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The mode of herbal medicine preparations and packaging: Selected plants for management of diseases in Sunyani Municipal, Ghana

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Abstract

The mode of preparations of herbal medicine from selected plants for management of diseases has remained a major challenge in the Sunyani Municipality. The aim of this research is investigate the methods used in preparing herbal medicine. A mixed method approach was employed in collecting both qualitative and quantitative data using questionnaires, interview schedule and focus group discussions. In all, 115 respondents were randomly selected from the study community. Descriptive statistics were used in the analysis of quantitative data. Quotations and recorded voices were used in analyzing the qualitative data. Findings from the study show that the mode of herbal medicine preparations were decoction, concoction, extraction and grinding. Again, liquid, solid and ointments are the forms of prepared herbal medicine. The study recommends that the government, Ministry of Health and the Ghana Health Services should provide scientific processing equipment for herbal medicine preparation.

Keywords: Herbal medicine, herbs/plants, mode of preparation, management of diseases

1. Introduction

Ghanaians until colonial time completely depended on herbs for treating diseases ^[1]. The plants used are believed to contain crucial ingredients for both the physical and spiritual well-being of the body. Due to the growing demands by the conventional medicine, herbal medicine has taken a new level where scientific process is introduced to improve the healing capacities of these plants medicine ^[2]. The herbal medicine in this study involves unorthodox therapeutic modalities such as homeopathy, self-medication and self-preparation ^[3-4]. Herbal medicine (HM), also known as, botanical medicine or alternative medicine has attracted quit a number of definitions and explanations by researchers and scholars in recent times. In this direction, there is no universally accepted definition(s) for herbal medicine. Abundant streams of knowledge from different scholars have been put together in an attempt of defining herbal medicine globally. Although, each of these ideas employs a unique conceptual and theoretical framework for advancing their own explanation of herbal medicine. In spite of these divergent broad of ideas, there is a convergence of thought and knowledge. In other words, there are common ideas that run through all definitions and explanation of HM ^[5]. Herbal medicine is defined as “the sum total of all the knowledge and practices, whether explicable or not, used in diagnosis, prevention and elimination of physical, mental and social imbalance and relying exclusively on practical experience and observation handed down from generation to generation, whether verbally or in writing” ^[6-7]. Since time immemorial, plants have been used for medicinal purposes. Scientists over the years have realized that people in different parts of the world tend to use the same or similar plants for herbal medicine ^[8-9]. Therefore, the herbal medicine can operationally be explained as medical products that contain active ingredients, aerial or underground parts of plants, or other plant materials, or combinations thereof, whether in the crude state or as plant preparations. Herbal medicine is thus perceived as the collection of knowledge, skills, and practices based on beliefs and experiences in indigenous cultures ^[10]. The issues relating to herbal medicine processes and mode of preparation have not been comprehensively addressed by researchers in the Sunyani Municipality. Subsequently, there is a lacuna in the herbal medicine literature in terms of understanding the relevance of how herbal medicine is prepared for healthcare delivery. The study area was purposely chosen because herbal medicine activities were commonly practiced in this area. The study therefore explored the mode of herbal medicine preparation of some selected herbs and plants for management of diseases in the Sunyani Municipal.

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The objectives of this study were; i. To examine the mode of herbal medicine preparations of some selected herbs and plants, ii. To assess the packaging and storage of herbal medicine and iii. To examine how labelling of herbal medicine is done in the study area.

2. Materials and Methods

2.1 Site Description

Sunyani Municipality is strategically located where roads from Sunyani, Berekum, Jaman and Seikwa. It is located between Latitude 7°15'S and 8°00'N and Longitude 2°25' E and 2°50'W. The Municipal shares boundaries with Tano South District to the South-West, North-West by Tain and Jaman District. The Municipality has a total land area of 2,653 Km². The Municipality in terms of trade is strategically located since it is able to transact business with all the four (4) other districts it shares boundaries with. The location of the Municipal makes transportation of goods and services to and fro the Municipality easy encouraging inter districts trade.

2.2 Sample size for the study

A sample size (n) = 115 of the respondents was determined using $n = N/1+N(a^2)$, where N = sample size, N = Total population of honey traders, a = 5% is the margin of error.

2.3 Sampling design, data collection and tools for data analysis

This study employs a mixed methods approach utilizing both qualitative and quantitative data collected ^[11]. The major sources of data for this study were both primary (bee-keepers and honey traders) and secondary (theses, journals, internet

etc.). The study used a cross-sectional survey design which offers information about a population at a given point in time. This design is intended to gain immediate knowledge and information on herbal medicine processes and mode of application in the Sunyani Municipality. This strategy assists in getting different data from different herbalists. Data were collected using questionnaire, interview schedule, focus group discussions and observation techniques. The reasons for using questionnaire were that the administration of questionnaire was less expensive, it saved time and financial resources, it was an efficient way to collect data statistically quantifiable and large respondents were reached within a short time period.

The rationale for using interview schedule stems from the fact that interview schedule provided a great deal of leeway for the respondents to reply questions and it was able to help get in-depth information about the herbal medicine activities from the respondents on a one-on-one basis. Also, because of its flexibility, more information was provided by the respondents. The figures or frequency tables generated in the SPSS version 20 were also exported to excel for editing to enrich visual presentation and Excel software were used for the quantitative data while quotations were employed to analyze the qualitative data by drawing inferences from the views of the respondents. the theory underpinned this research is humoral theory developed by the Roman doctor ^[12] which states that the four elements in nature - fire, air, water and earth - corresponded to four fluids in the body: Blood, yellow bile, black bile and phlegm. Herbs were believed to positively affect the humors through four key properties: Being hot, dry, cold or moist. Health was a matter of balancing the humors.

Ethical Approval and Consent to participants

Issue	Proposed Action
Voluntary informed consent	The researchers ensured that all participants in the research were duly informed and understood the processes and the probable outputs of their contributions and how these will be reported. Prior to any engagement the researchers provided participants with full details of the research aims and processes and then sought their consent based on these conditions. The researchers sought permission from the regional representatives of the Ministry of health and the Ghana herbal medicine associations' executives in the study areas.
Right to withdraw	The study recognized the right of any participant to withdraw from the research process at any time and/or for any reason. Therefore, the researchers advised all participants prior to any engagement and accepted their responses.
Value chain actors: Young people and adults	The researchers ensured that all interviewees were not put in a state of discomfort.
Anonymity	The study ensured that any data collected (including audio recordings) were kept anonymous in all publications arising from the research. The researchers assured the respondents that the overall purpose of the exercise was purely academic and that information will be treated as confidential as possible. All data will be kept securely, and the participants advised that they can access it at any time.
Disclosure	All major participants would be given a summary of the findings prior to publication.

Source: Authors Own Construct, 2020

3. Results

3.1 Some Selected Plants for Management of Diseases

Table 1 shows data concerning the most popular herbs used in the treatment and management of some illnesses that are found in the study areas. The data display the plants' common name, the botanical names of the herbs (plants) and their local names. Also, common diseases, parts of the plants used and whether the herbalists used the dry or fresh state of plants to treat diseases were all considered during data collection. Furthermore, the mode used for disease management such as decoction, concoction and extraction as well as grinding were essential ingredients when it comes to discussions of preparation of the herbal medicine. It is also obvious from Table 1 that multiple herbs are being used as a medicinal tool in the preparation of drugs and treatment of diseases. In most

cases, herbalists applied two or more herbs or plant products in producing and managing illnesses. This is the reason most herbal medicines have multiple effects on patients in the treatment and management of diseases.

It could be inferred from Table 1 that using plant's leaves in preparation of herbal drugs formed a greater portion of the HM documented. Other plant parts used were fruits, barks, flowers and whole plants. In addition, rhizomes, bulbs, seeds and roots were also used for HM preparation. Leaves were commonly used in herbal medicines because they represent the site of most photosynthetic activity in plants and they also contain very high concentrations of secondary metabolites ^[12]. Though a high proportion of leaves are being used for HM preparation, it does not pose much threat to the populations of the plants' community.

Table 1: Common herbs/plants and their mode of preparations

Common Name	Botanical Name	Disease(s)	Parts Used	Herbs' State	Freq (%)	Mode of Preparation
Aloe vera	<i>Aloe barbadensis miller</i>	Arthritis, Diabetes	Leaves	Fresh	03(2%)	The fresh plant sample is macerated and the liquid extract is taken twice daily. Juice extracted is applied to the affected part of the body with spoon
Neem tree	<i>Azadirachta indica</i>	Snake bites, Malaria, ringworm, hepatitis	Leave, Bark, root	Fresh	04(3%)	A decoction of the bark with charcoal is drunk and applied on the surface
Acacia	<i>Genus acacia</i>	Prostate disease	Root, Leaves	Fresh	02(1%)	A decoction of the leaves or the bark is taken twice daily
Tea leaves	<i>Camellia sinensis</i>	Anemia general body pain	Leaves	Fresh/dry	05(4%)	The fresh or dry leaves is boiled with water and taken thrice a day
Garlic	<i>Allium sativum</i>	Coughs	Bulb	Fresh	07(5%)	The fresh bulb is added to liquid herbal preparations containing other medicinal plants
Rauwolfia	<i>Rauvofia serpentina</i>	Obesity	Leaves	Fresh	01(0%)	Powdered root is mixed with coconut water and taken twice daily
Devil tree	<i>Alstonia scholaris</i>	Infertility	Bark/leave/Root	Fresh	08(6%)	Cut the bark into pieces and mixed with mango bark, boiled and taken three times daily
Moringa	<i>Moringa oleifera</i>	Jaundice/malaria	Leaves	Fresh/Dry	05(4%)	Powdered leaves mixed with porridge and taken every morning
Mango	<i>Mangifera indica</i>	Measles	Bark	Fresh	04(3%)	A decoction of the bark is drunk, either singly or as mixture with other barks in management of measles
Aiden fruit	<i>Tetrapleura tetraptera</i>	Sexual dysfunction	Fruit	Dry	07(5%)	Boiled it alone or add negro pepper and taken twice daily for two months.
Teak	<i>Tactona grandis</i>	Malaria	Leaves	Fresh/Dry	05(4%)	A decoction of the leaves is drunk thrice a day using cup.
Mahogany	<i>Khaya Senegalensis</i>	Convulsion, Boil, Anemia, heat rashes, HIV/AIDS	Stem Bark, leaves	Fresh/dry	06(4%)	Grind with lemon and apply it on affected area A decoction of the bark and drunk twice daily
Total					100%	

Sources: Field Data, 2020

The plant's leaves are more used in preparation of herbal medicine compared to the use of roots and barks. The use of a combination of various plant parts is a significant feature to the HM industry.

There are commonalities among the herbs used for preparation of herbal medical products. Data from the study community revealed that almost all the herbs and plants used for preparation of herbal medicine in Sunyani municipality are common. For example, the most commonly used plants or herbs for preparation and management of diseases in the study area in order of importance were Teak (7%), Devil Tree (6%) and Garlic (5%). Others were Apple (4%), Lemon (4%) and Mahogany (4%). The plants or herbs were also found in Sunyani municipal. Plants such as Teak, Devil Tree, Neem Tree and Lemon Tree were common in Sunyani municipality. However, a plant like Mahogany is common in the semi-deciduous vegetation areas (Sunyani municipality) but scarce in the Savanna zone. The above stated plants or herbs are of great importance when it comes to herbal drugs preparation and utilization in Sunyani municipality. Though there are equally indispensable herbs and plants, the above mentioned plants and herbs appeared to be frequently used in the study area visited. On the contrary, the least used herbs in the study area were Rauwolfia (1%) and Mistletoe (2%).

3.2 Processes of Herbal Medicine Preparation

In herbal medicine preparation, drying herbs as a method of preparation depends largely on the active ingredients such as essential oil and the type of the plant part like root, flower and leaf collected^[13]. In order to maintain the potency of the herbs, it is advisable to dry the herbs under shade rather than drying herbs by direct exposure to sunlight. In each case, the herb must be treated through sterilization to remove microbes using ethylene oxide. It was evidenced from the data collected that herbal medicine is prepared under three forms of

preparation processes. They were preparation of liquid herbal dosage forms, preparation of solid herbal dosage forms and preparation of other herbal dosage forms (Table 1). The liquid herbal dosage forms are orally prepared, including; fluid extract, decoctions, infusions, syrups and oral emulsions as well as aromatic waters. In this regard,^[14] affirmed that liquid herbal dosage forms may be prepared by dissolving the herbal preparation in an aqueous or non-aqueous solvent, by suspending it in an appropriate medium or by incorporating it into one of the two phases of oil and water system. The solid herbal dosage forms include herbal tea, plant powders, dry extract powders and pills. Others are capsules, tablets and lozenges. Preparation of other herbal dosage forms are ointment, creams and salves as well as inhalations. Plasters and patches and medicated soap and oil formed part of other herbal dosage forms. A question was posed during focus group discussion as to what forms of prepared herbal drugs have they been using or tried before? A respondent from Sunyani testified that:

"Oh! I have used different forms of prepared herbal medicine such as herbal tea, capsules, ointments and medicated soap. Due to old age, I suffered from body and joint pains and I used herbal medicine for management and treatment" A respondent, 2020.

3.3 Storage, Packaging and Labelling of Herbal Medicine

Table 2 presents the results and the discussions of the data gathered from one hundred and fifteen (115) herbalists on storage, packaging and labelling of herbal medicine produced in the study area. The study sought to find out the various states of herbal medicine in the study area. It was recognized that the prepared herbal drugs are in the form of liquid state, solid state and other forms. This has been the practice over the years in the study area and those operating licenses are able to package and label their products very well.

Table 2: Storage, packaging and labelling of herbal medicine

Dosage	Form of HM	Packaging	Labelling	Storage	Frequency	Percentage
Preparation of liquid herbal	Fluidextract Decoctions infusions Syrups Oral emulsions Aromatic waters	Plastic and glass bottles	Route of administration Quantity and quality ingredient Information on precaution Warning Adverse reaction	Mud pots (earthen pot), boxes and areas with low temperature	115	100%
Preparation of solid herbal	Herbal tea Plant powders, Dry extract powders Pills, Capsules, Tablets	Sacks Polythene bag Papers Small plastic container	Route of administration Quantity and quality ingredient Information on precaution Warning Adverse reaction	Hangers to the roof Nails fixed in the walls Fiber drums, Cloth Gunny bags	115	100%
Preparation of other herbal	Ointment Creams Medicated soap	Small plastic container	Route of administration Quantity and quality ingredient Information Precaution Warning Adverse reaction	Bags Boxes	62	54%

Sources: Field Data, 2020

The results indicate that all the herbalists (100%) used all forms of preparation such as preparation of liquid herbal medicine and preparation of solid herbal medicine. In addition, sixty-two (62) herbalists representing 54% used other forms of preparation like cream and ointment. In line with this a herbalist at Sunyani during focus group discussion narrated that:

“My activities as a herbalist have been registered and have a license from Ghana Food and Drug Authority to operate. One of the requirements is to label the medicines I produce. I use scientific process to prepare my herbal products and all my herbal medicines on the market have been labelled to direct the user as to how the drug should be used” (A 47 year old male respondent, 2020).

4. Discussion

4.1. Preparation of herbal medicine

There was clear indication that respondents used one form of herbal medicine preparation or the other. The patronage has been good as reported by the herbalists.

The plant materials mostly used in the study areas in preparation of herbal medicines were in the form of decoctions and infusion. Although it is documented that a variety of methods have been used for preparation of HM, the methods of decoctions and extraction have been widely reported. However, differences exist in the preparations of decoctions and extraction from place to place in the study area. For example, diversity existed among herbalists in the amount of menstruum (mainly water), length of time of boiling and how long the decoctions were kept in the Sunyani Municipal. It was realized from the herbalists in the Bono region that they mostly add more water to the prepared herbs and spend less time boiling the herbs ^[15]. Research portrayed that due to high temperature and less humidity in the Sunyani municipal, the patients there are mostly dehydrated hence, a need to add more water to suspension, decoction and concoction herbal drugs prepared. They added that owing to high temperatures in the Sunyani Municipality, boiling of herbs does not last longer. Though this high temperature exist Sunyani Municipality, the manner of preparation does not have a negative impact on HM potency ^[16]. This research work highlighted that as a result of climatic variation in the study area which sometimes influenced the preparation of HM, the potency of such drugs has not been affected. It also means that herbal medicines made by the same healer could vary in potency, which has implications in their use for treatment of diseases. Generally, there were no laid down

standards in the methods of preparation of the HM among herbalists in the study areas coupled with the absence of similarity in herbal medicine preparation in the study areas is a major disadvantage to the industry. Infusions is the process of using dried or fresh herbs, usually floating parts, soaked in boiling water for fermentations. This type of water-based preparation of herbal drugs is done by traditional herbalists especially those without license. It has been the most primitive way of herbal preparation. It is argued in many researches such as ^[17, 18], that the safety and hygienic aspects of the herbal drugs prepared through infusions cannot be guaranteed in the since that the process of applying modern purification method is missing. They added that it is often prepared for households and neighborhoods consumptions. In line with this, whenever a member of a family is sick, the elders collect some herbs being dried or flesh from nearby bush, mix them and boil it or pour boiled water on it for a number of days for fermentation and give it to the sick person as concoction. Similarly, ^[19] supported ^[17] and ^[18] on the grounds that infusions method of processing herbal drugs has been in existence in centuries and has kept the lives of many generations. In this regard, the method of infusion can be adopted by applying contemporary approach such as distillation method, and make it more wholesome for consumption.

Decoction is another imperative method of preparing herbal drugs for local consumption as indicated by ^[20]. They emphasized in this process that usually harder plant materials are boiled on the stove for longer hours than infusions. Usually, the backs and the roots of plants are used in this approach. The process is equivalent to infusion in the sense that the boiled plants would be allowed to cool for fermentation before it is taken as concoction.

Furthermore, syrups, as identified by ^[20] and reinforced by ^[21], is a process of preparing herbal medicine where herbs are incorporated into a thick sweet liquid for consumption. Some herbs are very unpleasant and as a results makes it difficult for consumption. Therefore, sweet substances like sugar, salt and honey are supplemented to make its usage easier. They indicated that sweet substances are incorporated into many perceived herbal medicine for the treatment of cough and asthma diseases. There is a crystal evidence in similar study conducted by ^[1]. It was undoubtedly stipulated in his findings that herbal drugs prepared from these bitter plants are more efficacious compare with others.

The final method of water-based preparations of herbal medicine as specified by ^[22] is the compresses. Compresses

generally talks of a situation where soft cloth wrung out of a hot or cold infusion or decoction is applied to the affected area. This method mostly applied to skin diseases. In a typical Ghanaian household, the herbalist or the elders use a piece of cloth, dip it into hot or cold infusion water and squeeze it on the affected part of the body. Similarly, a study conducted by ^[1], entitled “the application of herbal medicine on skin diseases in Ethiopia” confirmed ^[22] that the method of compression is functional in our local communities when someone or a member of that community got fracture or small cut. It is revealed in many works done by different researchers that the method of compression is tried and tested by traditional bones setters and the results proof that it is effective in healing fractures and cuts.

In the application of the above methods discussed, an individual treatment plan will include herbal remedies and where appropriate, dietary changes or nutritional supplements. Most HM are given in the form of a liquid solution that is taken in 5ml doses of two or three times daily. You may also be prescribed as herbal tea, tablets, ointment, cream or lotion ^[23-24].

The perceived patients will initially consult the herbalist or herbal medicine practitioners for diagnosing and treatment. After the initial consultation, three or four shorter consultations are usually necessary to assess their progress, followed by check-ups every three to six months, depending on the nature of your condition. Because HM work in a gentle and subtle way, they can take longer time to work than orthodox drugs, but their effects are long lasting and there should be little or no side effects ^[23-24]. Medicinal plants have always been used as natural first aid remedies such as rubbing dock leaves onto irritate stings bitten by bees/ant or applying lavender oil to treat burns. You may also come across herbalists running First Aid Services (FAS) at outdoor festivals. Some are even experienced nurses and paramedics. Herbs are used to treat a vast array of acute conditions, in both emergency and non-emergency situations ^[25].

^[26]. Advocate for the integration of safe use of medicinal plants for our patients by working with other healthcare practitioners such as Herbal Medicine Practitioners (HMPs), Orthodox Medicine Practitioners (OMPs) and other specialists. It is very important that all healthcare providers are fully informed about the herbs and drugs you are taking, including over the counter products and food supplements. This is important in order to avoid possible herb/drug/supplement/food interactions. Your Medical Herbalist (MH) is aware of the difficulties involved and will provide information on request and with your permission will liaise with any of your other healthcare providers ^[27].

4.2 Storage and Packaging of herbal medicine

The prepared herbal medicines need to be stored very well for future use by taking care of all the techniques involved in storage. It was observed during field study that there were two major means of storage; traditional (non-licensed herbalists and practitioners) and modern (licensed herbalists/practitioners). Whichever way one stores herb or herbal medicine, the drug storage techniques are to be followed with most care as the potency of raw drug has to be retained until they are utilized in the formulation. In relation to this, the study the support the work of ^[13] indicated that the raw drug required for the preparation of medicine are to be stored in cloth, mud pots (earthen pot), gunny bags or special designed hangers to the roof of the store house or to the nails fixed in the walls. They added that herbal materials even when stored in fiber drums, bags or boxes should be stored off the floor

and suitably spaced to permit cleaning and inspection. Another study by ^[28] confirmed the research findings that storage areas should be of sufficient capacity to allow orderly storage of the various types of processed herbal materials, herbal preparations or herbal dosage forms with proper separation and segregation. The necessary measures should be put in place to ensure proper and clean storage of herbs and herbal medicines. In particular, they should be clean, dry, sufficiently lit and maintained within acceptable temperature and humidity limits. The herbs should be controlled, monitored and recorded where appropriate to ensure good storage conditions, and comply with the first-in and first-out principle.

4.3 Labelling of prepared herbal medicine

Labelling of produced herbal medicine is very vital to users because it provides all the necessary information on the box or bottle containing the drugs. The orthodox medicines have been labelled to give prescriptions and warning to the patients. In the same way, most herbalists labelled their produced drugs. As the drug launch on the market for public use, proper labeling and dosage must be clearly stated because the health of the users are very paramount. It should be presented with proper information in the form of a label. The unfortunate situation is that some of the herbal medicines on the market either do not have proper labelling or lack of labelling. It is evidenced from Table 2 that labelling a product on the container, box or any other surface as a specific requirement on the content and format labelling for human prescription drug included the dosage form, route of administration, quantity and quality ingredient information, precaution and warning. In relation to this, a study conducted by ^[22] supported this claim that an undesirable effect reasonably associated with the use of the herbal drug may occur as part of pharmacological action of the drug or may be unpredictable in its occurrence. This means that the adverse reaction of the herbal medicine should be labelled clearly for users. Another crucial area is over dosages. This part should desire the signs, symptoms and laboratory findings of acute over dosages and general principle of treatment not forgetting the recommended usual dose range and if appropriate, an upper limit beyond which safety and effectiveness have been established.

5. Conclusion

The findings indicate that most herbalists and practitioners identified diseases through symptom descriptions, histories and laboratory tests. It was found out that the most common diseases that people in the study area mostly reported to the practitioners and the herbalists were, Ulcer, Malaria, Infertility and Diabetes, hypertension as well as waist pains. Others were General Body Pains, Typhoid and Asthma to mention but a few. Similarly, the herbalists and practitioners confirmed that all categories of people that visit them were aged, adults, youths and children both male and female. Herbal medicine plays crucial roles in healthcare problems in the area of infertility. The harvested plant materials were used in preparation of many herbal medicines predominantly in the form of decoctions, infusion, suspension and tablet. It was recorded in the study area that the routes of herbal medicine administration were oral, rectal, topical, and nasal. Among the routes, the most frequently used was the oral followed by a combination of oral and topical routes whereas the least used routes were nasal as exhibited.

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7. References

- Gyamfi AR, Kuada J, Asongu S. An integrative framework for entrepreneurship research in Africa. *International Journal of Behavioral Medicine*. 2018;25(1):112-122.
- Berlowitz I, Ghasarian C, Walt H, Mendive F, Alvarado V, Soelch MC. Conceptions and practices of an integrative treatment for substance use disorders involving Amazonian medicine: Traditional healers' perspectives. *Brazilian Journal of Psychiatry*. 2018;40(2):200-209.
- Stub T, Quandt SA, Arcury TA, Sandberg JC, Kristoffersen AE. Attitudes and knowledge about direct and indirect risks among conventional and complementary health care providers in cancer care. *BMC Complementary and Alternative Medicine*. 2018;18(1):44.
- Kemppainen LM, Kemppainen TT, Reippainen JA, Salmenniemi ST, Vuolanto PH. Use of complementary and alternative medicine in Europe: Health-related and Sociodemographic determinants. *Scandinavian Journal of Public Health*. 2018;46(4):448-455.
- Peprah P, Agyemang-Duah W, Arthur-Holmes F, Budu HI, Abalo EM, Okwei R, *et al.* We are nothing without herbs: A story of herbal remedies use; c2019.
- Merriam SB, Grenier RS. *Qualitative research in practice: Examples for Discussion and Analysis*. Jossey-Bass; c2019.
- Ahmed SM, Nordeng H, Sundby J, Aragaw YA, de Boer HJ. The use of medicinal plants by pregnant women in Africa: A systematic review. *Journal of Ethno Pharmacology*; c2018.
- WHO. *The WHO traditional medicine strategy 2014-2023*. WHO Library Cataloguing in-Publication Data. World Health Organisation, Geneva; c2017. ISBN: 978924150609.
- WHO. *The science of food standards: The road from Codex Alimentarius Commission 39 to 40*. Food & Agriculture Organization; c2018.
- Abbo C, Odokonyero R, Ovuga E. A narrative analysis of the link between modern medicine and traditional medicine in Africa: A case of mental health in Uganda. *Brain research bulletin*; c2018.
- Jordan JL, Croft PR. Justifications for using complementary and alternative medicine reported by persons with musculoskeletal conditions. A narrative literature synthesis. 2018;13(7).
- Lans C, Swanson TL, Westfall R. Herbal fertility treatments used in North America from colonial times to 1900 and their potential for improving the success rate of assisted reproductive technology. *Reproductive Biomedicine and Society Online*. 2018;5(2):60-81.
- Agu JC, Jeon HY, Steel A, Adams J. A systematic review of traditional, complementary and alternative medicine use amongst ethnic minority populations: A focus upon prevalence, drivers, integrative use, health outcomes, referrals and use of information sources. *Journal of Immigrant and Minority Health*. 2018;31(2):1-20.
- Aziz MA, Khan AH, Adnan M, Ullah H. Traditional uses of medicinal plants used by indigenous communities for veterinary practices at Bajaur Agency, Pakistan. *Journal of Ethno Biology and Ethno Medicine*. 2018;14(1):11-19.
- Atreya K, Pyakurel D, Thagunna KS, Bhatta LD, Uprety Y, Chaudhary RP, *et al.* Factors contributing to the decline of traditional practices in communities from the Gwallek-Kedar area, Kailash sacred landscape, Nepal. *Environmental Management*. 2018;61(5):741-755.
- Thapa NB. *Food security and livelihood strategy of rural people in Dailekh district, Nepal (Doctoral dissertation)*; c2018.
- Khan MSA, Ahmad I. *Herbal medicine: Current trends and future prospects*. In: *New look to phytomedicine*. Academic Press; c2019. p. 3-13.
- Oyededeji OO. *Cultivation of medicinal plants in South Africa: A solution to quality assurance and consistent availability of medicinal plant materials for commercialization*; c2018.
- Ghana Statistical Service (GSS). *Ghana living standards survey 6 with labour force module (GLSS6/LFS) 2015/2016: Three-cycle labour force report (fourth to sixth cycle report)*; c2016.
- Lopez JCF, Caragay RN, Sia IC, Madamba JS, Velasco DC, Lam HY, *et al.* Catalyzing development of best practice guidelines for community managed health programs: case study of a community-academic partnership. *Acta Medica Philippina*. 2018;52(4):332.
- Robinson J, Griffiths R, Fraser I, Raharimalala J, Roberts D, St John F. Supplying the wildlife trade as a livelihood strategy in a biodiversity hotspot. *Ecology and Society*. 2018;23(1):201-213.
- Booker A, Johnston D, Heinrich M. Value chains of herbal medicines: Research needs and key challenges in the context of ethno pharmacology. *Journal of Ethno Pharmacology*. 2012;140(3):624-633.
- Nyaaba GN, Masana L, Aikins ADG, Stronks K, Agyemang C. Lay community perceptions and treatment options for hypertension in rural northern Ghana: A qualitative analysis. *BMJ Open*. 2018;8(11).
- Semenya SS, Maroyi A. Respiratory infections treated by Bapedi traditional healers in the Limpopo Province, South Africa: Extent of Treatments and Diagnosis Techniques; c2018.
- Kunwar RM, Mahat L, Acharya RP, Bussmann RW. Medicinal plants, traditional medicine, markets and management in far-west Nepal. *Journal of Ethno Biology and Ethno Medicine*. 2013;1(9):66-87.
- Woolcock M. Enhancing public health outcomes in developing countries from good policies and best practices to better implementation. *Scandinavian Journal of Public Health*. 2018;46(22):10-18.
- Mays N, Fitzpatrick R. Assessing health care system performance. *Sociology as Applied to Health and Medicine*; c2018. p. 377-389.
- Rojas T, Bourdy G, Ruiz E, Cerapio JP, Pineau P, Gardon J, *et al.* Herbal medicine practices of patients with liver cancer in Peru: A comprehensive study toward integrative cancer management. *Integrative Cancer Therapies*. 2018;17(1):52-64.