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PHYTOCHEMICAL ANALYSIS AND EFFECTIVENESS OF SOME HERBAL MEDICINES IN MBALE, EASTERN UGANDA

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ABSTRACT - This research was aimed to investigate the phytochemical screening and effectiveness of some herbal medicines. Data was collected from the users of herbal medicines to determine their perception on effectiveness of herbal medicine, while phytochemical analysis was used to confirm if the herbal medicines are plant extracts. The effectiveness of the herbal medicines were analyzed using a statistical package SPSS version 20 after data was collected from herbal users. The herbal medicines were found to contain polyuronides, reducing compounds, saponins, tannins, alkaloids, anthrocenocides, steroid glycocides, flavonocides and anthocyanocides except HBT3, which is a counterfeit disguised among herbal products on market. Interestingly from the result, even the users of herbal medicine believe that conventional medicine are more effective than conventional drugs still use herbal products. The study proved that some of the selected herbal medicines contained the organic compounds which are responsible for curing diseases and the users also believed that the herbal medicines are well effective.

Keywords: Herbal medicine, effectiveness, phytochemical compounds and Mbale.

I. INTRODUCTION

Herbal medicines are defined as plant-derived material or preparations perceived to have therapeutic benefits, often contain raw or processed ingredients from one or more plants (WHO, 2000). Herbal medicines include herbs, herbal materials, herbal preparations, and finished herbal products that contain parts of plants or other plant materials as active ingredients (WHO, 2008). For this study finished herbal products were evaluated for effectiveness.

Even in this modern age, herbal medicines continue to be popular and widely used worldwide. Medicinal plants use is wide spread (Farnsworth and Suejarto, 1991). In China, traditional herbal preparations account for 30-50% of total medicinal consumption. The use of herbs and herbal products is rapidly spreading in industrialized countries as well. For instance, 90% of the German population has used a natural remedy at some point in their life. The global market for herbal medicines currently stands at over US $60 billion annually and is growing steadily (WHO, 2003).

The efficacy and potency of herbal medicine are indeed attracting global attention (Peltzer and Mngqundaniso, 2008; Mwangi, 2004) and that traditional, complementary and alternative medicine is globally increasing in popularity (Kaboru *et al*., 2006). The global trend indicates that even in the advanced countries, more people with the most advanced and

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sophisticated medical system are making headway in traditional medicine use to cater for their health care requirements (WHO, 2001). Studies have shown that, almost 70% of the population in Australia used at least one form of contemporary and alternative medicine, and 44.1% visited contemporary and alternative medicine practitioners in 2007. In the Netherlands, 60%, while in the United Kingdom, 74% of the people are advocating for the inclusion of contemporary and alternative medicine into the National Health Service. The percentage of the population which has used herbal medicine at least once in Canada, France, USA and Belgium stands at 70% , 75%, 42% and 38% respectively (WHO, 2002). A survey conducted in the member states of the European Union in 1991 revealed that 1,400 herbal products were used in the European Economic Community by patients (WHO, 1996). The popularity of herbal medicine in the United States has also grown remarkably in recent years. According to one national survey, herbal medicine use has increased from 2.5% in 1990 to 12.1% in 1997, an estimated 380% increase, and was found to be the second most frequently used method of alternative therapy (Eisenberg, 1998). Another study conducted in the U.S in 2002 shows that 62% of adults use herbal medicine in the past year (Heinrich *et al.,* 2004). Despite its soaring popularity, the efficacy of the alternative medicine remains questionable from the perspective of science and biomedical practice. The populations of developing countries worldwide continue to rely heavily on the use of traditional medicines as their primary source of healthcare (Cunningham, 1993). Ethnobotanical studies carried out throughout Africa confirm that native plants are the main constituent of traditional African medicines (Cunningham, 1997). Furthermore, there is increasing reliance on the use of medicinal plants for traditionally used rural herbal remedies (UNESCO, 1994). It is documented in a report by the WHO (2008) that in some Asian and African countries, 80% of the population use plant-derived medicines for their primary healthcare. In countries for which more detailed data are available, the percentage of the population that uses traditional medicine ranges from 90% in Burundi and Ethiopia, to 80% in Burkina Faso, the Democratic Republic of Congo and South Africa; 70% in Benin, Cote d'Ivoire, Ghana, Mali, Rwanda and Sudan; and 60% in Tanzania and Uganda (WHO, 2000). The use of medicinal plants plays a vital role in covering the basic health needs in developing countries, particularly Africa (Munoz *et al.,* 2003).

However, most of these herbal medicines are consumed without any scientific proof that they actually work. Some may contain compounds that are harmful to the body even in small quantity, while some lay dormant until after a long period of time or unless taken in excess, which may cause serious health injury or in some cases death. Many locals in Mbale, Rakai and Mbarara districts are using medicinal plants to treat coughs, diarrhea, swollen eyes, mites, worms, lice. However some of the therapeutic properties attributed to plants have proven to be wrong, such plants should be investigated scientifically to better understand their properties, and efficacy (Ellof, 1998).

II. EXPERIMENTS

Phytochemical analysis of selected herbal products

The phytochemical screening of selected herbal medicine was carried out in the Ethnobotany Laboratory at the Department of Biological Sciences, Makerere University. Chemical qualitative analysis for major active groups of compounds such as polyuronides, reducing compounds, saponins, tannins, alkaloids, anthrocenocides, steroid, glycocides, flavonocides and anthocyanocides was undertaken using standard qualitative methods of analysis as described by Sofowora, 1993; Trease and Evanss; 2004.

Preparation of samples for chemical analysis

The dry leaf (HBC4), powdered (HBT2 and HBC2) and liquid (HBT1, HBT4, HBC1, HBC3 and HBT3) herbal medicine samples obtained from herbal clinics were analyzed for secondary metabolites. The extracts from leaves and powdered samples were prepared following the description given by the herbalist. The leaf samples were ground using grinder to a very fine powder. Two spoonfuls of the powdered samples were mixed with 1 litre of distilled water. The mixture was then boiled on hot plate, after which the hot plate was switched off and the mixture was allowed to cool. The samples were filtered using Whatman No. 1 filter paper. The filtrate and the liquid samples were subjected to phytochemical screening. Some quantities of each of the samples were extracted by mixing with ether and heating to dryness.

The samples were then coded as HBT1, HBC1, HBT2, HBC2, HBT3, HBTC3, HBT4 and HBT4 respectively (HB=herbal, T=typhoid, C=cholera, 1-4-shop number).

III. RESULTS AND DISCUSSION

Secondary metabolite composition of herbal products

The results of secondary metabolite composition of the selected herbal products are presented in table 4.1. All the herbal products that were selected had at least five secondary metabolites detected except HBT3. Thus,

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the herbal products are plant extracts because they contain one or more of the secondary metabolites. HBT3 was not a herbal product but a counterfeit herbal product that was disguised among the herbal medicines in market.

The herbal medicine HBT2 had the highest number of secondary metabolites detected, followed by with 8 secondary metabolites. Tannins, anthrocenocides, flavonocides and polyuronides were all in high concentration (+++) in HBC2. While in HBT2 tannins, anthocyanocides and Anthrocenocides were in high concentration. HBT1 contains eight secondary metabolites with only tannins in high concentration. Both HBC1 and HBC4 had seven and six secondary metabolites with saponins, tannins and anthrocenocides in the high concentration, respectively. HBT4 and HBC3 contained six and five secondary metabolites respectively. HBC4 having saponins and flavonocides in high concentration. Apart from HBT3 which is an exceptional case, all the other samples contain saponin, tannin, steroid glycocides and Flavonocides. Alkaloids were found only in HBT1, HBC1, HBT2, HBC2 and HBT4. Polyuronides were detected only in HBT1, HBT2, HBC1 and HBC2.

Table 1.1: Phytochemical screening of herbal products

Samples	PL	RC	SP	TN	AK	AT	SG	FL	AN
HBT1	+	+	+	+++	+	+	+	+	-
HBC1	+	+	+++	+++	+	-	+	++	-
HBT2	++	+	+	+++	+	+	+	+	+++
HBC2	+++	+++	+++	+++	+	+	+	++	-
HBT3	-	-	-	-	-	-	-	-	-
HBC3	-	-	++	++	-	+	+	++	-
HBT4	-	+	+++	+	+	-	+++	+++	-
HBC4	-	-	+	+	-	+++	+	+	+

KEYS: Polyuronides (PL), Reducing compounds (RC), Saponins (SP), Tannins (TN), Alkaloids (AK), Anthrocenocides (AT), Steroid glycocides (SG), Flavonocides (FL), Anthocyanocides (AN), (+) presence of secondary metabolite in low quantity, (++) presence of secondary metabolite in moderate quantity, (+++) high quantity secondary metabolite present. (-) absence of the secondary metabolite.

The herbal medicines HBT1, HBC1, HBT2 and HBC2 were found to contain flavonoids, saponins and tannins that were characterized in extracts from *Acacia nilotica* which were effective in the cure of typhoid by Sarkiyayi and Abdulrasheed (2013). The secondary metabolites Alkaloids, saponins and tannins found in HBT2 and HBC1 were also found in *Balanites aegyptiaca* L. Drel. and *Moringa oleifera* Lam and were effective against *S. typhi* (Doughari, *et al.*, 2007).

In another study by Vivek *et al.*, (2010), aqueous extract of fruit peel of *Citrus sinensis* (L.), was found to contain flavonoids, saponins and alkaloids which was found to inhibit the growth of *S. typhi*, similar compounds were also found in HBT1, HBC1, HBT2, HBC2 and HBT4. Alkaloids, tannin, flavonoids and saponin were found in HBT1, HBC1, HBT2, HBC2 and HBT4 which were also found in *Adhatoda vasica* and *Vitex negundo* and were found to inhibit the growth of *Salmonella typhi* (Manoj, *et al*., 2013).

In a study by Shittu, *et al*., (2014), using extracts of *Spondias mombin*, *Senna occidentalis* and *Musa sapientum*, tannins, flavonoids, saponins and alkaloids were found in the extracts, similar secondary metabolites were also found in HBT1, HBC1, HBT2, HBC2 and HBT4 which were found to cure cholera. Steroidal glycosides were also found to inhibit the growth of *E. coli*, a bacterium causing cholera *by* Usama 2012, similar compound was also found in all the samples except HBT3.

Biswas, *et al*., 2012 in their study using extract of the leaves of *Kalanchoe pinnata* found alkaloids, flavonoids, glycocides, saponins, reducing agents and tannins, which were also found in HBT1, HBT2, HBC1, HBC2 and HBT4, which were found to cure typhoid and cholera.

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Table 1.2: Perception of the respondents on herbal medicine

Effectiveness of herbal medicine	**Frequency**	**Percent**
Never	19	10.4
Sometimes	135	74.2
Always	28	15.4
Those that combine herbal with conventional medicine		
Yes	93	51.1
No	89	48.9
Those that take herbal medicine for typhoid		
Yes	135	74.2
No	47	25.8
Satisfaction over herbal medicine for typhoid		
Yes	100	74.2
No	35	25.8
Those that take herbal medicine for cholera		
Yes	103	56.6
No	79	43.4
Satisfaction over herbal medicine for cholera		
Yes	77	74.7
No	26	25.3
Those that fully take the dosage of herbal medicine		
Yes	135	74.2
No	47	25.8

Source: Results of the analysis (2015)

The bar chart below indicates that 40.7%, 12.2%, 24.2%, 20.1% and 2.8% of the respondents said poverty, safer, satisfaction believe and others respectively. This shows that 40.7% of the respondents depend on herbal medicine because they cannot afford conventional drugs (Calixto, 2000 and Grunwald, 1995). Another part (12.2%) of the respondents use herbal medicine because they think that herbal medicines are safer than conventional drugs (Furnham *et al*., 1995; O'Callaghan & Jordan 2003). Some of the respondents (24.2%) said they get satisfaction with herbal medicine (Furnham *et al*., 1995; O'Callaghan & Jordan 2003).

A number of the respondents (20.1%) believe in herbal treatment, which is why they go for herbal rather than conventional drugs which is in agreement with the findings of Calixto (2000) and Grunwald (1995) and 2.8% have their own reasons why they use herbal medicine which include social pressure, dissatisfaction with the behavior of clinic staff and lack of privacy within the conventional clinic environment (Jewkes, 1998).

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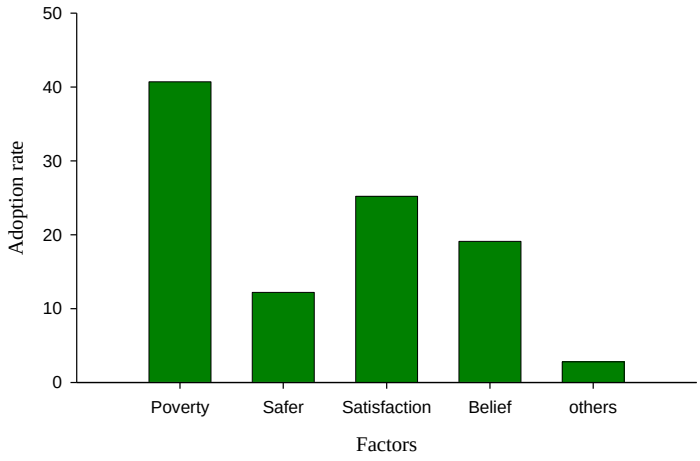

Figure 4.1: Distribution of respondents based factors for adoption of herbal
Source: Results of the analysis (2015)

The major source of information about herbal medicine in Mbale municipality is the media (Figure 4.1) Results in the figure indicate 57.7%, 11.5%, 11.0% and 19.8% of the respondents heard about herbal medicine from media, local leaders, neighbors and friends respectively. Majority of the respondents (57.7%) said that they heard about herbal medicine from the media which is similar to the findings of

Monique (2011). Some of the respondents (11.5%) heard about herbal medicine from the local leaders, 11.0% from their neighbors and 19.8% from their friends (Huanhuan *et al*., 2013). while 3.4% have other sources which include relatives, patients and doctors themselves (Huanhuan *et al*., 2013).

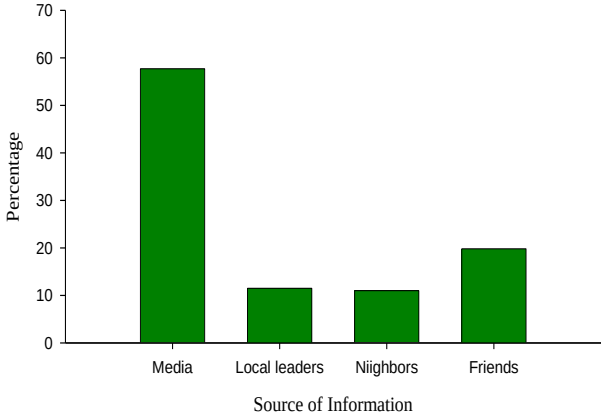

Figure 4.2: The distribution of respondent's base on Sources of information about herbal medicines

Source: Results of the analysis (2015).

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V. CONCLUSION

The conclusion drawn from this research is that Traditional Medicines are used by many people in managing health conditions. The study proved that herbal medicines used in treating typhoid and cholera is effective and the end users are satisfied with their effectiveness. This perception may be a major contributing factor influencing the sustained and increasing popularity of herbal medicine in Mbale municipality. Based on the findings in herbal medicine effectiveness, the use should be promoted but strongly regulated by National Drug Authority. Evidence-based research in the form of randomized controlled clinical trials should direct the proper use of herbal medicine to validate (or otherwise) efficacy and determine safety. There should be regular audit to check on the counterfeit product that may penetrate the market in the absence of control mechanism.

VI. REFERENCE

1. Calixto, J. B. (2000). Efficacy, safety, quality control, marketing and regulatory guidelines for herbal medicines (Phytotherapeutic agents). *Brazillian J. Med. Biol.* Res, **33 (2):** 179-189.
2. Cunningham, A. B. (1997). An Africa-wide overview of Medicinal Plant Harvesting, Conservation and Healthcare, Non-Wood Forest Products. In Medicinal plants for Forest Conservation and Healthcare. FAO, Italy.
3. Cunningham, A. B. (1993). African Medicinal Plants: setting priorities at the Interface between conservation and primary healthcare. People and Plants Working paper I. UNESCO, Paris 92p.
4. Doughari, J. H. Pukuma, M. S. and De, N. (2007). Antibacterial effects of *Balanites aegyptiaca* L. Drel. and *Moringa oleifera* Lam. on *Salmonella typhi*,. *African Journal of Biotechnology*, **6 (19):** 2212-2215.
5. Eisenberg, D. (1998). Unconventional Medicine in the US - Prevalence, Costs and Patterns of Use', *New England Journal of Medicine*, **328**: 5-9.
6. Eloff, J.N. (1998). Conservation of medicinal plants: Selecting Medicinal plants for research and gene banking. Genes III: Conservation and Utilisation of African Plants. Monographs in systemic botany from the Missouri Botanical Garden.
7. Furnham, A., Vincent, C. and Wood, R. (1995). The health beliefs and behaviours of three groups of complementary medicine and a general practice group of patients", *Journal of Alternative and Complementary Medicine*, **1:** 347-59.
8. Farnsworth, N. R., Suejarto D.D., (1991). Global importance of medicinal plants. Conservation of medicinal plants, eds O. Akerele, V Heywood, H, Synge, *Cambridge University Press*, Cambridge, 25-51.
9. Grunwald, J. (1995). The European Phytomedicine Market: figures, trends, analysis. *Herbalgram*, **38**: 60-65.
10. Heinrich M, Barnes J, Gibbons S, Williamson E M, (2004). A text book of Fundamentals of Pharmacognosy and Phytotherapy. 1st Edition, Elsevier, USA, **18:** 60-105.
11. Jewkes, R., Abrahams, N. and Mvo, Z. (1998) Study of the health care practices of pregnant women in Cape Town. Report 4. Summary of findings, conclusions and policy actions. Tygerberg: CERCA, Women's health. Medical Research Council.
12. Munoz-Mingarro D, Acero N, Llinares F, Pozuelo JM, Galan de Mera A, Vicenten JA,

(2003). Biological activity of extracts from *Catalpa bignoniodes* Walt (Bignoniaceae). *J. Ethnopharm*, **87**: 163-167.
13. Mwangi, J. W. (2004). Integration of Herbal Medicine in National Health Care of Developing Countries. *Editorial East Africa Medical Journal*, October, 2004.
14. O'Callaghan, F. V. and Jordan, N. (2003). Postmodern Values, Attitudes and the Use of Complementary Medicine", *Complementary Therapies in Medicine*, **11(1):** 28-32
15. Kaboru, B. B., Falkenberg, T., Ndulo, J., Muchimba, M., Solo, K., & Faxelid, E. (2006). Communities' views on prerequisites for collaboration between modern and traditional health sectors in relation to STI/HIV/AIDS care in Zambia. *Health Policy*, ***78*** **(2):** 330-339.
16. Peltzer, K. & Mngqundaniso, N. (2008). Traditional Healers and Nurses: A Qualitative Study on Their Role on STIs including HIV and AIDS in KwaZulu-Natal, South Africa. *Afr. J. Trad. CAM*, ***5*** **(4):** 380-386.
17. Sarkiyayi S. & Abdulrasheed K, (2013). Preliminary Investigation on Anti Typhoid Properties of Acacia Nilotica Leaf Extract. *Global Journal of Medical research Diseases*, **13(5):** 11-16.
18. Shittu, O. B., Olabode, Olanrewaju, O. Omemu, Adebunkola, M., Oluwalana, S. A. Samuel, A. and Akpan, I. (2014). Phytochemical and antimicrobial screening of Spondias mombin, Senna occidentalis and Musa sapientum against Vibrio cholerae O1. *International journal of current microbiology and applied sciences*, **3:** 948-961
19. Sofowora A. (1993). Medicinal plants and traditional medicine in Africa. Spectrum Books, Ibadan.
20. Trease G.E , Evans W.C. (2004), Pharmacognosy. 15th edn. Elsevier Ltd. London.
21. UNESCO (1994). Traditional knowledge in Tropical Environment Nature and Resource, **39**(1) UNESCO, Paris.
22. Vivek, K. Nandini, Shashidhara, Anitha, (2010). Anti typhoid activity of aqueous extract of fruit peel *citrus sinensis (L.). International journal of pharma, research and development*, **2(**9): 203-218.
23. WHO. (1996). Traditional Medicine-WHO Information fact sheets. Fact sheet N134, September 1996.
24. WHO. (2000). General Guidelines for Methodologies on Research and Evaluation of Traditional Medicine WHO/EDM/TRM/2000.1. World Health Organization, Geneva
25. WHO. (2001). Promoting the Role of Traditional Medicine in Health System: A Strategy for the African Region. WHO Regional Office for Africa.
26. WHO. (2002). Health for all Policy For the 21st Century in the Africa Region-Agenda 2000-WHO
a. Regional Office for Africa
27. World Health Organization. (2003) Traditional medicine 12-01.
28. World Health Organization. (2008) Traditional medicine 12-01.

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