Utilization and Accessibility of Securinega Virosa for Medical Use in Morogoro Municipality

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Utilization and Accessibility of *Securinega Virosa* for Medical Use in Morogoro Municipality

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Submitted in partial fulfillment of the requirements for Tanzania: Wildlife Conservation and Political Ecology, SIT Study Abroad, Spring 2017
Abstract

Approximately 80% of rural communities in Tanzania utilize the services of traditional healers. This is largely because modern medicine is often expensive, inaccessible, or has undesirable side effects. This study investigates use of traditional medicine in Morogoro Urban district where people do have access to hospitals. In particular, this study aims to assess the utilization and accessibility the plant species Securinega virosa for medicinal use by identifying and interviewing the actors involved in the supply chain from harvester to consumer. I conducted semi-structured interviews with eight traditional healers and one herbal medicine shopkeeper. I expected harvesters to express a decline in the availability of medicinal plants as habitats have been destroyed and the commercial market for herbal medicine has grown. To evaluate utilization of traditional medicine by local people, I conducted surveys of fifty-one individuals.

I expected use of traditional medicine to be correlated with education level and that people would prefer traditional medicine because it was more accessible (fiscally and in terms of location). I determined that Securinega virosa is used in Morogoro Urban to treat a variety of diseases including dysentery, diarrhea, cholera, stomach problems (gastritis, ulcers, pain, etc.), uterine diseases, menstrual problems, infertility, venereal diseases, hernia, and intestinal complications. Traditional healers in Morogoro harvest their plants from both the wild and from farms, from both in and out of Morogoro. There are indications that accessibility of medicinal plants has decreased due to worsening environment, disappearance of plants (possibly due to habitat destruction and over exploitation), government restrictions on harvesting from the wild, and an increase in commercial harvesting. Even though hospitals are accessible in Morogoro Municipality, over seventy percent of survey respondents reported to using traditional medicine.

Further, a system has developed where many people get tests from hospitals in order to get a diagnosis and then may choose to receive herbal treatment. Notably, the data showed no correspondence between education level and using traditional medicine.

Keywords: Traditional medicine, ethnomedicine, ethnobotany, utilization, accessibility

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1 Shangali, Chrispin F., et al.
2 Amri, Ezekiel, and Daniel P. Kisangau.
Acknowledgements

There are many individuals that made this ISP possible. I would like to extend my utmost gratitude towards my translator, Abi Abasi. You are one of the most kind and dedicated individuals I have ever met. Thank you for your persistence, flexibility, and investment in my study. You looked out for me, whether or not it was related to my project. I enjoyed your company in Morogoro and will miss you immensely.

Sister Rosamystica, you are also one of the kindest souls I have ever encountered. I deeply appreciate your willingness and dedication to help me find success in my project, regardless of the colossal amount of work you had for your classes. In particular, thank you for accompanying me to the Municipal Director and helping me to secure those letters. Additionally, thank you for taking care of me in the hospital and visiting me and feeding me every chance you had. I wish you the best for your studies and know you will find great success in your future.

Dr. Nonga, thank you for all of your guidance during this ISP. I appreciate the time and thought you put into helping me, even though were busy with classes, and all of your other students.

Thank you, Dr. Robinson Mdegela for sharing your experience and advice with me. I especially appreciate your help in narrowing down my ISP topic.

Dr. Perek, thank you for hosting me at SUA, Morogoro, and connecting me with Dr. Nonga and Dr. Mdegela. I greatly appreciate the opportunity to have access to some of the university’s resources and many of its wonderful professors.

Finally, thank you Simba for checking on me throughout my time in Morogoro and advocating for me when I was in the hospital. Thank you and your wife for a wonderful Easter meal and great company. You helped make my time in Morogoro run smoothly and made me feel at home.

I would also like to thank Felicity, Oscar, and Mama Juni for making such an incredible program possible, and I also want to thank Mama Juni for looking after me and accompanying me on many trips to the hospital.
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Introduction

An estimated 70–95% of the world’s rural population relies on herbal medicine to meet their primary healthcare needs. In 1993, Hines & Eckman determined that approximately 80% of rural communities in Tanzania utilize the services of traditional healers. This is largely because modern medicine is often expensive, inaccessible, or has undesirable side effects. In addition, there are often an inadequate number of dispensaries in rural areas. However, despite higher levels of modern medical infrastructure in urban areas, the establishment of modern, bio-medicinal hospitals and training of experts and practitioners has not been able to keep up with rapidly growing populations; thus, scientists speculate this is why herbal medicine is also popular in urban areas. For example, in Dar es Salaam, traditional medical practitioners constitute 10% of the population, which is 100 times higher than formal medical doctors. In Tanzania, plant-based medicine is still the only option for some and the preferred option for others.

This study will assess the utilization and accessibility of the plant Securinega virosa for medicinal purposes in Morogoro Urban district. While reasons for reliance on traditional medicine in rural areas are apparent, motivations for its use in urban areas are less obvious, since access to modern medicine has grown significantly. Additionally, the study will assess use and accessibility of traditional medicine by locals in Morogoro Urban. This paper consists of five sections. The first section considers the research objectives in more detail. The second section provides context and examines previous studies that have gathered information on how Securinega virosa has been used in Tanzania and its medicinal properties. The third section discusses the methods used in the study, ethics, and provides a site description. The forth section contains the study results and discussion. Finally, the concluding section reflects on the broader implications of the study’s findings.

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3 Shangali, Chrispin F., et al.
4 Amri, Ezekiel, and Daniel P. Kisangau.
5 Cunningham, A. B.
6 Shangali, 226.
I. Research Objectives

The objectives of this study are to assess the utilization and accessibility of Securinega virosa in all stages of its production for medicinal use in the urban setting of Morogoro Municipality. This includes identifying the various actors involved in the supply chains from harvester to consumer and considering utilization and accessibility at each point. The study addresses how traditional healers and herbalists use Securinega virosa, or Mkwambe, to treat disease. It looks at where this plant and others are harvested. It also evaluates utilization of traditional medicine in general and health care preferences by people living in this district.

II. Background and Literature Review

The World Health Organization (WHO) has defined herbal medicine as “a plant-derived material or preparation with therapeutic or other human health benefits which contains either raw or processed ingredients from one or more plants.” In Tanzania, there are several types of practitioners that use herbal medicine in their practices. There are the common traditional-type healers that create concoctions through basic processing like drying, pounding, boiling, etc. Often these healers harvest the plants themselves. However, transportation and accessibility of raw ingredients can be difficult due to bulkiness, and preparation can be time consuming. There are other types of herbalists who work out of established sanitariums that use modern scientific methods of diagnosing but treat using plant-based medicines, sometimes which are highly processed and in the form of capsules and serums. Even though access to modern medicine is increasing, the demand for herbal medicine is growing, and commercial harvesting is growing in popularity (largely in-country). Increased harvesting for medicinal (and biomass, etc.) purposes and habitat loss from deforestation and growing populations has increased pressure on some medicinal plant populations.

Many wild medicinal plants are becoming scarce in East Africa. The woodlands in the Morogoro region have been heavily deforested for local resource use, causing habitat fragmentation and endangering many plant species, some of which are endemic to this area. In

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7 Zhang, Junhua, et al.
8 Cunningham, A. B.
9 EL-Kamali, Hatil Hashim,12.
a study that considers the direct and indirect human impacts on medicinal plants of East and Central Africa, author EL-Kamili points out that in many cases, “the status of valued medicinal species is simply unknown.” He notes that many wild medicinal plants are becoming scarce in these countries, and many plant resources may become extinct from over-exploitation, habitat fragmentation, and other man-made destructive influences if conservation measures are not taken. Through this study I will investigate if harvesters have experienced reduction in accessibility or availability of *Securinega virosa*. I will also ask if it is harvested solely from the wild or if it has been cultivated as well to meet (presumably) increasing demands.

*Securinega virosa* is a species of shrub found (Figure 1) in the tropics and South Africa, the Mascarene Islands, tropical and subtropical Asia, and Australia. It grows in the miombo savannah woodlands (Figure 2), which surround the Morogoro region. Locally, it is known primarily as Mkwambe. In two studies conducted to inventory plants used in traditional medicine in East Africa, Hedberg et al. and Chbra et al. found that *Securinega virosa* has been traditionally used to treat a multitude of health problems. These

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10 Amri, Ezekiel, and Daniel P. 1.
11 EL-Kamali, Hatil Hashim, 6.
II. Background and Literature Review

include dysentery, diarrhea, cholera, stomach problems (gastritis, ulcers, pain, etc.), uterine diseases, menstrual problems, infertility, venereal diseases, hernia, intestinal complications, convulsions, epilepsy, mental illness, snake bites, diseases thought to be caused by witchcraft, malaria, for worms in sores, and as a sedative.\textsuperscript{12,13} The roots are used as well as the leaves and fruit, each having slightly different medicinal properties.\textsuperscript{14}

Several peer-reviewed studies have been conducted to test the medicinal efficacy of \textit{Securinega virosa}. In a study published in 2007, Magaji, M. G., et al. investigated the antidiarrheal activity of methanolic extracts of leaves, stem bark, and root bark of \textit{Securinega virosa} on mice. Diarrhea was induced by using castor oil. Results showed that leaves and root bark extract do possess pharmacological activity against diarrhea.\textsuperscript{15} In 2008, some of the same scientists conducted another study to test \textit{Securinega virosa} for use as a sedative. They tested the behavioral effects of methanolic root bark extract in mice. It was concluded with significance (\(P < 0.05\)) that “it contains biologically active principles that are sedative in nature and lend pharmacological credence to the ethnomedical use of the plant.”\textsuperscript{16} Other studies have shown \textit{Securinega virosa} has antimalarial, antioxidative, analgesic, antimalarial, anti-inflammatory, antidiabetic, cytotoxic, and sedative properties.\textsuperscript{17}

Although this study will not evaluate the medical efficacy of \textit{Securinega virosa} or traditional medicine, it is important to note that the medical properties of many traditional plants have been scientifically confirmed, and that herbal alternatives are an effective form of treatment in many cases.

\textsuperscript{12} Hedberg, Inga, et al.
\textsuperscript{13} Chabra, et al.,
\textsuperscript{14} Amri, Ezekiel, and Daniel P. Kisangau, 4.
\textsuperscript{15} Magaji, M. G., et al. “Preliminary antidiarrhoeal activity of methanolic extracts of Securinega virosa (Euphorbiaceae).”
\textsuperscript{16} Magaji, MG et al. “Behavioural Effects of the Methanolic Root Bark Extract of Securinega Virosa in Rodents.”
\textsuperscript{17} http://www.stuartxchange.org/Botolan.html
III. Methods and Site Description

Site Overview

I conducted data collection for this study in Morogoro Urban district located in Morogoro Region (Figure 4). This district is about 180 km directly west of Dar es Salaam. A 2012 census found the population to be over 315,000.\textsuperscript{18} Several forest reserves are within close proximity to Morogoro and the outer parts of toward the south the district are in a mountainous area. The nearby miombo woodlands provide resources that are vital to the livelihood of millions of rural and urban people living in Morogoro and East Africa. These people rely on these woodlands for food, energy, shelter, medicines and other invaluable services.\textsuperscript{19}

Methods

I assessed the utilization and accessibility of \textit{Securinega virosa} by identifying actors in the supply chain from harvester to consumer. Before starting data collection, I expected stages in the supply chain to resemble the following, and planned to evaluate them in the following manner:

- Harvesting: how the plant is harvested, where it is harvested from, and who harvests it
- Processing: what the level of processing of the product is and whom this is done by

\textsuperscript{18} Thomas Brinkhoff.
\textsuperscript{19} Nduwamungu, J., et al.
• Distribution to herbalists and traditional healers: who the suppliers of the plant are, and in what form it is supplied to the medical practitioners (if they do not harvest the plant themselves)
• Practitioners: what kinds of practitioners use this plant and what illnesses they treat using it
• Consumers: who the consumers are, how and where they receive treatment, and if they ever receive treatment for the same illness from a hospital

I planned to interview actors in every step of the supply chain; however, after starting data collection it became clear that many of the actors above are not distinct in the supply chain in Morogoro Urban. For example, many of the healers harvest herbs themselves, and therefore a distributor is not necessary. Thus, for interviews I focused primarily on traditional healers. I conducted eight semi-structured interviews with traditional healers and one semi-structured interviews with a shopkeeper. Interviewing patients who have used *Securinega virosa* proved to be a difficult task, since many healers do not keep patient contact information. Thus, I decided to instead conduct a structured survey of local people to address utilization of traditional medicine in general. I explored who uses traditional medicine, in what varieties, and health care preferences.

All interviews were conducted in the subject’s preferred language, which in most cases was Swahili. Abi Abasi, born and raised in Morogoro Urban, served as my translator and helped locate and arrange interviews with traditional practitioners.

*Interviews*

I conducted eight semi-structured interviews of traditional healers in five wards in Morogoro Urban district. The interviews typically lasted from thirty minutes to an hour in duration and were conducted at their clinics or homes, depending on whether or not they had a clinic. Three of the interviews were in Kihonda, two in Mji Mpya, one in Kilakala, one in Mlimani, and...
and one in Mwembesongo. Interview questions can be found in Appendix A.

I also conducted two opportunistic semi-structured interviews of herbal shopkeepers, focusing on where they get their plants and who their consumers are.

Surveys

I conducted a survey of fifty-one locals in the three most population-dense wards of Morogoro Urban district, Mji Mkuu, Mji Mpya, and Kiwanja cha Ndege. The survey contained basic questions about education level, age, and occupation, and then whether or not an individual uses traditional medicine and if so, in what form. It also explored health-care preferences and accessibility. The structured questionnaires were administered orally (survey questions can be found in Appendix A). I conducted surveys between the hours of 11am to 5 or 6pm for three days and in a different ward each day. I selected respondents semi-arbitrarily with an effort to get a variety of ages and both male and female respondents. I approached locals in households and work places and asked for participation. Because surveys were conducted during the work day, I attempted to interview people at work in addition to home to avoid getting a bias towards unemployed respondents. Because Mji Mkuu in particular is the downtown area of Morogoro, this was very straightforward to achieve.

In attempt to avoid further bias, I did not interview multiple people living in the same household, since presumably they could have similar health care preferences. I did sometimes, however, interview multiple subjects at the same place of business, as long as they weren’t related. I tried my best to conduct interviews one on one, but this was not always possible and I tried to cause minimal disruption to communities. I also avoided interviewing people that my translator knew.

Ethics

Attaining participant consent was an important part of the survey and interview processes. Traditional healers are a special subset of a population, and illicit great respect in their
communities. In addition to attaining consent from participants, I first went to the Municipal Director of Morogoro and introduced myself. My advisor, Dr. Nonga of department of Veterinary Medicine and Public Health at the Sokoine University of Agriculture (SUA), wrote a letter on behalf of SUA, detailing the objectives of my project and the stakeholders I planned to interview. He also described my status as an undergraduate student studying with SIT and my affiliation with SUA. The Municipal Director reviewed my case and granted permission. The office also provided me with the names and contact information of eight traditional healers in Morogoro Urban district and eight letters of introduction addressed to each of the healers. I successfully interviewed six of these traditional healers. The two other healers were known by my translator.

Before conducting interviews with healers, I provided them with the letter from the Municipal Director and introduced myself and the objectives of the study. I explained that participation is completely voluntary and that they could choose to not answer any question or back out of the interview at any time. I gave them the option of anonymity to protect them and encourage honest answers. I also asked for permission to record interviews and assured them that the recordings were for my personal use only and would be destroyed after one month. I received written consent for seven of the eight interviews with healers and verbal consent from the last.

Before interviewing shopkeepers and surveying locals I introduced myself and explained the objectives of my study. I gave a short explanation of consent and made it clear that participation was voluntary. I guaranteed anonymity for participants involved in the survey and did not record any identifiable information. I did receive written consent from most survey participants, but only collected signatures, not names. If I did not receive written consent, I got verbal consent. There were no participants younger than eighteen years of age.

**IV. Results and Discussion**

Results of the interviews with the traditional healers and shopkeepers are qualitative, while the survey results are quantitative and contain some qualitative metadata as well.
IV. Results and Discussion

Interviews

The following table provides an overview of the traditional healers, their training, and the number of years they have practiced. There is no data for healer eight.

<table>
<thead>
<tr>
<th>Practitioner</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Where did you learn to practice traditional medicine?&quot;</td>
<td>From other healers for 2 years</td>
<td>From grandfather since 1963</td>
<td>In India--90% of medical treatment is herbalism in the area he is from.</td>
<td>From grandfather</td>
<td>From family--grandfather and grandmother</td>
<td>From visions</td>
<td>Learned for 5 years from grandfather who was a healer</td>
</tr>
<tr>
<td>&quot;How many years have you been practicing?&quot;</td>
<td>18</td>
<td>54</td>
<td>10</td>
<td>28</td>
<td>18</td>
<td>42</td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Practitioner training. This table contains basic information on how the healers learned to practice and how long they have been practicing.

Utilization

One of my priorities during interviews with traditional healers was to learn if and how they utilized *Securinega virosa*, locally known as Mkwambe. Five of the eight healers I interviewed used some form of Mkwambe. Unfortunately, there are two types of plants that are locally referred to using this name. One is the shrub *Securinega virosa*, and the other is a vine I was not able to botanically identify. Two of the five traditional healers used the vine only, while the other three used the shrub.

The first healer uses the roots of the shrub to treat various kinds of stomach illnesses. He additionally uses the leaves and fruit of the shrub to treat venereal diseases in women, such as one called “Mgoro.” However, in order do this, he mixes Mkwambe with another type of plant, depending on the disease. He also uses the Mkwambe vine to treat various types of stomach illnesses. He prepares all of his remedies himself.

The second and third healers I talked to did not use Mkwambe. The fourth healer uses the vine to treat a variety of stomach problems and for children and adults. This healer mixes other plants with Mkwambe depending on the type of disease. It is common to prepare Mkwambe as a tea, boiling the vine root in water and drinking it regularly for a prescribed period.

The fifth healer does not use Mkwambe, but the sixth uses the vine, mixed with other plants, to treat stroke, blood sugar issues, and broken bones.
IV. Results and Discussion

The seventh healer uses the Mkwambe shrub. He creates a juice from the fresh leaves that is used to treat diarrhea. He creates flour out of the root and uses it to treat skin diseases, blood in the urine, fertility, menstrual pain, and other varieties of stomach problems. He says the root is the most active part of the plant. He also mentioned that there are many other plants that can be used to treat stomach problems. He often starts with a different kind of plant, and if that does not work he tries Mkwambe. He says this is because Mkwambe is incredibly strong, and he tries to start patients off with a lower dose.

The eighth healer also uses the Mkwambe shrub to treat a large variety of stomach problems and fertility in women.

Out of the diseases that Mkwambe has been traditionally used to treat (listed on page 4), the healers I interviewed used the shrub version (Securinega virosa) to treat the following: dysentery, diarrhea, cholera, stomach problems (gastritis, ulcers, pain, etc.), uterine diseases, menstrual problems, infertility, venereal diseases, hernia, and intestinal complications. There was no mention of using it to treat convulsions, epilepsy, mental illness, snake bites, diseases thought to be caused by witchcraft, malaria, for worms in sores, and as a sedative. Additionally, healer seven uses it to treat skin diseases.

Accessibility

Another part of my interviews was focused on where healers obtain their plants and herbs. I was also interested in discussing if there has been a change in availability of any herbs in the last twenty or so years. There was some variety in the answers. I chose to include answers from all eight healers, even though not all use Mkwambe.

Healer 1 obtains his plants from the wild himself. He says he doesn’t have a permanent location where he harvests. Some locations are in Morogoro and some are not. He says he is allowed to harvest from the wild because he is registered as a traditional healer (although this conflicts with what other healers told me later).

Healer 2 obtains some of his plants from a farm, and others from the wild. He harvests all of his plants himself.

The third healer is unique in that he uses highly processed herbal products from India (like the one in Figure 7). He does not harvest and use herbs from the wild in Tanzania, although he does incorporate holistic

Figure 7. Highly-processed herbal ointment for skin.
medicine like diet changes into his treatment. He has a supplier in India that he uses, and brings medicine back with him to Tanzania when he visits India.

The fourth healer harvests his plants from a farm near his house in Morogoro Urban district. For some other plants, he buys from a shop in town. He said he grows his plants on a farm because he was worried if he got his plants from the wild the government would interfere and accuse him of destroying the environment.

Healer five gets some of his plants from the Kilosa district in Morogoro region, but most of his plants come from the region near Lake Victoria. He harvests most of his plants from the wild and uses a machine to turn his plants into flour. He assured me that he harvests sustainably by leaving some of the roots of the plants so they can continue to grow. He is concerned about the environment. He says he can no longer get all of his plants at the same place because plants are disappearing. He used to get his plants from another location, but they have disappeared from there. Due to issues with availability of plants, he started a farm two years ago near Lake Victoria so he can have a more reliable source.

Healer six harvests plants from the Tabora region because the soil is better there. He says the environment in Morogoro is not good. He says compared to many years ago, more people are harvesting in the wild and plants are disappearing. He says he has seen an increase in commercial people that come and harvest the plants and sell them to healers. He hopes to have a farm in the future to increase accessibility.

The seventh healer harvests his plants from his farm in Mikese. He grows ninety-five different varieties of medicinal plants. He says the since 2000 the government has not allowed people to harvest from the wild in order to preserve the environment. Before 2000, people could go anywhere to get plants.

The eighth healer harvests plants from the forest on the mountain where she lives (in Mlimani, the ward that is on the side of a mountain.

Four healers harvest from the wild, two from a farm, one from both, and one buys products from India. There is some conflicting information about who is allowed to harvest from the wild. However, there is a theme of accessibility decreasing due to quality of the environment, plants disappearing, possible government restrictions, and increase in commercial use of medicinal plants.
IV. Results and Discussion

Surveys

I obtained survey responses from a total of 51 locals in the three wards Mji Mkuu, Mji Mpya, and Kiwanja cha Ndege. The male:female ratio of respondents is 3:2 (Figure 8). A 2012 census found males comprised forty-eight percent of the population in Morogoro Urban.\(^20\) Due to the central limit theorem, with random sampling and a large enough sample size, the gender ratio would reflect the larger population.

The mean age of respondents is 36 and the median is 35, with a standard deviation of about 13 years (Figure 10). An Anderson-Darling test shows that the ages reported do not follow a normal distribution (with over 99% confidence); however, we would not normally expect the ages of a population to be normally distributed.

Nearly seventy-three percent of respondents reported to using some form of traditional medicine (Figure 9). This is only slightly less than eighty percent, which is the 1993 estimate for the proportion of Tanzanians in rural communities use traditional medicine. Further, fifty out of fifty-one participants said they had been to the hospital for treatment in the past.

\(^20\) https://www.citypopulation.de/php/tanzania-coastal-admin.php?adm1id=0505
This is relevant because it shows that the people of Morogoro do have access to hospitals and modern medicine, but continue to use traditional medicine at rates almost as high as in rural communities, where access to hospitals is much more limited.

Out of the respondents that use traditional medicine, nearly forty-nine percent have seen a traditional healer and purchased herbal remedies from a store (Figure 12). Twenty-seven percent of have not been to a healer but have used herbal medicine of some kind, and nineteen percent of respondents have only been to a traditional healer. Two survey participants were healers and had previously used traditional medicine to treat themselves.

Out of the respondents that use herbal medicine, fifty-one percent reported they prefer the hospital to traditional medicine (Figure 11). Nineteen percent said they prefer herbal treatment, and nearly thirty percent said they like both for different reasons or it depends on the illness.

The next question was also focused on participants that use traditional medicine. I asked these participants if they had stomach problems like diarrhea (that could perhaps be treated using Securinega virosa) and required medical treatment, would they first go to the hospital or seek herbal treatment. Seventy percent of respondents said they would first go to the hospital (Figure 13). Sixteen percent said they would first seek out herbal treatment. Eleven percent did not specify and one respondent said it depends.
IV. Results and Discussion

The survey also found, unsurprisingly, people who prefer the hospital go to the hospital first for treatment. Further, people whose preference depends on the disease also go to the hospital first (presumably to get a diagnosis). Even though only fifty-one percent of respondents said they prefer the hospital, seventy percent would go to the hospital first. The source of this disparity is that many people go to the hospital for preliminary tests and measurements, receive a diagnosis, and then turn to traditional medicine for treatment.

Before conducting this survey, I was not aware how common it was for people to go to the hospital for tests and then use herbal treatment. Thus, when I asked for health care preference, I did not make a distinction between diagnosis and treatment. From my results I am not able to evaluate how many participants prefer this hybrid method of health care.

However, out of the nineteen people that use traditional medicine yet that said they prefer the hospital, fourteen of them, or seventy-four percent said they prefer the hospital because it has tests. Other reasons for preferring the hospital are as follows: three mentioned specialists, and one said healers are not perfect.

There were seven participants that said they prefer herbal treatment. For one person, this was because they hadn’t gotten better at the hospital. Another said they prefer plant-based remedies because the lack the chemicals that are found in modern pharmaceuticals. A third said the hospital is a long process (perhaps for them herbal medicine is more accessible). The two healers preferred traditional medicine because they could treat themselves. One of these healers had never been to a hospital in his life.

Out of the eleven participants that said their preference depends, five said they would go to the hospital for tests and use herbal treatment and two said treatment would depend on the test
IV. Results and Discussion

results and subsequent diagnosis. Three people said that sometimes the hospital does not work. One participant mentioned that the hospital is a long process and herbal medicine is more accessible and is inexpensive.

It is clear from this survey that going to the hospital for a diagnosis and seeking herbal treatment is a popular alternative to treatment with pharmaceuticals. This was also confirmed by healers who often mentioned that they were not always able to diagnose their patients themselves, but often relied upon tests from a hospital. According to several of the traditional healers I interviewed, a permit to conduct traditional medicine is not sufficient to be able to perform tests as well. Using modern methods to diagnose would require another kind of additional permit.

Data Correlations

I used cross-tabulation (Figure 14) and Chi-Square tests (Figure 15) to determine whether or not there is a correlation between finishing secondary school and using traditional medicine. I predicted that those with higher levels of education would be less likely to use traditional medicine. However, $P = 0.42 > 0.05$ indicates that these variables are independent., i.e., there is no statistical correlation between finishing (or not finishing) secondary school and using traditional medicine.

I ran the same tests to see if there is dependence between using traditional medicine and sex. $P = 0.75 > 0.05$ indicates that there is no statistical correlation between sex and using traditional medicine.

It is also interesting to note the most common ailments that people sought herbal treatment for. The following include ailments followed by frequency of response in parentheses: stomach problems (22), malaria (6), body pains (5), skin problems (2), stomach for men (possibly infertility) (2), UTI (2),
fertility/pregnancy (1), typhoid (1), blood pressure (1), ulcers (1), broken bones (1), and chest pain (1).

Survey Biases and Limitations

There were several biases present in my survey methods. First, the time of day (11am – 6pm) that I interviewed certainly influenced the results. Because I interviewed during working hours during the workweek, I missed the demographic with university degrees, because there are very few employment opportunities for this demographic in the areas of town I interviewed in.

Another bias was non-random sampling. I did not follow a specific algorithm to pick survey participants—it was done more opportunistically. The sample size is another limitation. Given more time, I could achieved a larger sample size that would be more representative of the population of Morogoro Urban district as a whole.

Another challenge is the honesty of responses. In most cases I believe respondents answered honestly, but sometimes participants might have been embarrassed to admit they use herbal medicine. Using traditional medicine can be associated with not having the fiscal means to go to a hospital. In addition, I was not always able to interview subjects one-on-one in order to avoid disrupting the communities and workplaces. Thus, respondents could have felt pressured to deny (or even falsely admit) to using traditional medicine in front of friends or others.

V. Conclusion

Securinega virosa is used in Morogoro Urban to treat a variety of diseases including dysentery, diarrhea, cholera, stomach problems (gastritis, ulcers, pain, etc.), uterine diseases, menstrual problems, infertility, venereal diseases, hernia, and intestinal complications. Traditional healers in Morogoro harvest their plants from both the wild and from farms, from both in and out of Morogoro. There are indications that accessibility of medicinal plants has decreased due to worsening environment, disappearance of plants (possibly due to habitat destruction and over exploitation), government restrictions on harvesting from the wild, and an increase in commercial harvesting.

Even though hospitals are accessible in Morogoro Municipality, over seventy percent of survey respondents reported to using traditional medicine. Further, a system has developed where many people get tests from hospitals in order to get a diagnosis and then may choose to
receive herbal treatment. Notably, the data showed no correspondence between education level and using traditional medicine.

It would be interesting to repeat the survey several years from now to see how utilization of traditional medicine has changed. As access and quality of modern medicine improves in Morogoro, use of traditional medicine may decline. Conversely, if using traditional medicine as a “natural, organic” alternative to pharmaceuticals is or becomes a fad, there may be no change or even an increase in the utilization of herbal medicine.

Another idea for further research would be to assess the environmental impacts of traditional medicine, both from local use and increasing commercial activity. Further, it would be interesting to evaluate how habitat fragmentation and deforestation has already impacted the medicinal plant populations in the Morogoro region. This could be potentially impactful area of research since, as El-Katim explains, most collectors, producers and consumers of traditional medicine are unaware of the extent to which factors like commercial use of medicinal plants is threatening the survival of many plant species.
Works Cited


Appendices

Appendix A: Interview and Survey Questions

Interview Questions for Traditional Practitioners

<table>
<thead>
<tr>
<th>Subject</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practitioner</td>
<td>1. Where did you learn to practice medicine?</td>
</tr>
<tr>
<td></td>
<td>2. How long have you been practicing?</td>
</tr>
<tr>
<td></td>
<td>3. How many patients do you have?</td>
</tr>
<tr>
<td>Utilization</td>
<td>4. What 5 herbs/plants do you use most commonly?</td>
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<tr>
<td></td>
<td>And what ailments do these heal?</td>
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<tr>
<td></td>
<td>5. Do you use Mkwambe/Mkalananga to treat your patients?</td>
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<tr>
<td></td>
<td>If yes:</td>
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<tr>
<td></td>
<td>6. What ailments do you treat with this plant?</td>
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<td></td>
<td>7. What part of the plant is used?</td>
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<tr>
<td></td>
<td>8. How is the treatment prepared and who prepares it?</td>
</tr>
<tr>
<td></td>
<td>If applicable:</td>
</tr>
<tr>
<td></td>
<td>9. How long does the treatment take to prepare?</td>
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</tbody>
</table>

Accessibility

| 10. Where do you get your herbs or medicines? |
| Are they self-harvested or from a supplier? |

If self-harvested:

| 11a. Are the plants from the wild or cultivated? |
| 12a. Have you noticed a change in the availability of the plant in the last 20 years? |

If from a supplier:

| 11b. In what form do you receive your herbal remedies? (Raw plant, already processed and prepared, etc.) |
| 12b. Has the product you receive from your supplier changed in price over the last 20 years? |

Other

| 13. Do your patients ever go to the hospital? |
| 14. How do you diagnose your patients?         |
| 15. How do you acquire new patients?           |
| 16. How do you determine the correct dose for your patients? |
Survey Questions

Age ____

Sex ____

Level of education finished ____

Occupation ____

Which ward do you live in? _____

1. Have you ever been to a traditional healer or herbalist?
2. Have you ever purchased herbal medicine from the store?

If the answer to 1 or 2 is yes:

To treat what ailment?

3. Have you ever been to the hospital for medical treatment?
4. If you had diarrhea or stomach issues would you first go to the hospital or seek herbal treatment?
5. Which do you prefer, the hospital or herbal treatment, and why?