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Full Length Research Paper

Knowledge, use and attitudes towards medicinal plants of pre-service teachers at a South African University

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Abstract

This study surveyed the knowledge, use and attitudes towards traditional medicinal plants of pre-service science teachers at a university in central Johannesburg, South Africa. The study aimed to determine the use of traditional medicines among pre-service science teachers (n=120) as well as find out the knowledge about the medicines held by the sampled teachers. It also sought to determine the pre-service teachers' attitudes towards traditional plant medicines and traditional healers. Data was collected through a written questionnaire and interviews. The questionnaire and interviews solicited the pre-service teachers' knowledge, use and attitudes towards traditional medicines regarding five common ailments namely; stomach ailments, flu/fevers; headaches; wounds and malaria. Data analysis involved descriptive statistics and is presented in the form of a table and a graph. The results show that the knowledge about medicinal plants used to treat the five investigated common ailments is limited as revealed by the relatively small number of plant species mentioned by the respondents (19). It was found that although all the participants use traditional medicines to treat one or more of the investigated ailments; their attitudes towards the use of traditional medicines and traditional healers can be described as negative. The majority of the respondents reported that they had used traditional medicines to treat fevers or flu. Most of the participants are sceptical about the effectiveness of traditional medicines to treat the investigated ailments. It is recommended that if the integration of knowledge about medicinal plants and indigenous knowledge in general into the school science curriculum is to be achieved, then a lot of work needs to be done to change teacher attitudes towards both traditional medicines and traditional healers.

Keywords: Traditional medicines, knowledge, use, attitudes, pre-service teachers, common ailments, curriculum, school science.

INTRODUCTION

Background

Globally, there is increasing recognition that traditional medicines (TMs) play an important role in primary health care (Kariuki and Njoroge, 2011). The World Health Organisation (WHO) 2000 estimates that 80 % of the people in developing countries depend on local medicinal plants for their primary health care. In South Africa, up to

80% of the African people, especially in rural areas, still depend on TMs for primary health care. Indeed, in some of South Africa's rural communities, TMs remain the only source of treatment. The use of TMs to supplement Western medicines has also been reported (Wyk and Gericke, 2000). Taylor et al., 2000, suggest that the use of traditional plant medicines in many developing countries could be attributed to the high costs of Western drugs and the fact that in many communities traditional medicines are simply culturally and spiritually more acceptable.

In South Africa, several studies have examined the use of traditional medicines by people living in rural communities. For example, de Wet et al., 2010 have studied the use of medicinal plants in the treatment of diarrhoea and sexually transmitted diseases (Wet et al., 2012) in northern Maputaland, a rural area in KwaZulu-Natal Province. The use of TMs by HIV/AIDS infected individuals in rural communities of South Africa has also been documented (Babb et al., 2007). While studies on use of TMs in South Africa's rural areas are abound, not much research has been done to document, the use of TMs in urban areas, where the majority of the population supposedly have access to Western medicine. This proposition is made interesting by the fact that if one moves around Johannesburg, which is the site of the study we are reporting here, one is amazed by the large number of traditional healers standing around street corners selling traditional plant medicines. There are also several traditional plant medicine dispensaries within the Johannesburg central district. Dold and Cocks, 2002 report that in South Africa, trade in traditional medicines is common in both informal and formal entrepreneurial sectors. This raises the issue of who among the Johannesburg urbanites are using TMs. It was interesting to find out if pre-service teachers studying for a Bachelor of Education degree in Physical Science or Life Sciences are amongst the Johannesburg urbanites that use traditional medicinal plants for primary health care.

The interest in studying the pre-service teachers' knowledge, attitudes and use of plant medicines was spurred by the fact that in South Africa, the Department of Education (DOE) 2011 has recommended the integration of Indigenous Knowledge (IK) into the school science curriculum. That knowledge includes knowledge about medicinal plants. According to Ogunniyi, 2004 successful curriculum reform and implementation, depends to a very large extent on teacher knowledge and attitudes. Generally, it is accepted that in traditional African societies, traditional healers are not only the custodians of IK, but are also responsible for passing that knowledge from one generation to the next. If knowledge about TM is to be integrated into the school science curriculum, and if teachers are to play roles in the transmission of that knowledge, it is important that their use, knowledge and attitudes towards TMs be documented. This documentation informs both school science curriculum development and science teacher education. Moreover, as de Wet et al., 2010 recommend, it is important to systematically document knowledge of medicinal plants before that knowledge completely disappears.

The objective of this study was to determine pre-service science teachers' knowledge and prevalence of use of TMs, to treat common ailments such as stomach pains, headaches, fevers, wounds, malaria, and HIV/AIDS. It also sought to determine their attitudes towards the use of TMs.

METHODOLOGY

Description of the ethnobotanical survey setting

The study site is the University of the Witwatersrand School of Education, which is located in the northern areas of central Johannesburg, in the Gauteng Province of South Africa (Figure 1). Johannesburg is situated on latitude 26.20°6 and longitude 8.0833 and located 1765 meters above sea level. It is the largest metropolitan in South Africa with a population of over 5 million. The University of Witwatersrand School of Education has a student enrollment of over 700. Students enroll to train as secondary or primary school teachers. The survey being reported here involved 120 second year students, who were training to be specialist secondary school teachers in Life Sciences (n=70; 37 females and 33 males) and Physical Sciences (n =50; 22 females and 28 males). This represented sixty percent (120 out of 200) of the second year students registered for either Life Sciences or Physical Science. The survey was conducted over a five week period between May 2013 and June 2013. The sources of the ethnobotanical data were a questionnaire (see, Appendix A) and semi-structured interviews. Examples of interview questions are given in Appendix B. Ten students, 5 from the Life Sciences group and 5 from the Physical Science group, were purposefully and conveniently selected for interview based on their willingness to participate and availability for interviews. In order to evaluate the clarity and validity of the questionnaire and interview items, pre-tests were conducted on a group of ten fourth year students (who were not part of the study sample), five each from Life Sciences and Physical Science respectively.

Questionnaire

The questionnaire (Appendix A) was in two sections. Section A sought demographic variables: age; gender; religion, subject of specialisation and mother tongue. Section B elicited information on pre-service teachers' knowledge, attitudes and use of medicinal plants. It sought such information as: whether the respondent had

ever used traditional medicine to treat common ailments (e.g. flu, headache, wounds, and stomach ache); what respondents thought about the effectiveness of traditional medicinal plants; and their knowledge of the plants or plant parts used in the treatment of common ailments. Respondents were required to give plant names in their mother tongue. They were also asked to indicate the part of the plant used for treatment, how it was prepared for use (e.g. boil leaves in water), and how they came to know about its uses as a medicine. Respondents were required to give their answers by filling in the spaces provided in the questionnaire. They were told that they could write as much as they wanted and provided with additional paper if they needed more space. For logistical reasons, the questionnaire was administered separately for the Life Sciences and Physical Sciences groups.

Interviews

Interviews were conducted during lunch time, with two interviews being conducted a week over a period of five weeks. The interviews were conducted by the first author. The interviews sought to elicit information on pre-service teachers' knowledge, attitudes and use of medicinal herbs as well as triangulate and validate responses from the questionnaires. All interviews were audiotaped and transcribed verbatim. Two of the five Life Sciences students who were interviewed were females. Three of the five Physical Sciences students who were interviewed were females.

Ethics Statement

The study design and the consent process were approved by the ethical clearance committee of the School of Education, University of Witwatersrand. Informed written consent was obtained from each of the participants prior to questionnaire administration and interviews. Written consent was also obtained for participating in the interviews and for being audio taped. Participants were informed of the purpose of the study and given assurances that all the information they provided would be kept in strict confidence. Participants were told that they were free to withdraw their participation at any point if they so wished. None of the participants withdrew from both the completion of the questionnaire and the interviews.

RESULTS

Participants' demographic data

Of the 120 students who completed the questionnaire, 59 (49.12%) were females. Student ages ranged from 18 to 25. The majority of the students (115 equivalent to 95.83 %) indicated that they were Christians, with the remainder saying they were either Muslims or belonged to traditional religion. The students were from a range of South Africa's ethnic language groups as follows: Zulu = 30 %; Xhosa = 26 %; Sotho = 12 %; Tswana = 10 %; Venda = 8 % Tsonga = 6 %; Swati = 3 % and other =5 %. Other grouped together English and Afrikaans speaking students.

Knowledge and use of medicinal plants

As a group the pre-service students mentioned a total of at least nineteen different plant species (Table 1), for the treatment of five common ailments, which are stomach related ailments (S), wounds (W), headaches (H), flu and/or fevers (F), and malaria (M). The figure of at least 19 is used here since the plants Aloe ferox and Aloe striatula are grouped together and are not distinguished when indigenous names were given. Some ailments mentioned by a small percentage of the participants (3.01%) included tooth ache/ gums, sore feet/ swollen body, pregnancy, ritual use and HIV/AIDS. These ailments are not included in Table 1, which focuses on the most common ailments mentioned. Amongst the plants, most mentioned the Aloe species (67.40%), with most indicating that *Aloe ferox and Aloe striatula (56.43%)* were used for treatment of fever/flu stomach ailments and headaches. Second in popularity was *Lipia javanica* (43.73%) and surprisingly followed by *Cannabis sativa* (33.21%).

Different plant parts were mentioned as used for treatment, with leaves dominant (73.68% of the species), followed by roots (52.63% of the species); with the use of stem, fruit, flower and bark mentioned for only six species. The most dominant administration route mentioned was oral accounting for 73.68% of the mentioned species. Boiling or mixing the plant part with water was the most reported preparation method.

All the participants indicated that they had used at least one or more of the mentioned plant species to treat common ailments, which would suggest that use of traditional plant medicines is prevalent among the sample. Figure 1 shows the percentage of pre-service teachers who said they had used TMs to treat five of the common ailments mentioned above. The most popular ailment for which the pre-service teachers used TMs was flu/fever (42.26%) and the least was treatment of malaria (5.64%). Thirty three percent of the respondents said they had consulted a traditional healer and 76.54 % reported that one or more members of their family had consulted a traditional healer. Most of those who said they had consulted a traditional healer mentioned such conditions as pregnancies, asthma, tooth ache and hallucinations. Most (80. 03 %) said they had used or come to know about the medicinal plant they mentioned

Table 1. List of plants mentioned by the pre-service science teachers (n=120)

	Botanical Name	Local Name (s)	Part used	Ailment treated	Preparation for use	Administration route
1	*Zingiber officinalis.*	ginger	root	S	boil with water	oral
2	*Tetradenia riparia*	Iboza	leaf	S, F	Add water to crush leaves	oral
3	*Helichrysum sp.*	Imphepho	root, stem, leaf	H	Inhaling smoke	nasal
4	*Aloe* sp.	Inhlaba or Inkalane	leaf	S	boil leaf with water	oral
5	*Cannabis sativa*	Insango	leaf	S, F	boil leaf with water	oral
6	*mainly mixture of H. attenuata* and *G. bicolor*	intelezi	leaf, root	S, C	boil with water sprinkle	oral or external
7	*Artemisia afra*	umhlonyane mhlonyane lengana	leaf	F	insert fresh leaves into the nostrils	nasal
8	*Euclea crispa*	motlhaletsogane iDungamuzi	Root, stem, leaves	F, H, M	boil with water	oral
9	*Aloe ferox and Aloe striatula*	Mohalakane	leaf	S, F, H	mix with water	oral
10	*Combretum imberbe*	Mohwelere-tšhipi Umbondwe omnyama	Flower, root, leaf	S, F, W	mix with water, rub ashes	oral and external
11	*Dipcadi sp.*	morothoana-phookoana	root	S	Boil with water	oral
12	*Momordica balsamina, L*	mohodu nkaka	leaf, root, fruit	S, W	boil leaves with water poultice for burns	oral and external
13	*Hypericum aethiopicum*	usukumbili	root, leaf	W	apply with burnt ash	external
14	*Urginea* sp.	Sekanama	leaf, root	W, S	Boil with water; Rub on skin	external or oral
15	*Lippia javanica*	Umsuzwane	leaf, root	F, M, H	Boil with water	oral
16	*Alepidea amatymbica*	Lesoko, iqwili ikhathazo	leaf	H	Inhaling smoke	nasal
17	*Gunnera perpensa*	ugobho	root	H, S	boil dried root powder in hot water	oral
18	*Solanum panduriforme*	mututulwa	fruit	S	boil fruit with water	oral
19	*Zanthoxylum davyi*	munungu	bark	S, H	Boil bark with water	oral

Key: S = Stomach, W = Wound, H = Headache, F = Flu/fevers, M = malaria

or used from older family members. This might point towards use of these plants being talked about in the families.

Attitudes towards traditional medicines

The majority of the respondents were of the (63.54%) were of the opinion that traditional medicines were not as effective in treating the common ailments as Western drugs given to patients in hospitals. A reasonable proportion (43.70%) believed that TMs were effective in treatment of fever/flu compared to the other ailments. Only 5.63 % of the respondents agreed that traditional healers could be as effective as Western trained doctors in the treatment of the common ailments. One of the interviewees commented:

Most of these so called traditional healers are fake, and work on the psychology and hope that patients will somehow get better. The problem is ...especially here in Johannesburg most are driven by poverty and the love for money. They can pick any plant anywhere and claim it treats such and such a disease. I think most of it has to do with beliefs of the patients than the medicinal value of the plant medicines given.

Another said:

…traditional doctors are not well trained to do such things, the utensils and tools are dirty and they only worsen the sickness… sometimes the medicines are not clean and by taking them in, they are also causing diseases…. sometimes these people take advantage and which their patients i.e. it is difficult to find out the real traditional doctors.

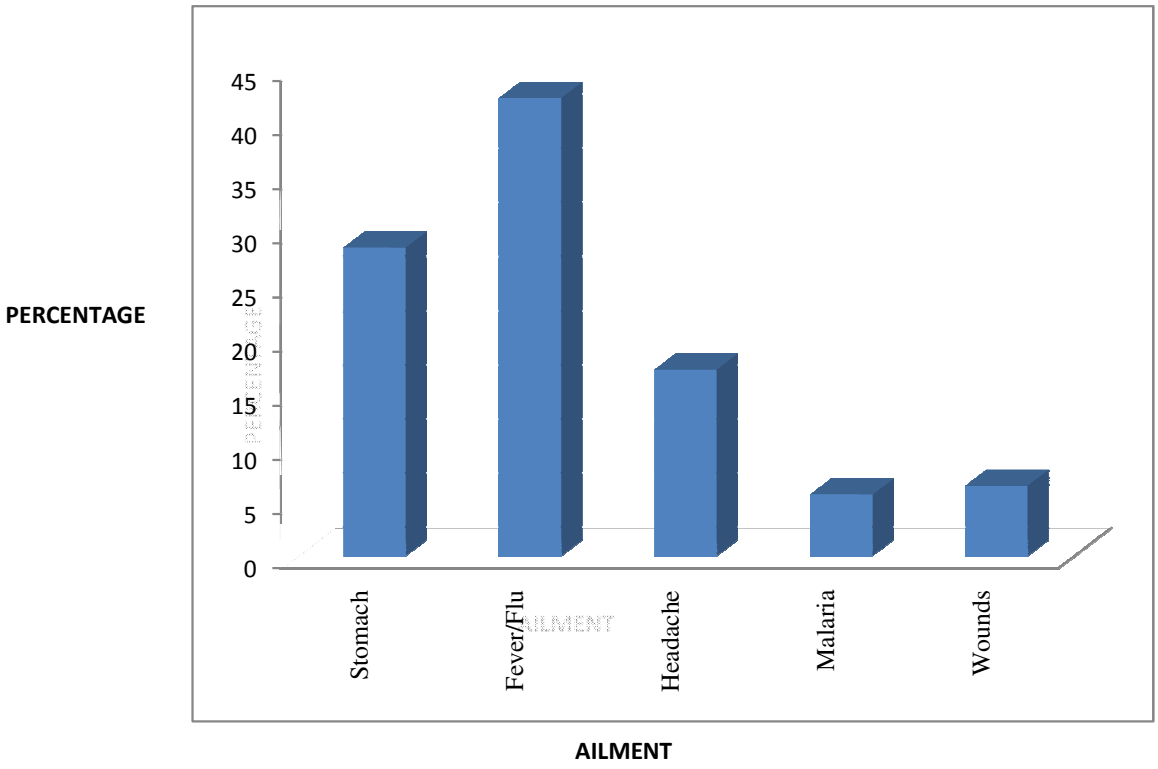

Figure 1. Five most common ailments treated using TMs as reported by pre-service teachers (n=120)

None of the participants indicated that TMs could treat HIV/AIDS. Only a few respondents reported that they got better (30.67 %) as result of taking TMs or their relatives or family members actually got better (37.54 %) as a result of consulting traditional herbalists or healers.

DISCUSSION AND CONCLUSIONS

In the present study it was found that most pre-service science teachers sampled have some knowledge about medicinal plant medicines used to treatment of five common ailments- which are stomach related ailments (S), wounds (W), headaches (H), flu and/or fevers (F), and malaria (M). This knowledge however is limited given that only 19 plant species were mentioned by the sampled pre-service science teachers. The study also revealed that each one of the pre-service science teachers in the sample has used one or more of the mentioned medicinal plants. While the participants report use of TMs the majority of them do not think that TMs are as effective as Western drugs in the treatment of the ailments investigated. An interesting finding is that none of the participants see TMs as effective or useful in the fight against HIV/AIDS which is contrary to findings from other studies ([6, 9, 10, 11], which suggest use of some of the plant species mentioned here in the relief of HIV/AIDS symptoms.

It is also interesting to note that most of the participants are sceptical about traditional healers, which can have implications about the pre-service teachers' willingness to involve traditional healers (Chinsembu, 2009) in teaching about TMs and inclusion of knowledge about these plants into the school science curriculum. If the integration of indigenous knowledge and knowledge about TMs is to be included into the school science curriculum, then it is important to work on attitudes of teachers first. The present study did not explore how the knowledge, use and attitudes towards TMs varied across the ethnic groups (e.g. Zulu, Xhosa, and Sotho). It also did not explore whether being registered for Physical Science or Life Sciences was in anyway related to both knowledge and use of TMs. These issues could form part of future studies. It also raises issues about whether the level of one's education has any bearing on use and attitudes towards TMs. It would be interesting to find out, for example, what lecturers who teach Sciences at universities think about TMs.

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APPENDIX A

Pre-service teachers' knowledge, use and attitudes towards medicinal plants questionnaire

Dear respondent,

We are carrying out a research on 'teachers' knowledge, attitudes and use of *medicinal plants*.' All the information provided will be treated confidentially. We therefore kindly request you to complete this questionnaire as honestly as possible. Thank you!

INSTRUCTIONS: Please DO NOT write your name on any part of this questionnaire.

SECTION A: BIOGRAPHICAL INFORMATION

1 Your age:_____
2 Your gender:_____
3 Your religion:_____
4 Subject (s) of specialisation_____
5 Mother tongue----------

SECTION B: KNOWLEDGE, ATTITUDES AND USE OF MEDICINAL PLANTS

1. Have you ever taken traditional medicine to treat the following? Tick (√) all that apply:
   (a) Stomach ailment (gastro-intestinal ailments) _____
   (b) Fever _____
   (c) Headache_____
   (d) Wounds_____
   (e) HIV and AIDS _____
   (f) Malaria_____
   (h) Other diseases (specify)_____
2. Do you believe that traditional medication is effective in treating the following? Tick (√) all that apply:
   a) Stomach ailment (gastro-intestinal ailments) ----------
   b) Fever ----------
   c) Headache ---------
   d) Wounds ---------
   e) HIV and AIDS --------
   (f) Malaria.....
   (h) Other diseases (specify)_____
3. Give the names (in your own home language) of traditional **medicinal plants** you know which can be used to treat each of the following sicknesses.
   (a) Stomach ailment (gastro-intestinal ailments).....
   (b) Fever .....
   (c) Headache .....
   (d) Wounds .....
   (e) HIV and AIDS .....
   (f) Malaria.....
   (h) Other diseases (specify)_____

4. (a) For each plant example stated complete the following table:

AILMENT	**Plant name**	**Part of plant used**	**How it is used**	**How did you come to know about its uses as a medicine**
Stomach (gastro-intestinal ailments)				
Fever				
Headache				
Wounds				
HIV and AIDS				
Malaria				
Other diseases (specify here)				

4 (b) Traditional medicines are effective in treating common ailments such as. Tick **(√)** the appropriate column.

Ailment	**Strongly Agree**	**Agree**	**I don't know**	**Disagree**	**Strongly Disagree**
Stomach					
Fever					
Headache					
Wound					
HIV and AIDS					
Malaria					
Other diseases (specify here					

5 Traditional healers are as effective as trained medical doctors in hospitals in treating common ailments such as. Tick **(√)** the appropriate column.

Ailment	**Strongly Agree**	**Agree**	**I don't know**	**Disagree**	**Strongly Disagree**
Stomach					
Fever					
Headache					
Wound					
HIV and AIDS					
Malaria					
Other disease (s) specify					

6 Do you agree with the statement that: "*Traditional medicines can just be as effective as drugs given to patients in hospitals*". Agree_____ Disagree_____

Explain your answer.

7 (a) Has any member of your family ever consulted a traditional healer?
Yes_____ No_____
If they have, for what health problem?
_____
_____
_____
_____

(b) Did the person get better? Yes _____ No _____
Explain your answer:
_____
_____
_____
_____

8 (a) Have you ever consulted a traditional healer yourself? Yes_____ No_____
If you have, for what health problem?
_____
_____

(b) Did you get better after seeing the traditional healer? Yes _____ No ____
Explain your answer:
_____
_____
_____

APPENDIX B
Examples of semi-structured interview questions

Introduction
We are carrying out a research on '*the knowledge, attitudes and use of medicinal plants'.* All the information you provided will be treated confidentially. We therefore kindly request you to allow us to interview you and to tape record our conversation for proper record. Thank you!

Questions
9 Have you ever taken traditional medicine to treat the following?
(e) Stomach ailment (any sickness affecting the stomach) _____
(f) Fever _____
(g) Headache_____
(h) Wounds_____
(i) HIV and AIDS _____
(j) Malaria_____
(k) Other diseases (specify)_____

10 Do you think traditional medicines are effective in treating the ailments mentioned earlier? Yes ------- No……..
Explain your answer: ……

11 For each of the following ailments, explain as follows:

AILMENT	**Plant name**	**Part of plant used**	**How it is used**	**How did you come to know about its uses as a medicine**
Stomach				
Fever				
Headache				
Wounds				
HIV and AIDS				
Malaria				
Other diseases (specify)				

4. Explain how effective the traditional medicines are treating the common ailments.

Stomach	
Fever	
Headache	
Wounds	
HIV and AIDS	
Malaria	
Other diseases (specify)	

5. If you were sick with any of those identified ailments, will you seek treatment from a traditional healer or from a trained medical doctor at the hospital?
6. Why do you think people consult traditional healers?