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*Research Article*

# **Management of Diabetes and Hypertension among Tswana and Zulu Traditional Health Practitioners: A Comparative Cross-Sectional Study Using a Mixed-Methods Approach**

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## **ABSTRACT**

Diabetes and hypertension contribute to a considerable burden of disease in sub-Saharan Africa (SSA), being largely due to poor diet habits, smoking and alcohol abuse. The study was aimed at providing evidence on the use of traditional medicine (TM) essential for managing these conditions by Zulu and Tswana traditional health practitioners (THPs). Data collection took place in the uMgungundlovu and uThukela Districts in KwaZulu-Natal (KZN) Province, and the Bojanala, Dr Ruth Sekgopomati Districts, in North-West Province, South Africa. Snowball sampling resulted in 863 THPs participating, 437 Zulus and 426 Tswanas face-to-face interviews were conducted using a semi-structured questionnaire to obtain qualitative and quantitative information about the objectives of the study. Most of Zulu and Tswana THPs acquired knowledge from a single source to manage diabetes and hypertension. The Zulu THPs acquired knowledge as a gift from birth while the Tswana's acquired knowledge from family members. Management was solely based on traditional knowledge, with the two groups having a similar cultural understanding of the two conditions and their clinical features, which were comparable to Orthodox Conventional Medicine (OCM) signs and symptoms. Treatment modalities mainly consisted of ethnopharmacological preparations of herbal mixtures concoctions and decoctions. There were similarities in the Zulu and Tswana THPs cultural understanding of these two diseases, descriptions of clinical features of diabetes and hypertension, and ethnopharmacological preparations used in their management. The findings are intended as a guide to developing a treatment framework that enables a common understanding of traditional practices to manage the two conditions.

**Keywords:** *Diabetes, Hypertension, Acquisition of Knowledge, Ethnopharmacological preparations*

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## **INTRODUCTION**

Non-Communicable Diseases (NCDs), such as diabetes and hypertension, are significant risk factors for heart failures and stroke in patients affected by these chronic conditions (Pradeepa, 2013). At a high-level meeting held by the United Nations (UN) member states in 2011, NCDs were described as a threat to achieving the Millennium Development Goals (MDGs) due to their impact on the economy as a result of low productivity and premature deaths (Mpofu *et al.*, 2014). Available World Health Organization (WHO) data suggests a prevalence rate of 3-14.5% for diabetes and 46% for hypertension in sub-Saharan Africa (SSA) (Semenya and Potgieter, 2015).

Any person who has the gift of receiving spiritual instructions from the ancestral world and utilized traditional knowledge based on culturally inclined principles to heal diseases is known as a traditional healer (Sodi *et al.*, 2011). The South African Traditional Health Practitioners Act recognizes the following groups of THPs: herbalists (*izinyanga/amaxhwele*) specializes in the use of herbs and medicinal plants; diviners (*izangoma, umthandazi* or *amagqirha*) are mainly women who consult the spiritual realm to establish the cause of a disease; traditional surgeons (*iingabi*) are responsible for circumcisions, and female traditional birth attendants

(*abablethisi* or *abazalisi*) who assist with pregnancy-related issues (Zuma *et al.*, 2016).

Studies in Africa have shown that THPs involvement in managing diabetes and hypertension use various herbal therapies, as is the case in Uganda for diabetes (Atwine and Hjelm, 2016). A similar study carried out in Tanzania revealed that two of the medicinal plants (*Cassia auriculata* and *Ricinus communis*) used by traditional healers to manage diabetes have been proven to be scientifically effective in address this chronic condition (Moshi and Mbwambo, 2002). In Zambia, THPs reported the use of herbal mixtures to manage hypertension (Goma *et al.*, 2016). In South Africa, a study by Peltzer *et al.* (2001) reported that THPs use herbal mixtures to manage diabetes (Peltzer *et al.*, 2001b) and hypertension (Peltzer *et al.*, 2001a). The practise of traditional healing is linked to the culture and environment within which THPs function (Agbor and Naidoo, 2016). THPs services are often well patronized in their local communities as their indigenous explanatory models of diseases are accepted and understood by the people they serve (Avhad *et al.*, 2013).

Within Africa, most studies explore THPs perspectives about managing diabetes and hypertension within a specific cultural environment. In Nigeria, a study explored the perspectives of THPs living in Edo Ekiti Region about managing diabetes (Akharaiyi *et al.*, 2017a), while in Tanzania, Kasole *et al.* (2019) investigated the THPs perspective in the Kilimanjaro region about managing diabetes (Kasole *et al.*, 2019). In South Africa, a study was conducted to establish THPs perspectives in the Nelson Mandela Metropole about managing diabetes (Van Huyssteen *et al.*, 2004) Similarly, researchers sought the perspectives of THPs in managing hypertension in the Northern Province (now Limpopo) of South Africa (Peltzer *et al.*, 2001a).

However, there is a paucity of information regarding comparison of the treatment approaches and methods used by THPs of two cultures in managing various diseases, including diabetes and hypertension, in Africa. The similarities and differences of treatment methodologies used by THPs in various cultures and environments are not well documented. Such comparison may assist in affirming the evidence base of practice that could lead to the standardization of treatment approaches. This study therefore aimed at comparing the perspectives of Tswana and Zulu THPs practising in their respective cultural environment regarding managing diabetes and hypertension. The specific objectives of the study were to establish: whether the Tswanas and Zulus THPs acquire specific training to manage the conditions; similarities and differences in their cultural understanding of the two conditions; similarities and differences in their description of the clinical features; similarities and differences in their ethnopharmacological and treatment approaches.

## MATERIALS AND METHODS

**Study design:** The cross-sectional mixed-method approach entailed using both qualitative and quantitative data (Creswell, 2005) to enable a deep understanding of the research problem, their integration enabling important conclusions to draw conclusions (Johnson and Onwuegbuzie, 2004).

**Study location:** The study took place in the uMgungundlovu and uThukela Districts KwaZulu-Natal (KZN) Province and Bojanala, Dr Ruth Sekgopomati Districts of North-West provinces, South Africa.

**Ethical approval:** Ethical approval was received from the Biomedical Research Ethics Committee (BREC) of the University of KwaZulu-Natal under reference number: BE 567/17.

**Participants selection:** Male and female THPs aged 18 years old and above were approached to participate in the face-to-face interviews using a researcher administered questionnaires. Those with experience in managing diabetes and hypertension were eligible for this study, with snowball sampling (Bryman, 2012) being used to identify potential participants. A sample size with a statistical power of 80% was computed using the following statistical parameters: Effect size equals 0,33 type 1 error ( $\alpha$ ) equals 0,05 (the probability of falsely rejecting the null hypothesis equals to 5% and a type 2 error ( $\beta$ ) equals 0.02 (the probability of falsely failing to reject the null hypothesis equals 20%). Based on the above parameters, a minimum sample size of 93 participants (THPs) was computed for each of 12 geospatial location in the four districts in KZN and North-West Provinces. To maintain the precision across the 12 selected geospatial locations (in urban, traditional or tribal and farm areas), a total sample size of 1,116 (93x12) participants was identified, with 558 in each province (Banerjee *et al.*, 2009), with 863 agreeing to participate, these being 437 Zulus and 426 Tswanas, representing 77.33% of the targeted population.

Assistance from the KZN and Tswana THPs associations resulted in initial contact being made with practitioners who referred the team to other THPs, as per the snowball sampling method (Bryman, 2012). The THP leaders of the district associations in both provinces explained the study to their members during their regular monthly meetings, at which those with relevant experience were identified.

**Data collection:** Quantitative and qualitative data were collected using a researcher administered questionnaire that was developed in English and translated into isiZulu and Tswana, with open and close-ended questions that were pilot-tested with THPs to determine its validity. Their socio-demographics were obtained, with questions exploring training and acquisition of knowledge, their cultural understanding of diabetes and hypertension, signs and symptoms, medical complications, treatment modalities and approaches, management challenges, and recommendations to improve diabetic and hypertensive care in South Africa. Face-to-face interviews were conducted by six research assistants who were fluent in both IsiZulu and Tswana. The THPs were visited in their homes, place of work and sometimes during their monthly meetings, with the study being conducted between September 2018 and September 2019.

**Data Analysis:** The Quantitative data analysis was carried out on SPSS version 20 (SPSS, 2011). Numerical values (age) and years of experience were expressed as mean  $\pm$  standard deviation while other parameters were expressed in

frequencies (n) and percentages (%). The qualitative data were thematically analyzed following (Tesch, 1990) recommendation of identifying themes in the raw transcribed data. Quotes are reported verbatim to substantiate the categorisation of the data, with member checking being done by providing the participants with the findings to establish data validity.

**RESULTS**

**Traditional Health Practitioners demographics:** Details of Zulu and Tswana THPs demographics are presented in Table 1. Zulu and Tswana THPs were on average age 47.43 ± 14.47 and 43.54 ± 13.66 respectfully. Zulu THPs were predominantly female (n=290, 66.40%) while the Tswana’s were mainly male (n=214, 50. 23%). Nearly half (46.50%) of Zulu THPs had completed their primary level education, while over half (51.20%) of the Tswana practitioners had completed high school. Majority of both Zulu (n=270, 61.80%) and Tswana THPs (n=159, 37.30%) were single. Majority of Zulu THPs were practicing traditional religion (n=180, 41.20%) while majority of Tswana THPs (n=356, 83.60%) were Christians. The majority of Zulu THPs were divination and herbal practitioners (n=334 76.40%), while for the Tswana THPs, this category constituted (n=182, 42.7%). Most of the Zulu and Tswana were practising their profession at home (n=424, 97.00%) and (n=395, 92.70%) respectfully, the majority of both groups practising their profession full-time (Zulu: n=348, 79.60%; Tswana; n=339, 79.60%). The majority of the Tswana THPs were registered with THPCSA (n=336, 78.90%) compared to Zulu THPs (n=196, 44.90%). Majority of Tswana THPs (n=254, 59.60%) were registered with their respective local healers' associations, THA compared to Zulu THPs (n=71, 16.20%). The mean age of years of experience stood at 15.69± 11.68 and 18.68±11.35 for Zulu and Tswana THPs respectfully

**Acquisition of knowledge and information about diabetes and hypertension diseases:** Table 2 indicates how both groups acquired their knowledge to manage diabetes and hypertension, with most Zulu’s regarding it as a gift from birth and being a calling, while most Tswana’s were trained by a family member of other persons for both conditions.

The following statements were made by Zulu THPs regarding where they acquired knowledge to manage these two diseases:

- “I was born with it”. Zulu Female, THP 49.
- “I was trained by my mother who is a healer herself” Zulu Female, THP 85.
- “I was trained by another healer” Zulu Male, THP 434.
- “It is my calling, I spiritually determine client illnesses” Zulu Female, THP 236.
- “I was trained by the Department of Health (DOH) through workshops” Zulu Female, THP 254.

The majority of Tswana THPs acquired their knowledge to manage both diabetes and hypertension through training received from their family members (n=118, 27.70%) and noted the following:

- “My mother was a ‘sangoma’ she trained me”. Tswana Female, THP 227.

- “I was taught by my grandfather”. Tswana Male, THP 27.
- “I had a year and a half training from a traditional doctor” Tswana Female, THP 220.
- “I was taught by a professional ‘matwetwe’” Tswana Female, THP 8.

**Table 1.**  
Socio-demographic characteristics of Zulu and Tswana THPs

Characteristics	Variables	Zulu (437)		Tswana (426)		
		No.	%	No.	%	
Age (YEARS)	18-29	53	12.10	87	20.40	
	30-39	85	19.50	89	20.90	
	40-49	94	21.50	105	24.70	
	50-59	104	23.80	87	20.40	
	60-69+	101	23.10	58	13.60	
	Mean ±SD		47.43±14.47		43.54±13.66	
Gender	Male	147	33.60	214	50.20	
	Female	290	66.40	212	49.80	
Education	Nil	70	16.00	55	12.90	
	Primary	203	46.50	105	24.60	
	High School	152	34.80	218	51.20	
	Tertiary	12	2.70	48	11.30	
Marital status	Cohabiting	18	4.10	70	16.40	
	Divorced	4	0.90	28	6.60	
	Married	121	27.70	141	33.10	
	Single	270	61.80	159	37.30	
	Widowed	24	5.50	28	6.60	
Religion	Christian	76	17.40	356	83.60	
	Islam	1	0.20	N/A	N/A	
	Traditional	180	41.20	61	14.30	
	Christian & Traditional	64	14.70	N/A	N/A	
	Islam & Traditional	1	0.20	N/A	N/A	
	Other (Shembe, Zion, etc)	97	22.20	N/A	N/A	
None	None	18	4.10	9	2.10	
	Kind of practice	Divination	6	1.40	157	36.90
		Herbal	95	21.70	87	20.40
		Divination and Herbal	334	76.40	182	42.70
		Other	2	0.50	N/A	N/A
Place of practice	Home	424	97.00	395	92.70	
	Market	10	2.30	22	5.20	
	Office	2	0.50	9	2.10	
	Other	1	0.20	N/A	N/A	
Type of practice	Full-time	348	79.60	339	79.60	
	Part-time	89	20.40	87	20.40	
Registration (THPCSA)	Yes	196	44.90	336	78.90	
	No	241	55.10	90	21.10	
Registration (THA)	Yes	71	16.20	254	59.60	
	No	366	83.80	172	40.40	
Years of experience		15.69± 11.68		18.68±11.35		

Legend: SD (Standard Deviation); N/A (Not applicable).

**Table 3** shows THPs cultural understanding of both diabetes and hypertension and indicates that (n=427, 85.60%) Zulu THPs and (n=426, 100.00%) of Tswana THPs described diabetes as a ‘sugar disease’, while they regarded hypertension as being similar to diabetes.

**Table 2.**

THPs acquisition knowledge for the management of both diabetes and hypertension.

Variable	Acquisition of Knowledge	Zulu (n=437) No. %	Tswana (n=426) No. %
Single Source of knowledge acquisition for diabetes management	Trained by the family member	31 (7.09%)	118 (27.70%)
	Trained by another person	22(5.03%)	107 (25.11%)
	A gift from my birth	211(48.24%)	84 (19.72%)
	It is my calling	87(19.91%)	52 (12.21%)
	I got professional training	46 (10.52%)	49 (11.50%)
	Other forms of training	2 (0.46%)	16 (3.57%)
	Declined to comment	2 (0.46%)	
Single Source of knowledge acquisition for hypertension management	Trained by the family member	3 (7.55%)	118 (27.70%)
	Trained by another person	26 (5.95%)	107 (25.11%)
	A gift from my birth	219 (50.11%)	84 (19.72%)
	It is my calling	71 (16.25%)	52 (12.21%)
	I got professional training	57 (13.04%)	49 (11.50%)
	Other forms of training	3 (0.69%)	16 (3.57%)
Multiple sources of Knowledge acquisition		36 (8.28%)	
		26 (5.95%)	

**Table 3**

THPs response regarding the cultural understanding of diabetes and hypertension.

Condition	Characteristics	Zulu (n=437) No. (%)	Tswana (n=426) No. (%)
Diabetes	Yes	427 (85.60%)	426 (100.0%)
	Declined to comment	10 (2.28%)	
Hypertension	Yes	426 (85.40%)	426 (100.0%)
	Declined to comment	11 (2.52%)	

The following statements were made by the THPs regarding their cultural understanding of diabetes.

*“Sugar disease is when you sweat, get tired quickly and some have wounds that don’t heal”* Zulu Female, THP 189.

*“It’s a sugar disease. It means there is an abnormal level of sugar in your blood, either higher or lower than the normal required level.”* Tswana Male, THP 28.

Regarding their cultural understanding of hypertension, most Zulu (n=426, 85.40%) and Tswana THPs (n=426, 100.00%) believe that it is similar to diabetes, as one condition leads to the other.

*“Hypertension and diabetes more or less the same”* Zulu Male, THP 8.

*“Hypertension is similar to diabetes”* Tswana Male, THP 226.

*“Hypertension is when a person gets dizzy or has difficulties in breathing and gets tired quickly”.* Zulu Male, THP 124.

*“It is an illness that causes a person to have heart palpitations and feel weak”* Zulu Female, THP 263.

*“When your blood is not flowing the way it is supposed to flow, often when it does this, your heartbeat is also affected, sometimes it beats faster sometimes slower, and it is dangerous”* Tswana Female, THP 264.

**Types of diabetes and hypertension**

The majority of Zulu THPs (n=358, 81.92%) felt that there were different types of diabetes, these being high and low blood levels. Three quarters (n=330, 75.50%) contended that there were two types of hypertension. Heart beating faster/slower than normal during breathing were regarded as the two major types by (n=330, 75.50%) by the Zulu THPs. On the contrary, all the Tswana THPs interviewed were of the opinion that there were not different types for both diabetes and hypertension. The THPs were aware of medical complications associated with diabetes and hypertension, as indicated in Table 4, with the two groups reporting similar problems. Regarding diagnosis, more Zulu THPs personally diagnosed both diabetes (n=364, 83.30%) and hypertension (n=372, 85.52%) than their Tswana counterparts.

Diagnosis of both diabetes and hypertension were based on spiritual diagnosis, BHPs assistance, and patients’ signs and symptoms. Regarding spiritual diagnosis, one Zulu THP had this to say:

*“I heard voices of my ancestors telling me what I should mix to heal a person with diabetes”* Zulu Female, THP 10.

*“I diagnose spiritually with the help of ancestral spirits”* Tswana Female, THP 374.

Some sought assistance from BHPs to diagnosed their patient before deciding on treatment:

*“There are several things I use, but I first refer the patient to a doctor to go check on their level of health before using certain things”.* Zulu Female, THP 236.

*“I cannot diagnose therefore I tell to go to the clinic first”* Tswana Female, THP 185.

Some based their treatment on signs and symptoms:

*“Am unable to detect diabetes, the patient need to first describe all the signs and symptoms they have such as always being hungry, weak erection than only after do I treat it”.* Zulu Male, THP 275.

*“The person tells me the various signs, such as being tired quickly, and those having swollen feet are some of the signs that I check on a person”.* Zulu Male, THP 295.

**Table 4**  
Perceived medical complications of both diabetes and hypertension

Variable	Characteristic	Zulu No. (%)	Tswana No. (%)	
Perceived medical complications	Diabetes complications	425 (97.25%)	422(99.06%)	
	Declined to comment	12 (2.75)	4 (0.94%)	
	Types of diabetes complications	Wounds that do not heal, eyesight problems, itchy private parts, weight loss		Eyesight problem, amputations, death
	Hypertension complications	423 (96.80%)	420 (98.59%)	
	Declined to comment	14 (3.20%)	6 (1.41%)	
Diagnosis	Types of hypertension complications	Heart problems, difficult to breathe, stroke	Stroke, heart attack, can lead to death	
	Personally diagnose diabetes	364 (83.30%)	279 (65.50%)	
	Diagnosis by BHPs for diabetes	73(16.70%)	147(34.50%)	
	Personally diagnose hypertension	372 (85.52%)	276 (64.80%)	
	Diagnosis by BHPs for hypertension	63 (14.48%)	150 (35.20%)	
	Based on reported signs and symptoms	N/A	2 (0.46%)	

Legend: N/A (Not Applicable)

**Table 5.**  
Identifying a person with diabetes and hypertension by Zulu and Tswana THPs

Characteristics	Variable	Zulu (n=437) No. (%)	Tswana (n=426) No. (%)	
Used modern diagnostic instruments	Yes	19 (4.35%), 13 (2.97%)**	0(0.00%)	
	No	416 (95.19%), 422 (97.03%)	426(100.00%)	
Able to identify signs and symptoms	Identified diabetes	364 (83.30%)	279 (65.50%)	
	Declined to comment	73(16.70%)	147(34.50%)	
	Indications of diabetes	Easy tiredness, wounds do not heal, excessive hunger, swollen feet, lack of appetite		Dry mouth, frequent urination, impaired vision, erectile dysfunction, eating regularly, wounds do not healed
	Identified hypertension	372 (85.52%)	276 (64.80%)	
	Declined to comment	65(14.87%)	150(35.21%)	
	Indications of hypertension	Feeling dizzy, difficulty breathing, easy tiredness, the heart beats very fast and in some instances beats very slow		Extremely shiny skin, swollen body, dimmed skin complexion, frequent feeling of dizziness

Legend:\*\*(use medical instruments for diagnosis of hypertension).

Most Zulu and Tswana THPs did not use modern instruments for diagnosis purposes, except a few Zulu THPs (n=19, 4.35%) and (n=13, 2.97%) who employ these instruments for diabetes and hypertension respectively. Table 5 presents Zulu and Tswana THPs description of clinical features for both diabetes and hypertension, which were similar.

Table 7 presents types of prescribed medical preparations employed by both Zulu and Tswana THPs for the management of hypertension.

#### Types of medications for diabetes and hypertension

Table 8 presents types of prescribed medical preparations used to manage diabetes and hypertension, these being concoctions and decoction. Most Zulu THPs used concoction (n=396, 90.61%) for their herbal mixtures preparations, while the Tswana THPs preferred decoction (n=372, 85.52%). 'Other forms' used by Zulu THPs holy water and fat from a lion. In this study, the standard doses for adults were not more than half cup size of 250 millilitres(mls) for adults and three teaspoons (15 mls) for children, irrespective of the recommended time for patients to take these forms of medications. The Zulu and Tswana THPs had prescribed dosage for adults and children diabetic and hypertensive

patients, with over 80% subscribing to these standards for both conditions.

They indicated that the dosage amount of the ingredients used depending on the individual patients' requirements and issues such as the bitterness of the herbal mixtures. Both groups preferred the oral route of administration for their herbal preparations. The preparations methods to manage diabetes and hypertension were similar:

*"Use a handful of Aloe Vera a handful of leaves of Insukumbilii (Senecio serratulooides) and a handful of roots of Ugobho (Gunnera perpensa). The medicinal plants are transferred to a pot and boiled together for about an hour or two. The boil herbal mixture allowed to settle down. The boiled herbal mixture is poured into a 1 or 2-litre clean plastic bottle to be given to patients".* Zulu Male, THP 432.

*"To prepare a herbal mixture Take a hand full of every sebetebete, then mokgopha (always fresh, we normally don't dry it because it is always available irrespective of a season, cut a leave to a size of a palm of a hand), sekaname, labatheka and motsitsana herb s/he is prescribing for the patient, put into the pot, then pour about 2.5 – 3 litres of water (be it hot or cold) into the pot allow it to boil for 30 minutes. Then leave to cool down and pour it into a 2 litre bottle for the patient to take the treatment home and drink as ordered by the healer".* Tswana Female, THP 181.

**Table 6.**

Medicinal plants effective in the management of diabetes.

isiZulu name	Tswana name	Scientific name	Common English name	Parts used	Phytochemical constituents
Inhlaba	Mokgopha	<i>Aloe vera</i>	Aloe	Leaves	Tannins, Saponins and Flavonoids (Arunkumar and Muthuselvam, 2009, Raphael, 2012)
Inkomfe	Labatheka	<i>Hypoxis hemerocallidea</i>	African potato	Root	Phytostreols, Norlignane glycoside hypoxoside, Aglycon rooperol (Owira and Ojewole, 2009, Nair <i>et al.</i> , 2007)
Inkalane	N/A	<i>Aloe arborescens</i>	Mountain bush aloe	Leaves	Sinapic acid, Chlorogenic acid & Aloin (Lai <i>et al.</i> , 2016)
Intshungo	N/A	<i>Momordica foetida</i>	Bad-smelling	Leaves	Flavonoids, Foetidin (Ndam <i>et al.</i> , 2014, Marquis <i>et al.</i> , 1977)
Indumbahlozi ye avocado	N/A	<i>Persea americana</i>	Avocado	Leaves, fruit, seeds	Saponins, Tannins, Flavonoids (Antia <i>et al.</i> , 2005, Ojewole and Amabeoku, 2006)
Dagga	N/A	<i>Cannabis sativa</i>	Medicinal cannabis	Leaves	Cannabinol, delta-9-tetrahydrocannabinoids (Atakan, 2012)
N/A	Mokgalo	<i>Ziziphus mucronata</i>	Buffalo thorns	Leaves	Phenol, Flavonoids, Proanthocyanidins (Olajuyigbe and Afolayan, 2011, Ibrahim <i>et al.</i> , 2012)
N/A	Sengaparile	<i>Harpagophytum procumbens</i>	Devils claw	Roots	Harpagoquinones, Flavonoids, Phytosterols, Amino acids (Mncwangi <i>et al.</i> , 2012, Mahomed and Ojewole, 2004, Kondamudi <i>et al.</i> , 2016, Gruenwald, 2002)
N/A	Tlhokwa letsela	<i>Dianthus basuticus</i>	Lesotho carnation	Roots	Alkaloids, Tannins, Saponins, Cardiac glycosides (Ashafa and Kazeem, 2015, Kazeem and Ashafa, 2015)
N/A	Lerumo-lamadi/ Phetola/ Mhetola	<i>Sutherlandia frutescens</i>	Cancer bush	Bark, leaves	Flavonoids, Saponins, Triterpenoids, Pinitol (Aboyade <i>et al.</i> , 2014, Daghman, 2016, Chadwick <i>et al.</i> , 2007, Van Wyk and Albrecht, 2008)

Legend: N/A (Not applicable)

NB: Recommended plants and their corresponding isiZulu or Tswana names are specific to the study areas in KZN and North-West Provinces.

**Table 7.**

Medicinal plants effective in the management of hypertension.

isiZulu name	Tswana name	Scientific name	Common name	Parts used	Phytochemical constituents
Insukumbilii	N/A	<i>Senecio serratuloides</i>	Two-day cure	Leaves	Alkaloids, Flavonoids, Phenols (Tata <i>et al.</i> , 2019, Gould <i>et al.</i> , 2015, Fawole <i>et al.</i> , 2009)
Imbozisa	N/A	<i>Plectranthus hadiensis</i>	Hairy spur flower	Leaves, Roots	Flavonoids, Alkaloids, Phenols, Tannins, Saponins, Glycoside, Cardiac glycosides, Phenolic acids (Menon <i>et al.</i> , 2012, Mothana <i>et al.</i> , 2010)
Ugalga	Konofole	<i>Allium sativum</i>	Garlic	Bulbs	Allicin, Diallyl, Disulphide, S-allyl cysteine and Diallyl trisulfide (Mikaili <i>et al.</i> , 2013, Nwokocha <i>et al.</i> , 2011)
N/A	Sekaname	<i>Urginea sanguinea</i>	Sea onion	Bulbs	Salicylic acid, Phloroglucinol (Marx <i>et al.</i> , 2005, Naidoo <i>et al.</i> , 2004, Majinda <i>et al.</i> , 1997)
N/A	Sebetebete	<i>Senna italica</i>	Italian senna	Leaves, seeds, roots	Flavonoids, Phenols (Mokgotho <i>et al.</i> , 2013, Masoko <i>et al.</i> , 2010)
N/A	Tsuko ya poo	<i>Borago officinalis</i>	Starflower	Leaves	Pyrrrolizidine alkaloids, Licosamin, Sopinin, Sopindian (Asadi-Samani <i>et al.</i> , 2014)
Ugobho	N/A	<i>Gunnera perpensa</i>	River pumpkin	Roots	Tannins, Phenols, Flavonoids (Maroyi, 2016)
Inhlaba	Mokgopha	<i>Aloe vera</i>	Aloe	Leaves	Tannins, Saponins and Flavonoids (Arunkumar and Muthuselvam, 2009, Raphael, 2012)

Legend: N/A (Not applicable) NB: Recommended plants and their corresponding isiZulu or Tswana names are specific to the study areas in KZN and North-West Provinces.

Zulu and Tswana THPs advised their patients to consume foods rich in fruit and vegetables, with the Zulu practitioners advising the consumption of orange, watermelon, apple,

guava, spinach, carrots, beetroot and peas. The Tswana THPs recommended peas, beans, spinach, lettuce, cucumber, cabbage and banana. They both advised their patients to avoid

fatty-foods and a high salt intake and to exercises regularly for the effective long-term management of these two chronic conditions.

**Perceived side effects, concurrent treatment options and recovery:** The THPS were of the opinion that their formulations had very few side effects (Figure 1) and made the following statements:

“Processed medications have bad side effects, while our medications are natural products” Zulu Female, THP 6.  
 “Our products are natural hence no side effects” Tswana Male, THP 2.

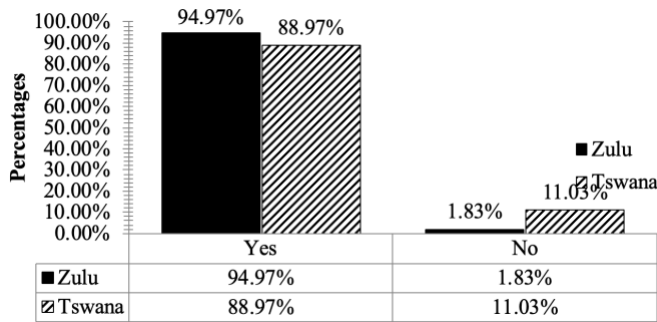
“Not following instructions of my prescribed herbal mixtures can cause side effects” Zulu Male, THP 81.

The following are the statements made by Zulu and Tswana THPs regarding the concurrent use of TM and western medications:

“I advise them to take them at different times” Zulu Female, THP 251.  
 “Not advisable, our medicine clash with western medications”. Zulu Male, THP 267.  
 “Take African medicine and western medicines at different times”. Tswana Female, THP 96.  
 “African medicine is too strong, it can wash western medicines”. Tswana Male, THP 360.

**Table 8**  
Types of medical preparations and prescribed dosage

Variable	Tribes	Characteristics	Diabetes No. (%)	Hypertension No. (%)
Herbal treatment options	Zulu (n=437)	Concoction	396 (90.61%)	389 (89.02%)
		Decoction	20 (4.58%)	22(5.03%)
		Other forms	7 (1.60%)	5(1.14%)
		Concoction/Decoction	6 (1.37%)	7(1.60%)
		Concoction/other forms	1 (0.23%)	14(3.20%)
		Declined to comment	7 (1.60%)	
	Tswana (426)	Concoction	389 (89.02%)	389 (89.02%)
		Decoction	22 (5.03%)	22 (5.03%)
		Other forms	5 (1.14%)	5 (1.14%)
		Concoction/Decoction	7 (1.60%)	7 (1.60%)
		Declined to comment	14 (3.20%)	14 (3.20%)
		Prescribed dosage	Zulu (n=437)	Standard dose adults & children
Abnormal dose	47 (10.76)			47 (10.76)
Declined to comment	28 (6.41%)			28 (6.41%)
Tswana (n=426)	Standard dose adults & children		411 (96.4%)	411(96.4%)
	Abnormal dose		15 (3.52%)	15(3.52%)



**Figure 1**  
Perceived side effects and concurrent treatment options

Table 9 presents the Zulu and Tswana THPs views about the recovery of diabetic or hypertensive patients under their care. Most of the Zulu THPs (n=368, 84.21%) were of the opinion that a patient could recover under three months, compared to Tswana THPs, of whom (n=277, 65.02%) felt that it would take more than three months.

**Recommendations to improve diabetic and hypertensive care in SA**

The referral of patients to THPs by biomedical health practitioners was reported to be minimal, indicating a one-way referral system (THPs sending patients to the clinic/hospital for diagnosis) regarding disease management (Table 10). The THPs made recommendations about improving diabetic and

hypertensive care in South Africa, with most being in favour of collaborating with BHPs. They were interested in acquiring equipment, such as sphygmomanometers and glucometers, to help manage these conditions, and indicated the need for further educational training to assist them to acquire the latest information.

**Table 9.**  
Estimated duration of recovery of diabetic and hypertensive patients under treatment.

Variable	Tribes	Characteristics	Diabetes N (%)	Hypertension N (%)
Duration of recovery under treatment	Zulu (n=437)	< 3 months	368 (84.21%)	368 (84.21%)
		> 3 months	32 (7.32%)	32 (7.32%)
		Depends on patients' condition	20 (4.58%)	20 (4.58%)
	Tswana (n=426)	No time frame	1 (0.23%)	1 (0.23%)
		Declined to comment	16 (3.66%)	16 (3.66%)
		< 3 months	149 (34.98%)	149 (34.98%)
	> 3 months	277 (65.02%)	277 (65.02%)	

**Table 10.**

THPs recommendations to improve diabetic and hypertensive care in South Africa.

Characteristics	Tribes	Variable	N (%)
Patients referred to THPs by BHPs	Zulu (n=437)	Yes	16(3.66%)
		Declined to comment	2(0,46%)
		No	419(95.88%)
	Tswana (n=426)	Yes	0(0.00%)
		No	426(100.00%)
Recommendations for improving treatment	Zulu (n=437)	Collaboration with BHPs	165 (37.75%)
		Collaborations and equipment	9 (2.06%)
		Equipment, collaboration with BHPs & training	247 (56.52%)
		Declined to comment	16 (3.66%)
	Tswana (n=426)	Collaboration with BHPs	399 (93.66%)
		Equipment	27 (6.34%)

## DISCUSSION

The number of practitioners included in this study, their age and gender distribution is regarded as representative of the population of THPs in the two provinces who provide diabetes and hypertension management, providing credibility to the results. The use of quantitative and qualitative questions enabled the respondents to select from a range of options and provide comments to substantiate their responses.

Regarding their acquisition of knowledge to manage the two conditions, majority of the Zulu and Tswana THPs obtained it from family members and training, while others regarded their insight as a gift from birth, a calling, for which they did not have any formal training. The Zulu THPs acquisition of knowledge without training is similar to the findings of a study conducted in Zambia and Tanzania, where the THPs also indicated that it was a gift by birth (Vandebroek *et al.*, 2004), is regarded as a calling made by the spirit of a deceased close relative (Matsika, 2015). Those trained by a family member who was a practising THP are similar to studies conducted among THPs in the Bolivian Andes Mountains, the Philippines and Cameroun, where practitioners acquired their knowledge from family members (Molina *et al.*, 2015, Vandebroek *et al.*, 2004). Some Tswana THPs acquired their knowledge to manage these two diseases through training from another person, with the literature indicating that this takes places through initiations (secret rituals) where a teacher (master healer) decides when the apprentice trainee THP is ready to start practising (Vandebroek *et al.*, 2004).

The Zulu and Tswana THPs had a similar cultural understanding about these two diseases, with most describing diabetes as a sugar 'disease', this being findings of studies conducted elsewhere in (Frimpong and Nlooto, 2019, Peltzer *et al.*, 2001c). Generally, THPs were of the opinion that diabetes and hypertension were similar, as one condition leads to the other, with studies conducted in the United States of America reporting that 73.6% of diabetic patients aged 18

years and above have hypertension (Khangura *et al.*, 2018). Similarly, a study conducted in Cape Town South Africa revealed that 289 (26.54%) of 1089 diabetic and hypertensive patients who seeks medical care from community health centres(CHCs) had both conditions (Steyn *et al.*, 2008). The Zulu and Tswana THPs described hypertension as a disease where the heart beats slower or faster than normal, which leads to difficulty in breathing.

When asked whether there are different types of both diabetes and hypertension, the majority of the Zulu THPs noted different types of diabetes, this being based on patient's sugar levels being either too high or too low and regarded breathing faster or slower than normal as the two types of hypertension. However, all the Tswana THPs interviewed contended that diabetes and hypertension were not divided into different types. The Zulu understanding of diabetes is in line with the scientific literature in terms of types 1 and 2, where the body's ability to produce insulin impacts on its ability to regulate sugar levels (Solis-Herrera *et al.*, 2018). From OCM has also divided hypertension into primary and secondary, is the former being an elevation of blood pressure due to environmental and lifestyle factors, such as smoking, stress and alcohol abuse, while latter is caused by toxicities and congenital diseases (Kokubo *et al.*, 2015).

Regarding their ability to diagnose the two conditions, the majority of Zulu and Tswana THPs stated that they could personally diagnose them based on spiritual divination, some said they refer patients to the clinic/hospitals for diagnosis before they start their treatment options and a few relied on medical knowledge-based or signs and symptoms reported by their patients. Spiritual diagnoses occur with ancestral assistance, mainly occurring through the performance of rituals to obtain knowledge and appease the patients' ancestral spirits as a favour to treat the condition (Matsika, 2015). This generally entails the THPs 'throwing the bones', through which the spirits give guidance about the problem and its possible causes, as well as the appropriate treatment regimen to relieve them of the medical condition (Mawere, 2011). Some THPs referred their patients to the local clinic to obtain a diagnosis before treating them. This referral behaviour was reported in a study conducted in Kenya, where patients were required to obtain a diagnosis from the local hospital before they were prescribed herbal mixtures by THPs (Chege *et al.*, 2015). A few Zulu THPs based the diagnosis on their knowledge of the signs and symptoms of diabetes, as was reported in research conducted in Nigeria (Akharaiyi *et al.*, 2017b). A few mainly Zulus THPs mainly use of modern instruments, such as glucometer and sphygmomanometer to test sugar levels, some having had formal training from tertiary institutions and the Department of Health (DOH).

Both groups of THPs indicated signs and symptoms for diabetes, such as tiredness, wounds that do not heal, excessive hunger, swollen feet, lack of appetite, that are the same as those reported in the scientific literature (Ramachandran, 2014). Likewise their signs and symptoms for hypertension, such as feeling dizzy, difficulties in breathing, easy tiredness, a rapidly beating heart or one that beats very slowly (Middeke *et al.*, 2008). Almost all the Zulu and Tswana THPs indicated if not managed appropriately, diabetes and hypertension could be disastrous to the health of a patient (Zhuo *et al.*, 2013,



Hodgson and Cai, 2001, Ogah and disease, 2006, Nathan, 1993).

Treatment modalities used by Tswana and Zulu THPs to manage diabetes and hypertension were based on non-pharmacological and ethnopharmacological interventions, these being prescribed herbal mixtures, mainly in the forms of concoctions and decoctions. The herbal mixtures were made by boiling parts (leaves, roots, bulbs and bark) of identified potent medicinal plants, either fresh or dried forms. The majority of Zulu THPs prescribed concoction, while the Tswana THPs prescribed decoction to manage these two conditions. Similar studies conducted in Nigeria and Kenya also revealed that THPs prescribed herbal mixtures in the forms of concoctions and decoctions to the managing diabetes (Akharaiyi *et al.*, 2017b, Chege *et al.*, 2015). Some of these medicinal plants, especially *Aloe vera* and *Allium sativum*, which was mentioned by Zulu and Tswana THPs, are also used by Ayurveda practitioners to manage both chronic conditions (Modak *et al.*, 2007), and have been proven scientifically to be effective. For example, a randomized control trial (RCT) study conducted in India revealed that 3167 diabetic patients who were administered with a diet containing *Aloe vera* leaves normalised their blood glucose within five years (Kim *et al.*, 2009, Agarwal, 1985). Similarly, a double-blind parallel randomized placebo control trial involving 50 hypertensive patients who were administered with aged *Allium sativum* extract in Australia experienced normalized blood pressure within 12 weeks (Ried *et al.*, 2010).

In this study, most Zulu and Tswana THPs did not prescribe more than half cup a (standard cup size of 250 millilitres) for adults and three teaspoons (15 mls) for children, irrespective of the recommended time for patients to take these forms of medications. This information is important for future studies to establish whether the THPs are prescribing the correct doses of the herbal mixtures.

Most Zulu and Tswana THPs in this study claimed that their prescribed herbal preparations were highly effective and had no side effects, which requires further investigation. An experimental study conducted in Ghana revealed that an anti-hypertensive polyherbal formulation with *Persea americana* and *Vernonia amygdalina* administered was declared non-toxic and safe to be used by humans, based on positive laboratory results when haematological (significant increase in white blood cells and liver function tests (significant decrease in albumin levels) ) conducted on a mice within 45 days after the animal was administered with the polyherbal formulation (Koffuor *et al.*, 2011). Conversely, a study conducted in the Democratic Republic of Congo indicated that a decoction of *Quassia africana* used as an antihypertensive herbal therapy exhibited high toxicity against MRC-5 cells, which is unsafe for human consumption (Muganza *et al.*, 2012). THPs in this study were not against their patients taking their prescribed herbal preparations concurrently with western forms of medications but were of the opinion that they should be taken at different times to mitigate the effects of possible contraindications. A study conducted by Dharmananda (2000) recommended that for patients take herbal preparations and western forms of medications at different times to avoid the effect of herb-orthodox conventional medicines (OCM)

interactions, which could pose a threat to the health of a patient (Dharmananda, 2000).

Regarding nonpharmacological interventions, Zulu and Tswana THPs stressed the need for exercises and to avoid fatty and salty foods on the part of patients, which is similar to OCM, Ayurveda, Traditional Chinese Medicine (TCM), Unani and Japanese Kampo medicine practitioners, who support the use of exercises as means to prevent and manage these chronic conditions (Bhikha, 2007, Kujala, 2006, Elder, 2004, Covington, 2001). The Zulu and Tswana THPs advised their patients to consume food rich in fruit and vegetables, specifically bananas by the latter, with the American Urological Association (AUA) listing the fruit as one of the top 10 bladder friendly foods that prevent frequent urination ([www.urologyhealth.org](http://www.urologyhealth.org)). The OCM and Ayurvedic literature recommend the consumption of fruit and vegetables to effectively control blood sugar levels (Naik *et al.*, 2015, Mann and Aune, 2010, Elder, 2004, Bazzano *et al.*, 2003). In this study, most of the Zulu THPs were of the opinion that a diabetic or hypertensive patients under their care could have their health restored in less than three months, while the majority of Tswana THPs indicated that it would take more than three months. From the OCM perspectives, both diabetes and hypertension are lifestyle diseases and cannot be completely cured in patients affected by these chronic conditions (Stults and Jones, 2006, Govindarajan *et al.*, 2006).

The Zulu and Tswana THPs indicated some of the challenges they faced in managing diabetes and hypertension as the lack of scientific, tools such as glucometer and sphygmomanometer for diagnostic purposes, and limited training, for which they requested training. Both groups were willing to work with BHPs and bemoaned the lack of co-operation from these practitioners. A study in KZN reported that patients were referred by THPs to BHPs for cancer treatment, but that the latter did not refer patients back to them for any conditions (Nkosi and Sibiyi, 2018). Bagwana (2015) argued that for the effective management of diseases in the South African context, there must be effective collaboration between BHPs and THPs, which could only be achieved through mutual respect among both practitioners (Bagwana, 2015).

This findings from this could lead to the development of a framework that will assist THPs to effectively manage diabetes and hypertension. It will also provide a base to identify areas for research, such as the manifestation of side effects, dosages, develop and regulate standard formulations, and contra-indications due to concurrent use of western medication. It will also provide a platform for BHPs to understand the role that THPs play in disease diagnosis and treatment, given that spiritual factors play a role in diagnosing the conditions and identifying their underlying causes. The findings suggest that the THPs have a common understanding of the causes and management of the two conditions., with the similarities/differences in their remedies indicating that most Zulu and Tswana THPs using *Aloe vera* as a major component to manage these conditions. Regarding dosage, most Zulu and Tswana THPs were not prescribing more than more than half cup size of 250 millilitres (mls) and three teaspoons (15 mls) for both adults and children respectfully. Based on the information provided above regarding commonalities in Zulu

and Tswana THPs understanding about the causes and management of these diseases including prescribing practices the development of a framework to standardize methods and treatment approaches is essential for the provincial associations to be aware of what their members are using to manage both diabetes and hypertension. More importantly, for the industry to self-regulate which will motivate formal research into the medicinal properties of the formulations but with intellectual property protection to THPs. Lastly, it will assist researchers to obtain credible information from patients who seek THPs treatment care options for randomised control trial (RCT) purposes.

A number of limitations are noted that may affect the ability to generalise the finding to other THPs in both provinces and across South Africa, this being that the study took place in two districts in each of the North West and KZN Provinces. This study relied on self-reporting from THPs and did not include the perspectives of their patients regarding the efficacy or non-efficacy of the prescribed herbal mixtures. Moreover, laboratory experiments were not conducted to ascertain whether herbal mixtures are without side effects and do not pose any health risk. Also, there may be inaccuracies in the data due to its transcription from isiZulu and Tswana languages into English. However, these limitations are not considered serious enough to affect the main findings of this study.

In conclusion, most Zulu and Tswana THPs acquired their knowledge from a single source, with the majority of Zulu's regarding it as a gift from birth, while the majority of Tswana THPs were trained by a family member. Also, most of the Zulu and Tswana THPs described diabetes as a 'sugar disease' in their culture, and were of the opinion that diabetes and hypertension are similar, as one condition leads to the other. There were similarities in the description of clinical features for both conditions, the most common being: frequent urination, excessive hunger and getting tired easily, difficulties in breathing and feeling dizzy, these being similar to that found in the scientific literature. Ethnopharmacological preparations used for management were mostly decoction and concoction, with *Aloe vera* as a major constituent. Owing to the similarities and differences in the acquisition of knowledge and training to manage the two diseases, similarities in their cultural understanding, description of clinical features and ethnopharmacological preparations, the findings could assist in developing an interventional tool to assist Zulu and Tswana THPs to manage both conditions. The tool is currently under investigation by the researchers.

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