  
.....  
.....  
.....

What safety measures do you follow in this specific medicinal plant (process)?  
.....  
.....  
.....

What happens when the health care user does not take the plant medicine correctly?  
.....  
.....  
.....

What should that health care user do?  
.....  
.....  
.....

**Thank you for your time and participation in this research.**



### Appendix 3b: Instrument (Afrikaans)

#### Semi-gestruktureerde vraelys vir inheemse gesondheidspraktisyns en kenners

North-West University, Faculty of Agriculture, Science and Technology, Indigenous Knowledge Systems Centre

#### Deel 1: Demografiese Inligting

Deelnemers kode: .....

Deelnemers kategorie: Kenner ☐ Praktisyn ☐

Gender: Manlik ☐ Vroulik ☐

Ondervinding-Hoe lank praktiseer u? .....

Skoolop voeding: Watter grad/standers het u die skool verlaat? .....

Werk u? .....

Age group: 18-35 ☐ 35-45 ☐ 55-65 ☐ 65-75 ☐ 75-85 ☐ 85-95 ☐

95-105 ☐

#### Deel 2: Inligting oor die 10 gemeenskap gebruik medisinale plante (Objective 1&2)

Wat is die name van die medisinale plante wat u gebruik vir die behandeling van siekte in die gemeenskap?

Plant 1-10 (Naam): .....

.....  
.....  
.....

Watter siekte gebruik u die plant? .....

.....  
.....  
.....

Watter gedeelte gebruik u?

In watter vorm administreer u die plant u die plant medisyne?

Hoe berei u dit voor?

Wat is die dosis?

Waar berg u die plant medisyne?

Vir hoe lank gebruik en berg u die plant medisyne?

Is daar enige veiligheids maatreëls in die voorbereiding, gebruik of berging van die plant medisyne?

Watter plante van die genoemde sal u as sterk (Gifstig) of mender veilig klassifiseer?

### **Deel 3: Inligting oor inheemse veiligheids maatreëls van sterk plante (Objective 3)**

Watter maatreëls gebruik u om te verseker die plant medisyne is veilig?

Wat voeg u by die plant medisyne?

Watter veiligheids maatreëls volg u in die spesifieke plant (proses)?

Wt gebeur as die gesondheidsorg-gebruiker die plant medisyne verkeerd gebruik?

Wat moet die gesondheidsorg-gebruiker doen?

**Dankie vir die saam werker.**



## Appendix 4: Memorandum of Understanding

### THE GRIQUA ROYAL HOUSE DIE GRIEKWA KONINGLIKE-HUIS



Administration Office: c/o 26th & Beardman Str. Faith Mission Centre Leonsdale Elsie's River 7490 PO Box 316 Elsie's River 7480  
Tel: 021 932 9901 Fax: 021 931 9400 Email: adamkolv@potka.co.za

#### MEMORANDUM OF UNDERSTANDING

This memorandum serves as an agreement reached between the Seboka Team under the leadership of Prof. Abel J. Pienaar and the Griqua Royal House. An appointed Seboka member will be expected to abide and respect the values and norms of the community while conducting research.

The following are the terms and conditions of agreement.

- The Seboka team is given the permission to conduct the research within the Griqua community, on a mutual capacity principle;
- The conducted research will be based on the Indigenous Knowledge Systems, of which the community will lead and guide the proceedings;
- The team (Seboka) will conduct the research using multiple research methodologies but the primary approach will be conducting "makgotla" with the assistance of a nominated member of the Griqua Royal House;
- The Seboka team will always respect the community and make sure that all the information is treated confidential;
- The research will be conducted by the appointed Seboka researcher, who will in turn sign the consent;
- Both parties also agree that the shared information remains the property of the Griqua Royal House unless otherwise stated;

This memorandum will be used as a global consent for conducting the research in the community. The participants' rights will also be taken into consideration and be respected while conducting the research. These rights are but not limited to the following:

BL

AK

- Autonomy and self-identification
- Privacy
- Confidentiality
- Justice
- Non-maleficence
- Voluntary participation
- Freedom of speech and movement as it will be an open forum

These conditions were discussed and agreed upon by the two parties (Community leader and Seboka Team leader). The terms and conditions discussed above are legal and bonding to the parties.

Signed at Campbell on 17<sup>th</sup> of July 2017  
 Seboka team leader : AK  
 Griqua Royal House : AKOKE  
 Researcher : [Signature]

Copies to: Griqua Royal House, Seboka office and researcher



His Majesty King Adam Khe  
 His Excellency High Commissioner A. M. M. M. M.



S-L  
 AK

## Appendix 5: Consent Form Singed by King Adam Kok 5<sup>th</sup>

### Appendices

#### APPENDIX 1: CONSENT FORM



NORTH-WEST UNIVERSITY  
YUNIBESITHI YA BOKONE-BOPHIRIMA  
NOORDWES-UNIVERSITEIT  
MAFIKENG CAMPUS

#### INDIGENOUS KNOWLEDGE SYSTEMS (IKS) CENTRE

##### Consent Form for the Interview

I am **Mr. Simangaliso Lesley Mashego** and a registered student in the Masters of in Indigenous Knowledge Systems at North-West University, Mafikeng campus under the supervision of **Professor A.J. Pienaar**.

The proposed research topic is: **Indigenous safety measures of communal-used plant-medicine in a rural KhoiSan community.**

##### The purpose of the research

Indigenous communities have a long history of using medicinal plants to meet their health needs and the knowledge about the correct and safe use of these medicinal plants has been passed down from generation to generation. However due to the diminishing of platforms of knowledge transfer the correct knowledge is known by few people and this may result in people misusing or using the medicinal plants incorrectly. These may result in adverse or acute poisoning hence this research is aimed at investigating how indigenous communities ensure safety of the medicinal plants they use.

##### The objectives of the study are:

a) Identify a toxic communal-used medicinal plant in the rural Khoi-San community b). Describe the indigenous knowledge of ten communal-used medicinal plants in terms of plant name, part used, formulation, preparation and dosage methods, toxicity and illness treated for each plant in a rural KhoiSan community. c) Ascertain indigenous safety measures of the identified medicinal plants in the community.

We are hereby seeking your consent to participate in the research process regarding your



indigenous knowledge on the use of medicinal plants which is in line with the above topic and objectives. You will be interviewed for approximately 45-60 minutes and the information will be recorded with an audio recorder (tape recorder, cell phone &/laptop). The information will be used for academic purposes only, where the findings will be published at an academic journal. You will be provided with a copy of the research instruments intended for this research and should you require any further information, please do not hesitate to contact the student or the supervisor.

There are no risks associated with taking part in this research. The benefits involved with participating in this study to the community are that this vital indigenous knowledge will be preserved and the information share will help further research that may promote the safe use of medicinal plants. Lastly, the identity of the participants will be kept confidential only code name such as Participant A or B will be used.

**Interviewee:**

I have read and understand the information relating the above study and have discussed and been briefed about the objectives and methods of this study and I am satisfied with the answers given. I understand that taking part in the study is voluntary and I have the right to withdraw from the study at any time without fear of any consequences. I also understand that my participation in this study is confidential and that all information derived from this interview will remain anonymous and will only be used for academic purposes.

**Thank you for your time and participation in this study.**

Researcher's Name: S.L. Mashaga

Signature: [Signature]

Date: 05/09/2017

Contacts: lesmash88@gmail.com

: 073 762 0899

Supervisor's Name: A.J. Pienaar (Prof)

Signature: [Signature]

Date: 5 Sept 2017

Contacts: abel.pienaar@gmail.com

: 082 680 7642

Participant's Name: Mrs. Ann-Mari

Signature: [Signature]

Date: 05-09-2017

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## Appendix 6: KhoiSan Medicinal Plants

Table 4.2 KhoiSan Medicinal plants

Local plant name	Part/s used	Preparation Methods	Form	Dosage	Illness treated
1. !Xobhagabe (G)/Wildemint (A)	Leaves	Fresh leaves are immersed in hot water or put in tea.	Taken as tea/infusion	Full cup	Regulates blood pressure. Treats Menstrual pains, headaches
2. Bloudissel	Roots	Roots are cooked with water or donkey milk	Decoction	Half cup once a day	Sexually Transmitted Infections (STIs) and toothache Infection
3. Dawietjie	Roots	Roots are cooked with water	Decoction	Half cup for adults, 1 Teaspoon children	Treat stomach cramps and convulsions in children
4. Grasshout	Roots	The roots may be crashed to powder or cooked with water	Decoction, Powder or Directly consumed	Half cup of decoction, teaspoon of the powder	Decoction is a purgative or detoxing agent used to treat gastrointestinal problems. The powder added to bath water to protect from evil spirits in children and a lucky charm for adults. A small piece of the root may be chewed and swallowed for stomach pains and food poisoning.
5. Krustemint/Griqua tea	Leaves	Fresh leaves are immersed in hot water or put in tea.	Taken as tea/infusion	Full cup	Regulates blood pressure. Treats flatulence especially in children and can also be used as a mouth freshener when leaves are chewed.
6. Rooistorm	Roots	Roots are crushed to powder, 1 table spoon is added to 5 litre of warm water	Infusion	Half cup	Kidney cleanser
7. Swartstorm	Roots	Dry root is burned and smoke is inhaled	Inhalant		Treat headache and for spiritual purposes like curse lightning and divination.
8. Wilde als	Leaves	Cooked with water	Decoction	Half cup twice a day	Respiratory illnesses, flu, fever
9. Wildekeur/ Kankerbos	Leaves Some use the roots	Cooked with water	Decoction	Half cup twice a day	Cleanses the kidneys, bladder and womb, it is also an immune booster, treats hypertension, respiratory illnesses and prevents cancer.
10. Wynruit	Leaves	Cooked with water	Decoction	Half cup twice a day	Respiratory illnesses, flu, fever and cold

## Appendix 7: Frequency of Citation

Table 4.3 Frequency of Citation

Local plant name	Frequency of Citation
!Xobhagabe (G)/Wildemint (A)	17
Bloudissel	17
Dawietjie	10
Grasshout	12
Krustemint/Griqua tea	17
Rooistorm	12
Swartstorm	12 (2)
Wilde als	17
Wildekeur/ Kankerbos	17
Wynruit	17



## Appendix 8: Informant Consensus Factor

Table 4.3 Informant Consensus Factor

Illness reported	Number of citation ( <i>nur</i> )	Number of plants used ( <i>nt</i> )	ICF
1. Respiratory illnesses: flu, colds, fever	17	3 (Wildeals, Wynruit & Wildekeur)	0.88
2. Blood pressure	17	2 (!Xobhagabe & Kruistemint)	0.94
3. Renal illnesses	8	2 (Wildekeur & Rooistorm)	0.86
4. Cancerous illnesses	15	1 (Wildekeur)	1
5. STIs	17	1 (Bloudissel)	1
6. Gastrointestinal ailments	14	2 (Dawietjie & Grashout)	0.92
7. Spiritual use Induce lightning and Divination	2	1 (Swartstorm)	1

**Appendix 9: Images Taken in the Community (consent obtained from the chief and the community)**















## Appendix 10: Acknowledgement of Article Submission



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### International Journal of African Renaissance Studies - Manuscript ID RARS-2018-0015 has been submitted online

1 message

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Cc: lesmash88@gmail.com, abel.pienaar@gmail.com, teboho.taaka@gmail.com, khauhelo.mahlatsi@gmail.com

09-May-2018

Dear Mr Mashego:

Your manuscript entitled "Indigenous safety measures of communally used plant medicine in a rural KhoiSan community" has been successfully submitted online and is presently being given full consideration for publication in International Journal of African Renaissance Studies.

Your manuscript ID is RARS-2018-0015.

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Sincerely,  
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## Appendix 11: Language Editor Certificate



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05 May 2018

TO WHOM IT MAY CONCERN

### CERTIFICATE OF EDITING

I, **Muchativugwa Liberty Hove**, confirm and certify that I have read and edited the entire research thesis, "**Indigenous safety measures of communally used plant medicine in a rural KhoiSan community**" by **Simangaliso Lesley Mashego**, student number **24872237**, submitted in fulfilment of the requirements for the degree **Master's In Indigenous Knowledge Systems** in the Faculty of Natural and Agricultural Sciences, **North-West University, MC**.

**Simangaliso Lesley** was supervised by **Professor Abel Jacobus Plenaar** of the North-West University.

I hold a PhD in English Language and Literature in English and am qualified to edit academic and research work of such nature for cohesion and coherence.

The views and research procedures detailed and expressed in the thesis remain those of the researcher/s.

Yours sincerely

Dr M.L.Hove (PhD, MA, PGDE, PGCE, BA Honours, English [UZ])

Original details: Dr M.L.Hove (22055215) C:\Users\22055215\Desktop\CERTIFICATE OF EDITING.docx  
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