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Research Article

Perspectives on the Concurrent Use of Traditional and Prescribed Antimicrobial Medicines for Infectious Diseases: A Triangulation Study in a South African Community

***Kadima M.G., Mushebenger A.G and Nlooto M**

Discipline of Pharmaceutical Sciences, Westville Campus, University of KwaZulu –Natal, Durban 4000, South Africa.

ABSTRACT

Traditional medicines are generally available, affordable and commonly used as self-care treatments. However, their inaccurate utilization can results in adverse events, or unfavourable outcomes. Individuals may consult both traditional healer practitioners (THPs) and biomedically trained healthcare professionals (BHPs) for their infections. This study aimed at determining whether any antimicrobial resistance and treatment failure could occur among patients, attending outpatient departments of selected healthcare facilities, who used concurrently prescribed antimicrobial and traditional medicines. A survey was conducted to assess the perceptions, knowledges, attitudes and beliefs of respondents on the concurrent use of traditional and prescribed medicines for infections. 132 respondents were included namely THPs, THP's patients, BHPs and BHP's outpatients. A small number of medicinal plants were used in the treatment of infections and 65.62% of both THPs and their patients (21/32) reported mixing different herbs for the treatment of infections. Respondents agreed that the combination of traditional and prescribed medicines for infections may lead to interactions, adverse effects; infectious diseases may get worse if there is no time lapses between the two medicines. However, BHPs and outpatients reported that combining traditional with prescribed medicines for infectious diseases may result in drug resistance, especially resistance to antibiotics and they highlighted that the majority of patients came to the clinic with several complications such as kidney failure, vomiting, diarrhea and jaundice due to the use of traditional medicine either alone or in combination with conventional medicines. The concurrent use of conventional and traditional herbal medicines may interfere or result in damaging some organs, failure of therapeutic effects and modification of pharmacological actions of administered medicines.

Keywords: *Concurrent, traditional medicine, infectious diseases, prescribed medicines, interactions*

*Author for correspondence: *E-mail*: gedeonkadima@gmail.com*;* Tel. +27 810966106

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INTRODUCTION

Traditional Medicine (TM), commonly referred to as indigenous or folk medicine, comprises medical and traditional knowledge formulated in several communities over generations prior to the modern medicine era(WHO, 2004). The World Health Organization (WHO) describes traditional medicine as " the sum of knowledge, abilities, and practices based on indigenous concepts, philosophies, and experiences of various cultures, whether explained or not, it is used to maintain well-being, prevent and treat, diagnose, improve physical and mental illness"(WHO, 2000). Traditional medicines include different practices, commonly known as herbal Ayurveda, traditional African medicine, Siddha medicine, Unani, Muti, Ifa, ancient Iranian medicine, acupuncture, traditional Chinese medicine, Islamic medicine and traditional Korean medicine (WHO, 2002).

People around the world choose traditional medicines as a curative agent, either alone or in combination with others treatment modalities, to maintain their health. In some Asian and African countries, up to 80%(WHO, 2002) of the population depends on traditional medicine for their primary medical needs. In different African traditional medical systems, plants are always the main source of medicines or treatment strategy. Some traditional Chinese medicine, such as Coumarin, Aescin, and Liu-jun-zi-tang, is used to improve postoperative side effects such as tiredness, pain, appetite,

diarrhea, nausea, vomiting, and lymphedema at certain stages of cancer lesions(Qi et al., 2015).

TM treatments are frequently used in developed and developing countries where they are generally available and sustainable. TM treatments can have less adverse effects than conventional therapies (WHO, 2002). The benefits of TM include its diversity and flexibility, its availability and cost-effectiveness in many parts of the world; it is widely accepted in low- and middle - income countries and the relatively low level of technological input required. As a result, TM therapies can significantly contribute to the improvement of the healthcare system in many countries (WHO, 2002).

Approximatively 27 million South Africans, including both PLWA and people living with other infectious diseases rely on traditional medicine for their primary health needs(Street et al., 2008). This is relatively good because of plant accessibility, affordability, confidentiality of health information between patients and practitioners and the high cost of synthetic medicines (Ballabh et al., 2008); traditional medicines are also believed to combat certain symptoms, including weight loss, skin disorders, energy shortages, lack of appetite, diarrhea, nausea and vomiting, treatment of side effects of antiretroviral medicines (ARVs) as well as dizziness, fungal infections, pain and stomach upsets(Richter, 2004, Petzer and Mngqundaniso, 2008).

TM is commonly used in combination with conventional medicines, with most satisfactory results, but in some cases, the effect of the two treatments may be magnified, interacted and/or opposed (Fugh-Berman, 2000, Ramadan, 2017). A study showed that many patients used TM in conjunction with conventional medicine and therefore interactions could pose a risk at any stage of absorption, distribution, and elimination of pharmaceutical disposal, which could affect the pharmacokinetics of the medicine in the body(Müller and Kanfer, 2011, Di Minno et al., 2017). Studies done in South Africa reported that hypertensive patients consult THPs after visiting BHPs for the same disease condition (Peltzer et al., 2001, Hughes et al., 2013).

Medicinal plants such as *Taraxacum officinale, Echinacea purpurea, Hypoxis hemerocallidea, Moringa oleifera* and *Lessertia frutescens* induce the inhibition of cytochrome CYP450 enzymes that can alter antibacterial metabolism (ATB) or (ARV)s which lead to lack of efficacy and adverse effects experienced by PLWA and using simultaneously TM with ARVs(Müller and Kanfer, 2011, Mills et al., 2005). Gail, H., et al (2015) reported that Hypoxis hemerocallidea was widely used among THPs for the management of different infectious disease conditions including HIV and TB (Gail et al., 2015).Individuals may consult both Traditional Healer practitioners (THPs) and biomedically trained healthcare professionals for bacterial and viral infections.

However, there is a limited knowledge of interactions about the concurrent use of TM and prescribed medicines for bacterial and viral infections. This study aimed at determining whether any antimicrobial resistance and treatment failure could occur among patients, attending outpatient departments of selected healthcare facilities, who used concurrently prescribed antimicrobial medicines and traditional medicine in the Ilembe district, South Africa.

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MATERIALS AND METHODS

Setting and design

This was a cross sectional descriptive study using a semi structured interviews; utilizing snowball sampling technique. This was conducted in the iLembe District. It is located in KwaDukuza on the east coast of the province, bordering the Indian Ocean and comprises four municipalities: Mandeni, Ndwedwe, KwaDukuza, and Maphumulo.

The district covers 3 269 km2, the smallest provincial district in KwaZulu-Natal, with a population size of 630 464 people and it is approximately 75 km from Durban with a population including 90.8% of black African, 2.4% of the white population and 6.8% of others. The majority of the population in the district consists of native isiZulu speakers (82%) followed by native English speakers (9.6%), native Xhosa speakers (3.3%) and others (5.5%) (KZNHealth, 2017). The district comprises four local municipalities located between Durban and Richards Bay: Mandeni, KwaDukuza, Maphumulo, and Ndwedwe with a small urban area in which the majority of the area is rural. The district's rural and traditional areas are characterized by low educational levels, high unemployment rates, and a severe lack of basic services (KZNHealth, 2017).

ILembe Health District has four hospitals: Montebello District hospital, Stanger Provincial hospital, Umphumulo District hospital, and Untunjambili District hospital. Besides the community, the study included also two Hospitals, Stanger Provincial hospital, and Umphumulo District hospital. Both hospitals belong to the ILembe health department in the public sector (Plate 1).

Plate 1
Map showing location of study (www.municipalities.co.za)

Data collection

An explorative study using a semi-structured interviews with 132 informants (THPs, Patienare seen by THPs, BHPs and patients are seen either by BHPs alone or by both THPs and BHPs) was conducted on January 2018. A total of 17 THPs and 15 patients seen by them were initially identified and interviewed by snowball sampling technique (Heckathorn, 2011); while 100 participants including 50 BHPs and 50 outpatients attending the two selected healthcare facilities were also interviewed. An interview face to face was used and the questionnaire form used for data collection was specifically developed for the study in which were included in section A the participants' address, age, gender, marital status,

educational level, language spoken, occupation as well as in section B, information relating to the use of TM and their related conditions and in section C, information on any clinical outcomes including treatment failure and antimicrobial drug resistance from the concomitant use of TM and prescribed medicines.

Data collection had four (4) phases. The first phase was done with THPs which were recruited purposively using snowball technique in their living community in Ilembe district. Some of them were approached at their workplace during their business hours and other at their households and the only tool used was a questionnaire. Phase two was done with patients seen by THPs using snowball technique with their permission also in their living community; they were asked whether they had used at the same time traditional and conventional medicine; to those that the answer was "yes", they were asked if they could indicate which healthcare facility they had attended to in ILembe district. The third phase of the interview was with BHPs, they were recruited at two different clinics and in two different municipalities in Ilembe district. BHPs were recruited purposively in the two selected healthcare facilities during their business operating hours. Finally, the fourth phase was conducted among outpatient, only those who were consulted by both THPs and BHPs and those who were attending the outpatient department in the two healthcare facilities.

Statistical analysis: Data collected from participants by interview were firstly entered and captured into Excel spreadsheets then all the responses from participants were analysed using a thematic content analysis approach (Stephen et al., 2011)then later on introduced into Statistical Package for Social Sciences (SPSS), software version 25. Descriptive statistics including frequency and percentage were used to describe socio-demographic characteristics of study participants and for expressing different variables or questions.

RESULTS

Socio-demographic characteristics of participants: Table 1 presents the socio-demographic characteristics of participants included in this study. Overall, the majority of participants included were black Africans (116/132, 87.88%), female (86/132, 65.15%), unmarried (89/132, 67.42%), employed (84/132, 63.64%) and had attended at least secondary school (55/132, 41.66%). The median age was 35 years old with a standard deviation of 12.031(35 years old ± 12.031), while the minimum and maximum age were 18 and 76 respectively (Range 18 – 76) (Table 1).

Disease conditions treated and African traditional medicine used by THPs: Table 2 presents self-reported disease conditions and African traditional medicines used by THPs for treating patients seen by them. The majority of THPs (64.70%, 11/17) have treated either one or more disease conditions such as period pains/abdominal cramps (Isibibho) and headache (Ubuhlungu ikhanda). The following medicinal plants were reported by these eleven THPs for the management of the disease conditions above: Gumtree (Ugum-tree**)**, *Ikhowa* mushroom (Umsilinga), *Hypoxis hemerocallidea* (Magic muthi or inkomfe), *Senegalia burkei* (Umkhaya), *Hilliardiella aristata* (Isibhaha), *Spirostachys Africana sond* (umtumbothi), *Sutherlandia Frutescens subspecies Microphylla* (Insiswa or Unwele).

Table 1
Socio-demographic characteristics of participants

Variables	Sub category	Frequency of THPs n=17 (%)	Frequency of Patients seen by THPs n=15 (%)	Frequency of BHPs n=50 (%)	Frequency of Out patients seen by BHPs, n=50, (%)	Total, N=132 (%)[95%CI]
Ilembe district	**Municipality A**	17	15	25 (50.0)	25 (50.0)	82(62.12)[53.84 - 70.4]
	Municipality B	None	None	25(50.0)	25(50.0)	50(37.88)[29.6 - 46.16]
Gender	**Female**	7(41.18)	12(80.0)	39 (78.0)	28(56.0)	86(65.15)[57.02 -73.28]
	Male	10(58.82)	3(20.0)	11(22.0)	22(44.0)	46(34.85)[26.72 - 42.98]
Race	**Black African**	16 (94.12)	15(100.0)	36(72.0)	49(98.0)	116(87.88)[82.31 - 93.45]
	Indian	1(5.82)	None	11(22.0)	1(2.0)	13(9.85)[4.77 -14.93]
	White	None	None	2(4.0)	None	2(1.52)[-0.57 - 3.61]
	Mixed race	None	None	1(2.0)	None	1(0.76)[-0.72 - 2.24]
Occupation	**Employed**	1(5.82)	9 (60.0)	48 (96.0)	26(52.0)	84(63.64)[55.43 - 71.85]
	Unemployed	16(94.12)	6 (40.0)	2(4.0)	24(48.0)	48(36.36)[28.15 - 44.57]
Marital status	**Married**	9(52.94)	2 (13.33)	24 (48.0)	5(10.0)	40(37.82)[29.55 - 46.09]
	Unmarried	8(47.06)	13 (86.67)	25 (50.0)	43(86.0)	89(67.42)[59.42 - 75.42]
	Widowed	None	None	1 (2.0)	2(4.0)	3(2.27)[0.27 - 4.81]
Educational level	**Illiterate**	7(41.18)	2(13.33)	None	1(2.0)	10(7.57)[3.06 - 12.08]
	Primary Sc.	6(35.3)	10(66.67)	None	23(46.0)	39(29.54)[21.76 - 37.32]
	Secondary Sc.	3(17.65)	3(20.0)	24(48.0)	25(50.0)	55(41.66)[33.25 -50.07]
	Tertiary	1(5.82)	None	26(52.0)	1(2.0)	28(21.21)[14.24 - 28.18]
Language spoken	**IsiZulu**	14 (82.35)	15(100.0)	35(70.0)	49(98.0)	113(85.6)[79.61 - 91.59]
	Xhosa	2 (11.76)	None	1(2.0)	None	3(2.27)[-0.27 - 4.81]
	English &/Afrikaans	1(5.82)	None	14 (28.0)	1(2.0)	16(12.12)[6.55 - 17.69]
			Total			**100%**

Table 2
Self-reported disease conditions and African traditional medicine treated by THPs

Variables	Self-reported disease conditions treated	Self-reported African traditional medicine used
THP1	Open a person's womb (Isizalo), Fits (Isifo sokuwa), Shingles (Ibhande), Tuberculosis (Isifo sofuba), influenza (Imfuluwenza), Gastritis (Ubuhlungu isisu), HIV infection (Igciwane lengculazi)	Sutherlandia Frutescens subspecies Microphylla (Insiswa or Unwele) (boost the immune system), Isijula (Consider carefully deep: direct to the infection), Umbola (defeat the infection and makes it weak)
THP2	Diarrhea (**Isifo sohudo**), stroke (unhlangothi), period pains/abdominal cramps/ (Isibhobo)	Gumtree (**Ugum-tree)**, *Ikhowa* mushroom (Umsilinga), goat (imbuzi), *Inhambanella henriquesii* (Umathungulu), marula tree, *Sclerocarya birrea (*Umganu), Aloe sp **(Inhlaba)**
THP3	Shingles (Ibhande), period pains/abdominal cramps/ (Isibhobo), Stroke (unhlangothi)	Umsindo (Directed to the care of pain)
THP4	Headache (Ubuhlungu ikhanda), period pains/abdominal cramps/ (Isibhobo), Shingles (Ibhande), HIV infection (Igciwane lengculazi), punishment, assault (ukushangwa)	English name (Ikhanda Eligatswayo), Hypoxis hemerocallidea (Magic muthi or inkomfe)
THP5	Fits (Isifo sokuwa), Mego vuvukal kongawo, isisu segazi, Fufunyani (demons), Bladder or Abd. Pains (Ubuhlungu besisu)	Not shared
THP6	Headache (Ubuhlungu ikhanda), Body itching/ sores on the body (Sores on the part the penis) (Uma unezilonda esithweni sangasese)	**Isilwane (animal, beast), Senegalia burkei (Umkhaya) and Setaria verticillata (Isinama), Sutherlandia Frutescens subspecies Microphylla (Insiswa or Unwele**
THP7	Shingles (Ibhande), menorrhea (Isisu), Headache(Ubuhlungu ikhanda), Mental trouble (Ukuhlushwa), ralwani	Not shared
THP8	period pains/abdominal cramps/ (Isibhobo),), Inkwanju (cramps), amajagamba	**Animal skin (sheddings of a snake, crocodile), Hilliardiella aristata (Isibhaha), Spirostachys Africana sond (umtumbothi)**
THP9	Bilharzia (Umkhaza isichnene), period pains/abdominal cramps/ (Isibhobo), Headache (Ubuhlungu ikhanda),	**Imkwangu, Hilliardiella aristata (isibhaha)**
THP10	Stroke (Unhlangothi), Shingles (Ibhande), Help clear womb to bare kids, Headache (Ubuhlungu ikhanda)	Not shared
THP11	Crazy people (Isifo sengqondo), Headache(Ubuhlungu ikhanda), (where female is Bewitched and bleeds endlessly), urinary infections (Phayipi lomchamo)	**Mangifera indica** (Ukwango=Umango), Sutherlandia Frutescens subspecies Microphylla (Insiswa or Unwele)
THP12	Psychotic people (crazy) (Isifo sengqondo) and most emotional trips, and others diseases as, Gonorrhea, Cancer, Cold & Flu (Umkhuhlane)	**Carpobrotus dimidiatus (Ikhambi)**
THP13	HIV infection (Igciwane lengculazi) and Cancer even crazy people	Hypoxis hemerocallidea (Magic muthi or inkomfe), Liliaceae lancifolium Spp, Wild (ilabatheka)
THP14	Stomach Ulcers (Ubuhlungu isisu), Rashes(Ukuqubuka), saws, Headache (Ubuhlungu ikhanda), Diarrhea (**Isifo sohudo**), any diseases	Spirostachys africana sond (Umtombothi), *Sclerocarya birrea (*Umganu),
THP15	Problem with urinating, Headache(Ubuhlungu ikhanda), period pains/abdominal cramps/ (Isibhobo),), Wounds (Isilofida)	Inguduze, insumbili (help for witchcraft), Spirostachys Africana sond (Umtombothi), Hilliardiella aristata (Isibhaka) (help for isibhobo), Umushlwa help for wounds
THP16	Flu & cold (Umkhuhlane), Diarrhea (**Isifo sohudo**), Vomiting (Uyahlanza) & nausea, Infections, Any diseases	Spiritual water used after praying, Liliaceae lancifolium Spp, Wild (Ilabatheka), Dombeya Rotundifolia, (Unhliziyo omkulu), Tetrademia ripania, Kamiaceae, (Ibozane: Ginger bush)
THP17	Diabetes (Isifo sikashukela), Bilharzia (Umkhaza isichnene), HIV infection (Igciwane lengculazi), Bronchitis, Asthma, Bad spirits (Isifo sengqondo)	isibunge, Khalimusi, Hilliardiella aristata (Isibhaha), Ginger, Imboziso (help against flu), Hypoxis hemerocallidea (Magic muthi or inkomfe)

Table 3.
Self-reported disease conditions by patients seen by THPs

Participants	Self-reported disease conditions	Self-reported traditional medicines used
Patient 1	Leg problem, foot was swollen	Not shared
Patient 2	Weakness	Not shared
Patient 3	Headache, no appetite	Not shared
Patient 4	Stressed out, Unbearable anxiety	Water and prayer
Patient 5	Sores on the body	Prayer & Herbal medicine not shared
Patient 6	Abdominal pain	Herbal medicine not shared
Patient 7	Coughing with blood, Chest pain	Not shared
Patient 8	Diarrhea, vomiting	Herbal medicine not shared
Patient 9	Stomach-ache, Coughing	Herbal medicine not shared
Patient 10	Respiratory problem, Chest pain, Coughing, Body pain	herbal mixtures (Plant, powder) not shared
Patient 11	Body itching, Headache	Herbal medicine not shared
Patient 12	Body itching	Not shared
Patient 13	Wounds, Rashes	herbal mixtures (Plant, powder) not shared
Patient 14	I was just sick, unwell	herbal mixtures (Plant, powder) not shared
Patient 15	I was just sick, unwell	herbal mixtures (Plant, powder) not shared

Table 4
Frequency of self-reported disease conditions and prescribed medicines by BHPs and outpatients

Self-reported disease conditions	Frequency of self-reported disease conditions		Total (N=181)	Self-reported prescribed medicine used
	Reported by BHPs	Reported by Outpatients		
TB (Pulmonary, abdominal & meningitis)	31(17.13)	20(11.05)	51(28.18)	Rifafour (Ethambutol, Rifampicin, Pyrazinamide, Isoniazid), Pyridoxine
HIV infection	15(8.29)	27(14.92)	42(23.21)	FDC (TDF, EFV, 3TC/ABC, 3TC)
Scabies	8(4.42)	4(2.21)	12(6.63)	Fluconazole, Augmentin (Amoxicillin + Clavulanate), Benzyl benzoate
Wound infections & Rashes	6(3.31)	3(1.65)	9(4.97)	Clotrimazole cream, Fluconazole, Gentamycin, ciprofloxacin, Metronidazole
Meningitis	5(2.76)	3(1.65)	8(4.42)	Amphotericin B, Augmentin(Amoxicillin + Clavulanate), cephalexin, ceftriaxone
Malaria	4(2.21)	None	4(2.21)	Artesunate (2), CoArtem(2), Metronidazole, Bactrim (Trimethoprim and sulfamethoxazole, cotrimoxazole),
Pneumonia	3(1.65)	4(2.21)	7(3.87)	Ceftriaxone, Augmentin(Amoxicillin + Clavulanate), amikacin, tazocin (Piperacillin-tazobactam), Imipenem, meropenem, azithromycin,
Respiratory problem, Coughing with blood, Chest infection	3(1.65)	4(2.21)	7(3.87)	Augmentin (Amoxicillin + Clavulanate), Ceftriaxone, Ampicillin
UTI	2(1.10)	None	2(1.10)	Augmentin(Amoxicillin + Clavulanate), ciprofloxacin, ceftriaxone
STI	2(1.10)	3(1.66)	5(2.76)	Azithromycin
LRTI	2(1.10)	None	2(1.10)	Azithromycin, Augmentin(Amoxicillin + Clavulanate), Ceftriaxone
Herpes zoster	2(1.10)	None	2(1.10)	Acyclovir, Augmentin (Amoxicillin + Clavulanate), ciprofloxacin
Diarrhea, weakness & vomiting	1(0.55)	8(4.44)	9(4.97)	Metronidazole, ciprofloxacin, Sorol citrate
Body itching/ sores on the body (Sores on the part the penis)	1(0.55)	2(1.11)	3(1.65)	Augmentin(Amoxicillin + Clavulanate), Fluconazole
Skin disease	1 (0.55)	None	1(0.55)	Augmentin(Amoxicillin + Clavulanate), cloxacillin
URTI	1(0.55)	None	1(0.55)	Amoxicillin
Influenza infection	1(0.55)	None	1(0.55)	Augmentin(Amoxicillin + Clavulanate), ceftriaxone, cephalexin
Measles	1(0.55)	None	1(0.55)	Fluconazole
Herpes snapper	1(0.55)	None	1(0.55)	Acyclovir
Chickenpox	1(0.55)	None	1(0.55)	Amikacin
Others(Non-communicable diseases: Headache, Epilepsy)	5(2.76)	6(3.31)	11(6.10)	Non prescribed antimicrobials (Panado, Allergex)
None response	None	1 (0.55)		None
Total	**96 (53.0.4%)**	**85 (46.96%)**	**181(100%)**	

NB: *******There was more than one condition or disease reported by participants.*
Keynote: *FDC: Fixed dose combination; BHP: biomedically healthcare professionals; TB: Tuberculosis, HIV: Human immunodeficiency virus; UTI: Urinary tract infection; LRTI: Lower respiratory tract infection; STI: Sexually transmitted infection; URTI: Upper respiratory tract infection; None: not reported.*

Self-reported disease conditions reported by patients seen by THPs: Table 3 presents self-reported disease conditions reported by patients seen by THPS. The majority of patients (4/15) reported that they had cutaneous conditions such as sores on the body, body itching, wounds infection and rashes (Patients 5, 11, 12, 13). Three patients out of fifteen reported having respiratory problems such as chest pain and coughing (Patients 7, 9, 10)

Self-reported disease conditions and prescribed medicines by BHPs and outpatients: Table 4 presents the frequency of disease conditions and prescribed medicines self-reported by BHPs and outpatients. In total, 181 diseases were self-reported by respondents with almost half by BHPs (96/181, 53.04%) while the remainder of disease conditions were self-reported by outpatients (85/180, 46.96%). Overall, TB infection accounted for 28.18% (51/181) of all cases reported. Out of this proportion, 60.78% (31/51) were reported by the BHPs and 39.22% (20/51) were reported by outpatients. HIV infection accounted for 23.20% (42/181) of all cases reported overall. Out of this proportion, 35.71% (15/42) were reported by BHPs and 64.29% (27/42) were reported by outpatients

Perception of BHPs and outpatients on the use of TM and prescribed medicines : Table 5 presents the frequencies of responses obtained from respondents on the use of TM. To the question "*Have you ever treated infectious diseases in the past 3 months? /have you had infectious diseases in the past 3 months?"* Overall, 78% of BHPs (39/50) have reported that they have treated infectious diseases while 100% of outpatients (50/50) have reported having infectious diseases.
To the question "*Are your patients satisfied with the treatment received for the above infectious diseases? / Are you satisfied with the treatment received for the above infectious diseases?"* the majority of BHPs (46/50, 92%) agreed that their patients were satisfied with treatment while 88% of outpatients (44/50) also recognized that the treatment administered to them was correct.
This question was asked to respondents "*What do you think about the treatment administered to patients? / what do you*

think about the treatment administered to you?" overall 80% of BHPs(40/50) responded that the treatment was "Effective" while 88% of outpatients (44/50) responded also that the treatment was "Effective"

To the question *"Have you ever treated other patients referred to you by THPs? / Have you ever used traditional medicine in the past 3 months?"* A few numbers of respondents of BHPs (7/50, 14%) that they received patients referred from THPs while a number of outpatients (22/50, 44%) reported that they have been referred from THPs to BHPs and have used TM. Furthermore, to next question asked only to outpatients *"Can TM fight infectious diseases?"* Half of them responded affirmatively (25/50, 50%) and only 34% of outpatients (17/50) responded that "sometime" TM can fight infectious diseases. Another question was asked only to outpatients *"What do you think about the use of TM to treat your infectious diseases?"* Overall 30% of outpatients (15/50) responded that "TM can fight infectious diseases if using the right dose and the right medicinal plant."

To the question asked only to outpatients *"What do you think of combining various medicines to treat the same infectious diseases?* The majority of them (14/50, 28%) responded that "They can fight both completely the same disease" Another similar question was asked to outpatients *"Have you ever combined at the same time TM and prescribed medicines?"* Overall 20% of outpatients (10/50) responded that "I stopped with TM when I started with prescribed medicine" and 20% other outpatients (10/50) responded that "Doctor or THP could not allow the use of both"

Table 5a:
Perception of BHPs and outpatients on the use of TM and prescribed medicines

Questions	Responses	BHPs n=50(Fr %)	Outpatients n=50 (Fr %)
Have you ever treated infectious diseases in the past 3 months? / Have you had infectious diseases in the past 3 months?	Yes	39(78)	50(100)
	No	11(22)	None
Are your patients satisfied with the treatment received for the above infectious diseases? / Are you satisfied with the treatment received for the above infectious diseases?	Yes	46(92)	44(88)
	No	4(8)	6(12)
What do you think about the treatment administered to patients? / What do you think about the treatment administered to you?	Effective	40(80)	44(88)
	No effective	4(8)	6(12)
	According to guidelines	6(12)	None
Have you ever treated other patients referred to you by THPs? / Have you ever used traditional medicine in the past 3 months?	Yes	7(14)	22(44)
	No	43(86)	28(56)
Can TM fight infectious diseases?	Yes	NA	25(50)
	No	NA	8(16)
	Sometimes	NA	17(34)
What do you think about the use of TM to treat your infectious diseases?	TM can fight infectious diseases if using the right dose and the right medicinal plant	NA	15(30)
	It can heal but not for infectious diseases like HIV or TB	NA	11(22)
	It depends on the believing	NA	6(12)
	It is so strong and harmful, then it can bring any Intoxication or damage to the body	NA	6(12)
	No, it cannot cure infectious diseases	NA	4(8)
	As African, we believe in TM	NA	2(4)
	It can treat but with many side effects	NA	1(2)
	I advise both TM and prescribed, but THP and BHP must be in touch to avoid any side effect	NA	1(2)
	I do not believe in TM as a Christian	NA	1(2)
	Only qualified doctors can treat Infectious diseases	NA	1(2)
	No idea	NA	2(4)
What do you think about combining various medicines to treat the same infectious diseases?	They can fight both completely the same disease	NA	14(28)
	Since it is the doctor's idea then it is fine	NA	11(22)
	At the hospital they give us various medicine for only one disease, then combining is good	NA	5(10)
	Not good, the treatment can fail or any Intoxication	NA	5(10)
	Many side effects and complications can happen	NA	4(8)
	It depends on everyone's believes	NA	3(6)
	Medicines can interact with each other	NA	3(6)
	It depends on everyone's experience(THP or BHP)	NA	2(4)
	The disease can become worse	NA	1(2)
	No idea	NA	2(4)

Keynote: NA: not applicable, Fr: frequency, No idea: no sufficient knowledge to answer the question

Table 5b:
Perception of BHPs and outpatients on the use of TM and prescribed medicines (contd)

Have you ever combined at the same time TM and prescribed medicines for infectious diseases?	**I stopped with TM when I started with prescribed medicine**	**NA**	**10 (20)**
	Doctor or THP cannot allow the use of both	NA	10(20)
	I never combine since TM brought bad effect, I stopped immediately	NA	9(18)
	I never used both	NA	9(18)
	I stopped TM before to start with prescribed medicines	NA	2(4)
	I stopped with TM when I started with HIV medicine	NA	2(4)
	I stopped TM before since it did not heal me	NA	2(4)
	They must be used separated with a gap of time	NA	2(4)
	I could not combine since they can bring many complications	NA	1(2)
	I stopped TM when I got diarrhea	NA	1(2)
	I stopped with TM when I knew my HIV status	NA	1(2)
	I used TM alone for Diarrhoea	NA	1(2)
What do you think about drug-drug interactions for those patients using concurrently TM and prescribed antimicrobial medicines?	Can result in drug resistance especially resistance to antibiotics	10(20)	NA
	Most of the patients come to the clinic with several complications such as Kidneys failure (liver failure), vomiting, Diarrhoea, and jaundice after using either TM alone or in combination with prescribed medicine, Since TM is not safe at all.	9(18)	NA
	Combing TM with Western medicines must be discouraged since the desired effect of medicines can be increased in producing many complications.	6(12)	NA
	Delay of the healing process with prescribed medicines because of TM used (Drug-interaction)	5(10)	NA
	Both can inhibit each other, so treatment failure can happen	4(8)	NA
	I think any interaction like toxicity or Treatment failure can happen	2(4)	NA
	Awareness should be given to the patient when combining	2(4)	NA
	Use either TM alone or western medicines alone.	2(4)	NA
	Since it is a free country, then patients are free to use medication of their choice according to their different cultural background	2(4)	NA
	Collaboration might be between THPs and BHPs to avoid any intoxication	2(4)	NA
	Use either TM alone or western medicines alone	1(2)	NA
	THPs must be registered before giving medicine to patients	1(2)	NA
	Difficult to assess notice as patients do not report herbal use	1(2)	NA
	Drug resistance can happen because TM is not registered in MCC	1(2)	NA
	HIV or TB patients who take both, their viral load became high	1(2)	NA
	I never encounter, come across those patients	1(2)	NA
Can I talk to the concerned patients using both TM and prescribed antimicrobial medicines?	Yes	13 (26)	NA
	No	37(74)	NA

The following question was addressed only to BHPs *"What do you think about drug-drug interactions for those patients using concurrently TM and prescribed antimicrobial medicines?* The majority of BHPs (10/50, 20%) responded that "This could result in drug resistance especially resistance to antibiotics" and 18% of them (9/50) responded that "Most of the patients came to the clinic with several complications such as kidneys failure or liver failure, vomiting, diarrhea and jaundice after using either TM alone or in combination with prescribed medicine, since TM is not safe at all*."* Another question was asked only to BHPs *"Can I talk to the concerned patients using both TM and prescribed antimicrobial medicines?"* the majority of BHPs (37/50, 74%) did not give their agreement (Table 5).

Self-reports of clinical outcomes following concurrent use of both TM and prescribed medicines by BHPs and outpatients.: Table 6 presents clinical outcomes reported by BHPs and Outpatients following the concurrent use of both TM and prescribed medicines.

To the question asked only to BHPs "*Are you aware of patients using both THPs and BHPs for infectious diseases?"* The majority of BHPs affirmed that they were aware of patients using both TM and prescribed medicines (38/50, 76%). A question was asked to respondents "*Have you ever registered some cases of drug-drug interactions(TM and prescribed medicines)?"* A small number of both BHPs (17/50, 34%) and outpatients (11/50, 22%) indicated that they had registered some cases of drug-drug interactions.

Respondents were asked about the *"types of interactions found between TM and prescribed medicines".* Only 11% of BHPs (22/50) responded that "The desired effect increases" while 10% of outpatients (5/50) responded that "they were intoxicated"

To the question *"Have you ever registered some cases of adverse effects when combining both TM and prescribed medicines?"* A small number of both BHPs (13/50, 26%) and outpatients (12/50, 24%)) registered some cases of adverse effects. A question was further asked to probe the types of adverse effects experienced by patients for combining both TM and prescribed medicines. Diarrhea (7/50, 14%) and kidney failure (7/50, 14%) were mainly reported as adverse effects experienced by BHPs while Vomiting and weakness (7/50, 14%) and diarrhea (4/50, 8%) were mainly experienced among outpatients. A number of BHPs (16/50, 32%) responded that "Drug interactions, resistance to treatment, failure of TM and intoxication could occur when combining TM and prescribed medicines." Furthermore, they said that medicines would interact with each other and patients became very ill with symptoms such as convulsion and unconsciousness"

Table 6.
Perceptions of BHPs and outpatients on the clinical outcomes from the use of both TM and prescribed medicines

Questions	Responses	BHPs n=50(%)	Outpatients n=50(%)
Are you aware of patients using both THPs and BHPs for infectious diseases?	Yes	38(76)	NA
	No	12(24)	NA
Have you ever registered some cases of drug-drug interactions when combining both TM and prescribed medicines?	Yes	17(34)	11 (22)
	No	33(66)	39(78)
If yes, which medicines (TM and prescribed medicines) were involved?	Not determined	33(66)	40(80)
	TM	17(34)	8(16)
	HIV medicine	None	1(2)
	TB medicine	None	1(2)
Types of interactions between TM and prescribed medicines	The desired effect increases	11(22)	None
	The desired effect decreases	6(12)	1(2)
	Intoxication	2(4)	5(10)
	MDR	None	2(4)
	Treatment failure of TM	None	3(6)
Have you ever registered some cases of adverse effects when combining both TM and prescribed medicines?	Yes	13(26)	12(24)
	No	37(74)	38(76)
If yes, which medicines (TM and prescribed medicines) were involved?	TM	NA	7(14)
	TB medicines	NA	2(4)
	HIV medicines	NA	1(2)
	HIV medicines associated with TB medicines	NA	1(2)
	HIV medicines associated with Painkillers	NA	1(2)
Kind of adverse effects	Diarrhea	7(14)	4(8)
	kidneys failure (liver injury)	7(14)	None
	Jaundice	6(12)	None
	Vomiting and weakness	4(8)	6(12)
	Rashes	3(6)	2(4)
	Tiredness and loss of energy	2(4)	2(4)
	Loss of appetite	2(4)	2(4)
	Electrolyte in balance	1(2)	None
	Confusion	1(2)	None
	Convulsion	1(2)	None
	A headache	1(2)	1(2)
	Dizziness	None	1(2)
	Penis part changed color	None	1(2)
What is the effect experienced by patients for combining both TM and prescribed medicines? / What is the effect experienced by you for combining both TM and prescribed medicines?	Drug interaction or drug resistance (Failure of TM, any intoxication), medicines will interact with each other and patients become very ill (Convulsion, unconsciousness)	16(32)	None
	Never experienced because patients hide the use of TM	12(24)	None
	Kidneys failure (renal failure), drug-induced, diarrhea, vomiting, and death	11(22)	None
	Delay of treatment, unsatisfactory of treatment, less effectiveness of treatment and death	11(22)	None
	Qualified doctors can explain it well	None	7(14)
	I will not recover if combining	None	6(12)
	Interaction can occur between TM prescribed medicines	None	6(12)
	The medicine effect can increase and damage the body	None	6(12)
	To avoid any Intoxication, this must not be allowed	None	6(12)
	The disease can become worse	None	5(10)
	They can interact with each other	None	5(10)
	TM was not used at the same time with western medicine	None	1(2)
	No idea	None	8(16)

Keynote: *NA: Not applicable, None: Answer not provided*

Perceptions of THPs and patients seen by them on the use of TM

Table 7 presents the perceptions of both THPs and their patients on the use of TM. A question on diagnosis was asked to THPs ***"****How do you decide whether you are treating a viral or bacterial infection?"* Overall 35.29% of THPs (6/17) responded that "spiritual search, dreams and ancestor guidance (Idlozi)" were the way for them to determine whether it was about viral or bacterial infection. Furthermore, four THPs (4/17, 23.53%) out of those number responded that "they did not cure viral infections, after seeing their patients' symptoms they referred them to the hospital".

To the question "*What basic ideas (philosophy) are you using before you decide on the treatment pattern?"* A few THPs (5/17, 29.41%) indicated that they learned from ancestors and elders. Dreams and calling from ancestors were as well reported as a way to determine their treatment pattern (3/17, 17.65%). Furthermore, another question was asked to THPs about "*Are your patient(s) satisfied with your healing?"*

Table 7.
Perceptions of THPs and patients seen by them on the use of TM

Questions	Responses	THPs n= 17(%)	Patients n=15(%)
How do you decide whether you are treating a viral or bacterial infection?	Spiritual search, dreams and ancestor guidance (Idlozi)	6(35.29)	NA
	Symptoms from patients then I do not cure viral infection, in case I refer to the hospital	4(23.53)	NA
	Certain explanations, symptoms, medical records, examination (Ukuhlola) from the patients	3(17.65)	NA
	First I send people to the hospital for the blood test, then I treat according to the hospital results	2(11.76)	NA
	Symbols showed by ancestors	1(5.88)	NA
	Disease revealed by the holy spirit	1(5.88)	NA
What basic ideas (philosophy) are you using before you decide on the treatment pattern?	I learned from ancestors and elders	5(29.41)	NA
	Dreams and calling from ancestors	3(17.65)	NA
	Practical experience for many years and traditional searching	2(11.76)	NA
	Talents and ancestors calling	2(11.76)	NA
	The philosophy is to talk to elders that have passed away	2(11.76)	NA
	Revelation from the holy spirit	1(5.88)	NA
	First seek help from the hospital then here(THP)	1(5.88)	NA
	There is a school where we are taught	1(5.88)	NA
Do your patient(s) satisfied with your healing?	Yes	14(82.35)	NA
	Not at the exact time	3(17.65)	NA
Can I talk to your patient(s)?	Yes	6(35.29)	NA
	No	11(64.71)	NA
Any reason(if the answer is NO)	My patients' life are private and confidential	7(41.18)	NA
	I lost their contacts	4(23.53)	NA
Why did you choose TM for your condition?	TM healed me before, I believe in it then it is fast and less costly	NA	6(40)
	I was told about it	NA	3(20)
	The hospital was far	NA	3(20)
	THPs are more confident than doctors, then the healing is fast	NA	2(13.33)
	Because the doctor failed to heal me	NA	1(6.67)
Did you use traditional medicine previously?	Yes	NA	11(73.33)
	No	NA	4(26.67)
Did the THPs use some prayer, things, songs, spiritual rituals in addition?	Yes	NA	11(73.33)
	No	NA	4(26.67)
Specify those practices	Prayer to ancestors	NA	6(40)
	He screamed to the spirit and sung	NA	1(6.67)
	He kept quiet for a moment when he prayed	NA	1(6.67)
	He rang the bell then prayed	NA	1(6.67)
	He turned around by singing	NA	1(6.67)
	Attended the services, when they praise and pray	NA	1(6.67)
	None	NA	4(26.67)
How do you feel after treatment (the issue)?	Relieved	NA	8(53.33)
	Unwell	NA	4(26.67)
	Relieved but with side effect	NA	2(13.33)
	Nothing changed, he referred me to the hospital	NA	1(6.67)

Keynote: *NA: Not applicable*

Most of THPs (14/17, 82.35%) responded that their patients were satisfied with the treatment received. More than half of patients seen by THPs (8/15, 53.33%) have confirmed that they felt relieved by the treatment received from THPs. Another question asked to THPs "*Can I talk to your patient(s)?"* The majority of THPs (11/17, 64.71%) did not agree and gave as a reason that their patients' life was private and confidential (7/11, 41.18%).

To the question asked to patients *"Why did you choose TM for your condition?"* Almost half of the patients (6/15, 40%) seen by THPs responded that **"**TM healed them before, they believed in it then it was fast and less costly". Furthermore, a small number of same patients (3/15, 20%) seen by THPs responded that "They were told about TM as well as because the hospital was far". A similar question was asked to patients *"Did you use traditional medicine previously?"* The majority of patients (11/15, 73.33%) seen by THPs agreed that they used TM before. In addition, another question was asked to patients about" *Did the THPs use some prayers, things, songs, spiritual rituals in addition?"* Most of the patients seen by THPs (11/15, 73.33%) affirmed that THPs did some rituals upon them such as *"Prayer to ancestors"* (6/15, 40%).

Self-report of clinical outcomes following concomitant use of TM with prescribed medicines by THPs and Patients seen by them.

Table 8 presents the general perception of THPs and patients seen by them on the use of TM. To the question "*What type of treatment are you using to treat your patients with infectious diseases?"* A small number of THPs (5/17, 29.41%) responded that their information was "*confidentia*l" and the same question was also asked patients (9/15, (60%) seen by them who also indicated that they did not know the medicines used by their THPs since THPs did not share their knowledge.

Table 8a.
Perceptions of THPs and patients seen by them on the clinical outcomes from the use of both TM and prescribed medicines

Questions	Responses	THPs n=17(%)	Patients n=15(%)
What type of treatment are you using to treat your patients?/ Which type of TM, your THP has used to treat you?	Confidential	5(29.41)	None
	Plants and animal parts	4(23.53)	None
	Not using plants	3(17.65)	None
	It depends of the problem	2(11.76)	None
	Most of the knowledge the ancestors had, it was from plants (Leaves, crops,..)	1(5.88)	None
	crops, leaves	1(5.88)	None
	Leaves, roots	1(5.88)	None
	He used herbal (Muthi), but I do not know	None	9(60)
	No idea, it is THPs own secret	None	3(20)
	I was unconscious, I cannot know	None	1(6.67)
	Wangi caba (cut with a bleed), herbs, impepo, pleading with ancestors	None	1(6.67)
	Water and prayer	None	1(6.67)
In case of a different problem, does the THP mix also different herb to treat you? Are you also sometimes mixing different herbs for your patient in case of a different problem?	Yes	11(64.70)	11(73.33)
	No	6(35.29)	4(26.66)
Reasons for mixing both TM and prescribed medicines for infectious diseases	Each illness has its own plant, so they can be combined	2(11.76)	NA
	Each khambi has its own things/infection	2(11.76)	NA
	The intakes are different so medicines do not interfere	2(11.76)	NA
	I can combine until I find a solution	2(11.76)	NA
	People come with certain different cases of the problem, then you must treat by mixing herbs	2(11.76)	NA
	Each medicine has its place to work	1(5.88)	NA
	I mix 3 or 4 medicines when I am not sure with the diagnostic	1(5.88)	NA
	When I am not sure with the patient's problem	1(5.88)	NA
	None	4(23.53)	NA
Do your patients combined TM and prescribed medicines for infectious diseases? / Do you use to consult also BHPs for the same problem?	Yes	15(88.23)	6(40)
	No	2(11.76)	5(33.3)
	Yes but not for the same problem	None	1(6.67)
	Yes I did before to consult the THP	None	1(6.67)
	Yes Referred by the THP	None	2(13.33)
Reasons for combining both TM and prescribed medicines for infectious diseases	In case of any interaction (vomiting or coughing), I do refer them	1(5.88)	NA
	In case of treatment failure or complication, I refer 100% of patients to doctors	1(5.88)	NA
	In case that THP's medicine does not work	1(5.88)	NA
	It is a norm now. We were taught, we cannot donate water or blood that leading to death	1(5.88)	NA
	It is good to work hand to hand(a collaboration between BHP and THP)	1(5.88)	NA
	They do combine but not for the same problem	1(5.88)	NA
	only in case of over illnesses	1(5.88)	NA
	There are medicines only for specific disease, so prescribed medicine will not work after using TM	1(5.88)	NA
	None	9(52.94)	NA
Do you ever register some case of adverse effects after mixing that?	Yes	8(47.05)	6(40)
	No	9(52.94)	9(60)
(If Yes) List them	Weakness and vomiting	3(17.65)	1(6.67)
	Dizziness and weakness	2(11.76)	1(6.67)
	Diarrhea and vomiting	2(11.76)	None
	Allergies	1(5.88)	None
	Chest pain	None	1(6.67)
	The disease went worst	None	1(6.67)
	loose of sight	None	1(6.67)
	Nausea	None	1(6.67)
	None	9(52.94)	9(60)

Keynote: NA: Not applicable, None: Answer not provided

Table 8b.
Perceptions of THPs and patients seen by them on the clinical outcomes from the use of both TM and prescribed medicines (contd.)

What is your thought about interaction when using at the same time TM and Conventional medicine for infectious diseases?	**The disease can get worst**	**None**	**4(26.66)**
	They can interact with each other	None	2(13.33)
	The medicines effect can either increase or decrease	None	1(6.67)
	The treatment can either be successful or fail	None	1(6.67)
	There must be a time gap in their use	None	1(6.67)
	They both treat and they do not clash	None	1(6.67)
	Side effects can occur	None	1(6.67)
	You can get intoxicate	None	1(6.67)
	Interaction is good especially when you are not sure with one medicine	3(17.65)	None
	A mutual relationship is good. We do not have the equipment to check the minor things that play a big role in a person life	2(11.76)	None
	It is good for fighting completely the diseases but this treatment must be stopped in case of adverse effect	2(11.76)	None
	The interaction is good as long as there is a time lapse	2(11.76)	None
	Patients must not take both, at least his BHP and THP must be in known.	1(5.88)	None
	Since we do not have the same knowledge, we should help each other(TM and Prescribed medicine)	1(5.88)	None
	No idea	3(17.65)	3(20)
	Patients get heal but there must be a mutual relationship between THP and BHP	1(5.88)	None
	The interaction is good. BHP cannot treat a specific disease that needs an ancestor intervention.	1(5.88)	None
	We cannot heal disease instantly, there is a process. So BHP and THP must collaborate	1(5.88)	None
According to you, what can occur if the patient takes at the same time TM with conventional medicine?	If they respect the time lapse, nothing bad can happen	6(35.29)	NA
	Intoxication	3(17.65)	NA
	It depends on their dosage, but any complication must be avoided	3(17.65)	NA
	Medicines can interact	3(17.65)	NA
	No Idea	1(5.88)	NA
	There must be a mutual relationship, there is something that I can heal and some other that the doctor can also heal	1(5.88)	NA

Keynote: NA: Not applicable, None: Answer not provided

The following question was asked to respondents "*Do both THPs and their patients' mix sometimes different herbs for treatment in case of different infectious diseases?"* the majority of both BHPs (11/17, 64.70%) and patients (11/15, 73.33%) asserted that they mixed different herbs in case of infectious diseases.

To the question about any reason for mixing different herbs, the majority of THPs (10/17, 58.82%) responded that "each illness had its own plants, so they could be combined. Each Ikhambi (medicinal plant) had its own condition /infection; the intakes are different so medicines do not interfere; THPs could combine until they find a solution; people came with certain different cases, then THPs must treat by mixing herbs". Moreover, another question asked to both THPs and patient "*Do your patients combined TM with prescribed medicines?* Most of BHPs (15/17, 88.23%) responded that they were aware that their patients used to combine TM with prescribed medicines.

Patients seen by THPs were asked the following question: "*Do you consult also BHPs for the same problem?"* Less than half of patients seen by THPs (6/15, 40%) responded that they consulted both THPs and BHPs.

To the question about any reason for*" combining TM with prescribed medicines for infectious diseases",* less than half of THPs (8/17, 47.05%) responded that in case of any interaction such as vomiting and coughing they did refer patients to BHPs. In case of treatment failure or any other complications, THPs referred 100% of their patients to BHPs. In addition, in case of any medicine from THPs did not work; THPs are not allowed to donate water or blood or any other treatment that may lead the death of patients. Thus it is good to work hand to hand or to collaborate between BHPs and THPs.

To the question "*Do you ever register some cases of adverse effects after mixing TM with prescribed medicines for infectious diseases?"* Almost half of THPs (8/17, 47.05%) and less than half of patients (6/15, 40%) responded that they had experienced adverse effects. Vomiting, dizziness, diarrhea, and weakness were some of the adverse effects reported by THPs (3/17, 17.64%) and one patient (1/15, 6.66%).

The following question was asked to THPs "*What is your thought about interactions for using at the same time TM with conventional medicines?"* Few THPs (3/17, 17.64%) responded that *"interactions were good especially when you are not sure with one medicine*", the same question was asked to patients seen by THPs, a few patients (4/15, 26.66%) responded that "*disease could get worst."* Another question was asked to THPs "*According to you, what can occur if the patient takes at the same time TM and conventional medicine?"* Less than half of THPs (6/17, 35.29%) responded that "nothing bad could happen if patients respected the time lapse between the two treatments"

DISCUSSIOIN

This study was conducted in the Ilembe district, South Africa. Experiences from BHPs, outpatients, THPs and patients are seen by them. The aim of the study was to establish whether any antimicrobial resistance and treatment failure could occur among patients, attending outpatient departments of selected healthcare facilities, who used concurrently prescribed antimicrobial medicines and TM.

This study found a small number of medicinal plants used by THPs such as *Spirostachys Africana sond* (Umtombothi), *Hypoxis hemerocallidea* (magic muthi or inkofe) and Sutherlandia frutescens (Insiswa or Unwele). Although the majority of THPs could not reveal the specific recipe used for each disease condition treated with the listed plants above; a few THPs indicated that they used *Sutherlandia Frutescens* for "boosting the immune system." THPs in this study also used *Hypoxis hemerocallidea and Sclerocarya birrea* (Umganu) for treating diarrhea (Isifo sohudo) and HIV infection (Igciwane lengculazi). The use of *Hypoxis hemerocallidea* against infectious diseases has been reported previously in another study for the treatment of sexually transmitted infections*(De Wet et al., 2012).* Another study reported the use of *Hypoxis hemerocallidia* and Sutherlandia frutescens for enhancing the immune system and may have antiviral properties (Awortwe et al., 2013, Mugomeri et al., 2016). *Sclerocarya birrea (*Unganu plant) has been reported having a pharmacological property against sexually transmitted infections such as *gonorrhea (De Wet et al., 2012).* In some African countries, the same plant was used in the management of human ailments, such as diarrhea, dysentery, and others(Louis et al., 2018).

In this study, 65.62% of THPs and their patients (21/32) mixed different herbs for the treatment of infectious diseases. This finding may be supported by another study conducted in Portugal (Freitas et al., 2013) which reported the synergistic enhancement of antimicrobial compounds from medicinal plants. However, respondents from this study reported that *they had experienced adverse effects such as vomiting, dizziness, diarrhea, and weakness when mixing different herbs for the management of their infectious diseases.* Compared to another study, respondents expressed negative attitudes towards the use of TM in conjunction with prescribed medicines by showing that TMs were most of the time harmful especially when mixing them with ARVs, they ended to death or any other complications(Weintraub et al., 2018) Weintraub et al (2018)

Respondents agreed that when combining both TM and prescribed medicines for infectious diseases, interactions and adverse effects may result and if there is no respect of time lapses between the two medicines, the infectious disease may get worse. Perceptions from respondents in this study may be supported by statements such as TM and prescribed medicines could coexist and complement each other (Giovannini et al., 2011, Calvet-Mir et al., 2008). In the same line, another study done in Brazil reported that people in the local community relied on both TM and prescribed medicines to treat diseases of all categories including infectious diseases (Zank and Hanazaki, 2017).

Majority of disease conditions were infectious diseases (169/180, 93.88%) with mainly TB infection (51/181, 28.33%) and HIV infection (42/180, 23.33%) reported in Table 4 above. This may be supported by a previous study done in KwaZulu-Natal province which found that KwaZulu-Natal province had the highest prevalence of HIV infection in South Africa(Gómez-Olivé et al., 2013); a recently published report on the prevalence of HIV infection in South Africa showed that KwaZulu-Natal province was the most prevalent province (Approximatively 26.6 %) among the top four high HIV-prevalent provinces in South Africa (Statistics South Africa, 2018).

Respondents (30%, 15/50) from this study perceived that TM can fight infectious diseases if using the right dose and the right medicinal plant; in addition, they responded that TM is associated with prescribed medicines could fight completely infectious diseases. In contrast, Weintraub Et al.,(2018) disagreed in showing that the majority of respondents in his study opposed the concurrent use of TM and prescribed medicines for the management of HIV infection and they believed that ARVs were the most effective option for treating HIV infection (Weintraub et al., 2018). In line with the findings of this study, TM remains the framework and cannot be ignored against the management of infections. Accordingly, many authors suggested for collaboration between BHPs and THPs by respecting local expertise in managing infectious diseases (Green and Ruark, 2016, Gqaleni et al., 2011)

Outpatients (20/50, 40%) in this study reported that they stopped with using TM when started with prescribed medicine or when they knew their HIV status because BHPs would not allow the use of both. A study done previously in 2010 showed that the use of TM usually decreases among patients after ARV initiation.(Peltzer et al., 2010); more studies reported that traditional medications provided good results, despite their side effects and toxicity (Leone et al., 2015, Anwar et al., 2007). TM and prescribed medicines if used concurrently should be used wisely per avoidance of any interactions and adverse effects such as kidney failure which mostly reported the present study.

Respondents in this study including BHPs and outpatients reported that combining TM and prescribed medicines for infectious diseases may result in drug resistance especially resistance to antibiotics and they highlighted that the majority of patients came to the clinic with several complications such as kidneys failure, vomiting, diarrhea and jaundice after using either TM alone or in combination with prescribed medicines. Similar studies were conducted in the UK and in Ethiopia showing that the lack of collaboration between health practitioners has an impact on treatment failure. BHPs always have negative perceptions about TM which discourage patients from sharing information on the use of TM which result in adverse effects and interactions on patients health due to the toxicity of TM used (Mekuria et al., 2018, Barnes, 2003). From these experiences stated by respondents in this study, authors may admit that having conventional medicines and TM at the same time may interfere or may result in damaging some organs, failure of the treatment as well as modifying drugs pharmacological action.

This study was a triangulation study including four (4) types of participants, namely THPs, patients seen by THPs, BHPs, and outpatients. This study had a few limitations. This was a self-report survey with a small sample size due to the confidentiality of information among THPs. There was neither observation of THPs in their practices nor experimentations conducted by researchers. Distinguishing between types of THPs and furthermore, all patients did not have the same disease conditions. There was no matching of information between BHPs and patients seen by them; although this study matched information from THPs and a few patients seen by them. The concurrent use of TM and prescribed antimicrobial was under-reported by participants because of embarrassment or belief that their medical providers were against TM use or their information could be divulgated (Puoane et al., 2012). The majority of medicinal plants used by THPs for infectious diseases or other disease conditions were not reported by them and kept as a secret. However, results cannot be generalized to the entire population of THPs, patients seen by them, BHPs and outpatients in the entire province of KwaZulu-Natal and South Africa.

In conclusion, the present study presented different perceptions from THPs, BHPs and their patients on medicinal plants used concurrently with prescribed antimicrobial medicines and their effects on antimicrobial resistance and treatment failure. A small number of medicinal plants were reported with antibacterial and/or antiviral properties. THPs and their patients confirmed that they combined medicinal plants for a positive result. Cases of interactions and adverse effects were reportedly referred by THPs to the nearest hospital or clinic. However, patients seen by either BHPs or THPs confirmed that they stopped with TM when they started with prescribed antimicrobial medicines. The majority of BHPs reported that adverse effects such as kidney failure, vomiting, and jaundice were the most common clinical outcomes among patients who used either TM alone or in combination with prescribed medicines. Further studies are needed in other parts of South Africa to investigate the effects of concurrent use of traditional medicine and prescribed antimicrobial medicines. Furthermore, studies are needed to investigate bidirectional referral systems between THPs and BHPs.

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