



Ethno medicinal survey of plants used for the treatment of rheumatism in Kajuru Local Government Area of Kaduna State, Nigeria

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ABSTRACT

The study ethno- medicinal survey of plants used for the treatment of Rheumatism was carried out in Kajuru Local Government Area of Kaduna State. Multi-stage random sampling was employed the groups of respondents in this study. Primary and secondary data was used for the study; a total of fifty (50) questionnaires were randomly distributed among ten (10) herbal medicine practitioners from each of the five (5) selected wards selected within the Local Government. Data obtained was also supported with personal interviews. Result revealed that majority of the respondents were male (70.2%), while 29.8% of the population were female, the age group with the highest percentage (40.4%) of the respondents was between 41-50years, 55.3% of the respondents do not have opportunity to attend formal education. The highest percentage of the respondents (53.2%) identified bone ache as the commonest symptom of this disease, is closely followed by 44% of the respondents that identified muscle pull as sign of Rheumatism in the study area. (74.5%) of the respondents specified that the disease is predominant during the raining season, but the effect can also be prolonged to dry season. 72.3% of the respondent identified that Rheumatism is a disease normally affect adult category. According to the respondents, the plant parts normally used are arranged in descending order of their percentage as follows: 44.2% identified roots as the plants part normally used for the treatment of Rheumatism \geq 18.6% who identified leaves and back respectively \geq 7.0% of them that chose fruit. Methods of preparation of phyto-remediation of Rheumatism are arranged in

decreasing order according to the view of the herbal practitioners; Boiling 34.9% ≥ Soaking in water 27.9% ≥ Pounding in moulter 18.6%, Grinding 14.09% ≥ Squeezing and Soaking in alcohol 2.3% respectively, boiling was seen the method mostly used in extraction of the active ingredient of the plant root and other plant/parts. Problems faced in administering herbal medicine and they include: Graduation and dosage (63.4%), Problem of scientific backing (24.4%), Marketing/Patronage problem and law enforcement agent with 4.9% respectively. It was recommended that, research be intensified upon in terms of corresponding dosage of phyto-remedy to different ailment including rheumatism, depending on the gravity of the ailment and the age group of the affected individuals.

Keywords: Ethno medicinal, survey, plants, Treatment, Rheumatism

1. INTRODUCTION

Medicinal plants are those plants that are commonly used in treating and preventing specific ailments and diseases and that are generally considered to be harmful to humans (Anselem, 2004). Medicinal plants have been identified and used throughout human history. Plants have the ability to synthesize a wide variety of compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and herbivorous mammals. At least 12,000 of such compound have been isolated so far, a number estimated to be less than ten percent of the total (Tapsell, *et. al* 2006). According to (Lai and Roy, 2004) chemical compounds in plants mediate their effect on the human body through processes identical to those already well understood for the chemical compounds in conventional drugs; thus, herbal medicine does not differ greatly from conventional drugs in terms of their functions.

Traditional medicine has been used for centuries by herbalists, healers, spiritualists, hunters and farmers as means of primary health care at community level. Herbalist, healers, spiritualists, hunters and farmers use indigenous plants for treating and averting illnesses and are believed to be the basis for primary health care provision. Traditional medicine has been shown to be effective and about 60% of rural population depend on it for their primary health care (WHO 1978, Akinyemi *et.al.*, 2003).

Traditional medicines apply the familiarity, experience and practices based on the ideas and beliefs to its culture, for preservation of well-being.

In Nigeria, traditional medicine is used in the treatments of almost all diseases including “stubborn” illness as the land is blessed with not only different varieties of plants but also the wisdom of the traditional knowledge to cure, treat and heal sickness. Several thousand people in Nigeria with partial access to systematized contemporary health support centers’ still depend on traditional systems of medicine to cater for their primary health care needs. The use of herbal medicine is well established and widely acknowledged to be safe and effective (Farnsworth, 1998) Herbalist, healers, spiritualist, hunters and farmers in Nigeria use many different species of plants as a usual source of medicine.

Ethno botany is the study of traditional human uses of plants. It is recognized as an effective way to discover future medicines. In 2001 researchers identified 122 compounds used in modern medicine which were derived from "ethno medical" plants sources. 80% of these have had an ethno medical use, identical or related to the current use of the active elements of the plants (Fabricant and Farnsworth, 2001). The use of herbs to treat disease is

almost universal among non-industrialized societies and is often more affordable than purchasing modern pharmaceuticals.

Rheumatism is an acute illness in human body, it is characterized by pain and swelling of the muscles, ligaments and tendons or the joints. Jain (1991). Rheumatism commonly known as 'Vat', 'Gathia', 'Ardhang Vat' in Hindi as well as *in Odiya*. He said in general, rheumatism refers to various painful medical conditions, discomfort and disability, which affects bones, joints, muscles, tendons, nerves etc.

Rheumatism is a sickness associated with the people that engage in hard labour, common during the raining season, and is yet to be accorded the required attention. It is therefore imperative for this study to create the required information on the herbal approach to the treatment of this ailment. Hence the quest to doing this necessitates the following objectives: to identify the socio-economic characteristics of the respondents, to identify the medicinal plants used in the treatment of rheumatism and classify them into families, identify the plant part use, methods of preparation and utilization.

2. METHODOLOGY

Study Area

Kajuru is a local government area in Kaduna state, Nigeria. Its headquarter is in the town of Kajuru. Kajuru local government area is located on longitude 9°59' N and, 10°55' N and latitude 7°34' E and 8°13' E with an area of 2,464 km square. It has an estimated population of 110,868 people according to (2006 census). It shares boundaries with Igabi local government area to the north, Chikun local government to the west, Kaura local government to the east, Zangon Kataf local government area and Kachia local government to the South-west and South respectively.

Sampling Techniques

Multi-stage random sampling was employed for this study. The first stage involved the purposive selection of five (5) wards among the ten (10) Wards in Kajuru local government. The second stage was the random selection of ten (10) herbal medicine practitioners from each of the five (5) wards making a total of fifty (50) questionnaires. The data was also supported with personal interview.

Data Collection

Primary data and Secondary data were used for this study; primary data was generated through the use of structured questionnaire, while secondary data was sourced from journals, text books and book of proceedings.

Data Analysis

Descriptive statistics such as percentage and frequency distribution table was used to achieving objective (i), (ii) and (iii).

3. RESULTS AND DISCUSSIONS

Socio Economic Characteristics of the Respondents

The Socio economic characteristics of the respondents were analyzed using the following variables such as; Gender, Age groups, Educational status and the Occupation of all the respondents in the study area.

Table 1. Socio-economic characteristic of the respondent

S/N	Variable	Frequency	Percentage
1	Gender		
	Male	33	70.2
	Female	14	29.8
	Total	47	100.0
2	Age		
	20-30	7	14.9
	31-40	8	17.0
	41-50	19	40.4
	51-60	13	27.7
	Total	47	100.0
3	Educational status		
	Non formal Education	26	55.3
	Primary Education	5	10.6
	Secondary Education	3	6.4
	Tertiary Education	3	6.4
	Quranic Education	10	21.3
	Total	47	100.0
4	Major occupation		
	Civil servant	2	4.3
	Artesian	1	2.1
	Trader	10	21.3
	Farmers	15	31.9
	Others	19	40.4
	Total	47	100.0

Gender: This was used to examine the participation of males and female in the ethno-botanical treatment of Rheumatism in the study area. From this study, it was revealed that male respondent represented 70.2% of population, while 29.8% of the population was female. It was observed that male respondents dominated this population; this might be due to the fact

that male respondents are always very good at care giving like their female counterpart and this cannot be over emphasized in the treatment of bone related diseases (Rheumatism). In addition, male (men) were more prone to bone and joint related diseases because of hard labour and arduous work being carried out by men, the unfortunate experience of some victim of bone related issues such as; Fracture, dislocation, Rheumatism may have ginger large numbers of male respondents to learn this trade in order to help their families, and other people who may also be a victim of any of the bone related ailment. Also, it is an inclined culture in Africa, that male respondents inherit his parent belongings after her demise (exit), including the cultural traditional and physical wealth. Hence, this is one of the boosters of percentage of male respondents in the population. While the reasons for the low representation of their female counterpart may be that females are generally weaker vessels, hence, they perform lighter responsibilities, therefore, they are less-prone to Rheumatism and bone related ailment. Also, parents hardly leave culture, tradition and indigenous belief in the hands of female.

Age: The respondents studied cut across various age groups, ranges from: (17.6%), 20-30 years (14.9%), 31-4 years (17.6%), 41-50 years (40.4%). The age group with the highest percentage was 41-50 years. It can be deduced from this study that age is a relevant indices that determine the experience and the level of competence of individuals on the indigenous utilization of plant products for the remediation of this ailment. Hence, we can say that there was competent hand in the treatment of Rheumatism in the study area as these people have wealth of experience and knowledge as a result of their age. It is also an indication that information obtained from this result is true having the least percentage (14.9%) of the respondents in population under 20-30years of age. This can be attributed to reasons such as; pursuit of formal education, lack of interest in this trade and the need to search for white collar jobs with suitable salaries and incentives. Such Youth with so much vigor and ability require good jobs where they can contribute their intelligent quotient more productively.

Educationally, the population studies were educated at various levels; Primary education 31.90%, Secondary education 6.4%, Tertiary education level 6.4% and those respondents who do not have opportunity to attend formal education system occupied 55.3% of the population. We observed from this study that the level of education of majority of the practitioners of herbal medicine in the study area is relatively low. This can be attributed to the perception of these groups of traditional healers in the need for formal education, also it can be traced to their believed that the knowledge of traditional healing is cultural, instinct, inherited, and spiritual and hence require no education. Therefore, mainly they depend on these aforementioned mean of traditional and indigenous knowledge in the treatment of Rheumatism with very minimal formal education. Hillenbrand, (2006) reported that different studies in different areas showed that medicinal plant knowledge were transferred knowledge to the young generation. Knowledge of herbal treatment was mainly acquired either by ancestral means or by training or both (Suffness and Douros, 1979).

Occupationally, apart from the physto-remedy of Rheumatism, these respondents also involved in other occupations as an additional source of income (revenue), these are area; Farming (40.4%), Artisan (43.4%), Trading (21.3%) and civil servant (4.3%). It can be seen from this result that majority of the respondents were into farming. Farmers relate closely with the nature, they understand the component of the nature (plant and animal), their parts and products that can be harnessed toward enhancing their wellbeing medically and

otherwise. Though, civil servants who are believed to be the few educated respondents (9.4%) in this groups also partake in the business to complement their income, this group may have learnt the use of plant products for remediation of Rheumatism and other bone related disease from the indigenous knowledge transferred to their from their parents. The need for other occupation or trade is required since this ailment (Rheumatism) is a seasonal disease mainly common to raining season and cold weather.

Knowledge of the Respondents about Rheumatism

Table 2 below provides some useful information about Rheumatism based on the ideals of the respondents using the following variables: Symptom of Rheumatism, season of prevalence, and the categories of people affected.

Table 2. Information about the disease

S/N	Variable	Frequency	Percentage (%)
1	Symptoms of the Rheumatism		
	Headache	1	2.1
	Catarrh	21	44.7
	Rashes	25	53.2
	Total	47	100.0
2	Season prevalence of the Disease		
	Dry season	4	8.5
	Raining season	35	74.5
	During Harmattan season	1	2.1
	All of the above	5	10.6
	No specific season	2	4.3
Total	47	100.0	
3	Categories of people affected		
	Children (4-12yrs)	2	4.3
	Teenagers	3	6.4
	Youth	8	17.0
	Adult	34	72.3
Total	47	100.0	

Source: Field survey, 2016.

Rheumatism is a very serious bone related disease that normally brings about acute pain on the affected part of the body. This disease is said to be associated with cold environment, and raining season. Table 2 above revealed that there were various symptoms of Rheumatism and includes Headache, Muscle pull, Bone ache and Swollen of the affected part of the body. From the result the highest percentage of the respondents (53.2%) identified bone ache as the commonest symptom of this disease, is closely followed by 44% of the respondents that

identified muscle pull as sign of Rheumatism in the study area. Very few respondents 2.1% identified headache as a symptom of this disease. The initial symptom include occasional arthritis, joint pain etc. it is important to note that these symptoms are not peculiar to Rheumatism alone as the can as well be noticed in other bone related ailment. This agrees with the submission of (Jain, 1991) who reported that Rheumatic and Arthritis diseases, literally means joint and inflammation. Though, they share the same symptoms which involve joint pains, joint stiffness, joint inflammation and joint damage. There are many common types of arthritis viz. rheumatoid arthritis, osteoarthritis, juvenile arthritis, psoriatic arthritis, reactive arthritis, and infectious arthritis. Other ailments are also having similar symptoms with Rheumatic and Arthritis (Jain, 1991) rheumatism is characterized by the symptoms of inflammation redness, heat, swelling, and pain, fever, intense soreness stiffness of the affected muscles, pain in eyes, loss of sleep and improper urination.(Jyotsana *et. al.*, 2011)

Season of Prevalence: The season of prevalence is the period at which the disease is very common or rampant. The following seasons were identified by the respondents: Dry season, Raining season and the harmattan period. More than eight percent (8.5%) of the respondents identified harmattan season as the period of prevalence of the disease Rheumatism, (74.5%) specified that the disease is predominant during the raining season, while 2.1% of the respondents were of the opinion that the disease normally spread widely during the dry season at the pick of the sunny period. The highest percentage of the population identified raining season as the period of prevalence of Rheumatism. Hence, we deduce from this study that this season may be very friendly for the multiplication and spread of this disease, though this was opposed by very few individual. This means that raining season might not only be the season that this ailment normally occur, but it's very common during the raining season and also the effect can as well be prolonged to dry season. This agrees with Jain (1991) who said that the exact cause of most forms of rheumatism is not known, but exposure to wet and cold weather may aggravate the pain.

Categories of affected persons: Rheumatism according to the respondents affects different categories of age group, from teenagers, youth and adult people. From the result, 72.3% of the respondent identified that the disease normally affect adult people, 17.0% of them attributed the disease to youth, 6.4% of the respondents were of the opinion that rheumatism is pronounce in teenagers while 4.3% of them attributed the commonest of this ailment to children. We can deduce from this study that the older the age, the higher the susceptibility of individual to the disease called Rheumatism. This agreed with the submission of (Mustafa *et.al*, 2016) who reported that rheumatism is more common in women than men but the prevalence increases dramatically with age. This could be justified with the fact that the older an individual is, the greater her responsibilities and the more arduous work such individual does carried out even at no seasons specific in order to meet the family obligations.

Plants part used in the treatment of Rheumatism and their methods of utilization

Table 3 below shows plant part used in the treatment of Rheumatism. The following variables were observed, part of plant used, methods of preparation, route of administration, graduation, dosage per day and the curative period.

Table 3. Plants part used in the treatment of Rheumatism

S/N	Variable	Frequency	Percentage
1	Part of the plant used		
	Bark	5	11.6
	Leaves	8	18.6
	Roots	19	44.2
	Root, bark & stem	8	18.6
	Seed	3	7.0
	Total	47	100.0
2	Methods of preparation		
	Boiling	15	34.9
	Soaking in water	12	27.9
	Squeezing	1	2.3
	Pounding in mouter	8	18.6
	Grinding	6	14.0
	Soaking in alcohol	1	2.3
Total	47	100.0	
3	Route of Administration		
	Oral	27	90.0
	Inhaling	2	6.7
	Others	1	3.3
Total	30	100.0	
4	Graduation for drinking		
	Glass-cup	26	89.7
	Tea spoon	3	10.3
Total	29	100.0	
5	Dosage per days		
	Once	9	32.1
	Twice	19	67.9
Total	28	100.0	
6	Time taken to cure the ailment		
	2 Days	14	29.8
	3-5 Days	24	51.1
	1 week	8	17.0
	1-2 weeks	1	2.1
Total	47	100.0	

Source: Field survey, 2016

Parts used: Various plant parts were identified with phyto-remediation of Rheumatism in the study area. These include; Leaves Bark, Roots, Stem, Fruits and Seeds. The response given by the respondents with regards to the part use are arranged in descending order of their percentage as follows: 44.2% identified roots as the plants part normally used for the treatment of Rheumatism \geq 18.6% who identified leaves and bark respectively \geq 7.0% of the respondents that had chosen fruit. It was observed from this result that the highest percentage of the population 44.2% prepare plant roots for the remedy by Rheumatism in the study area. Hence, this can eventually result to extinction of such forest plants. Therefore, there is need for conservation of these medicinal plants. This development supports the clamor for biodiversity preservation through cultivation and afforestation programmes (Sofowora, 1993). It is well recognized by conservationists that medicinal plants primarily valued for their root parts and those, which are intensively harvested for their root and bark often, tend to be the most threatened by over-exploitation (Flatie *et al.*, 2009).

Methods of preparation: there are various methods of preparing phylo-remediation of Rheumatism in the study area. These methods are arranged in decreasing order according to the view of the respondent (herbal practitioners); Boiling 34.9% \geq Soaking in water 27.9% \geq Pounding in moulter 18.6%, Grinding 14.09% \geq Squeezing and Soaking in alcohol 2.3% respectively, boiling was seen as the method of preparation or extraction of the active ingredient of the plant root and other plant/parts.

Route of administration: Several method of administration of the phyto-remediation of Rheumatism were identified in the study area, 90.0% of the respondent identified oral as their choice route of administering the identified plant product (plants) for the treatment of the ailment, 6.7% of the respondents inhaling their choice route of administering herbal plants for the cure of rheumatism, while 3.3% of the respondents uses other method such as incision etc.

Graduation: The two (2) major instruments used in the measurement of the quantities this phyto-medicine. These includes; the use of glass cup as identified by 89.7% of the respondents while, 10.3% of the respondents specified the use of Tea spoon. Hence, the use of glass cup is the commonest tool used for the measuring the quantities to be taken per dosage. On the basis of daily usage, 32.1% of the respondents use 1 glass cup/day, while 07.2% of the respondents normally take the medicine twice daily.

Time taken to cure the ailment: The curative period of the plant product (phyto-medicine) was examined from the respondents. Various periods were stated as the curative period Rheumatism from the day of application of the medicine. The result revealed that 29.8% of the respondents specified two (2) days from the first day of application, 51.1% of the respondents said that the time taken to cure this ailment from the first day of application is between 3-5days, 17.0% went for 1week, and 2.1% of the respondents identified 1-2week as the period of time taken to cure this ailment from the first day of administration of the medicine. we deduce from this result that the application of herbal medicine is effective in the cure of Rheumatism, though the effectiveness varies, based on the concentration of the medicine and the length of time or the period this ailment had been with the carrier (diseased individual). This justified the dosage (quantity of the medicine to be used), the number of time it should be used daily and the length of time it may require to cure the diseases.

Table 4. Constraints faced on the collection and Administration of Phylo-medicine for the Treatment of Rheumatism

S/N	Variable	Frequency	Percentage
1.	Place of collecting herbs		
	My home garden	2	4.3
	Farm land	26	55.3
	From the forest	17	36.2
	Others	2	4.3
2.	Problem in Collection of herbs		
	Competition	1	2.3
	Over harvesting	15	34.9
	Fire	7	16.3
	Extinction	2	4.7
	Scarcity	17	39.5
	High cost harvest	1	2.3
3.	Problems faced in the administering of herbal medicine		
	Law enforcement Agent	2	4.9
	Graduation and dosage	26	63.4
	Problems of scientific backing	10	24.4
	Marketing/patronage Problem	2	4.9
	Specify others	1	2.4
4.	Suggestion for means of enhancing the availability of herbs		
	Domestication	1	2.1
	Protection in natural envt	15	31.9
	Cultivation in home garden	1	2.1
	Cultivation in the farmland	11	23.4
	All of the above	19	40.4

It is important to know the source of the herbs used in the treatment of rheumatism in order to effectively manage them, and as such investigation was carried out on the source of the herbs they normally use, it was observed that 55.3% of the respondents obtained the herbs from the farm lands, 36.2% from the forest and 4.3% from their home gardens and the rest 4.3% gets their own herbs from other sources of herbs.

From the results it was observed therefore that majority (55.3%) of the respondents obtained their herbs from their farm lands this could be due to several reasons such as commence, (proximity to their homes or business places), free entry and exit without having to be taxed or fined, increased profile as much as not spent in procurement and sometimes they may even sell to others. Less than forty percent (36.2%) of the respondents obtained their

herbs from the forest. This could be due to reasons such as inadequate farmlands to raise these herbs, lack of knowledge on how to cultivate them etc.

Problems Encountered in the Collection of Herbs

These herbal practitioners are faced with different problems during the collection of herbs used in the treatment of Rheumatism. The results of the surveyed respondents revealed 39.5% for scarcity of herbs, 34.9% for over harvesting, 16.3% for fire, 4.7% for extinction and 2.3% stated that high cost of harvest and competition to be the problems they normally encountered in the collection of herbs. These identified problems are not completely in isolation, they are intertwined. This is because one problem consequently leads to another.

Overharvesting is a problem being experienced by some of these respondents this is because some of those that trade herbs are not educated and as a result have no idea of the consequences of their actions on flora diversity and the environment. Hence, they harvest herbs on sight both young and mature and this in turn could be responsible for scarcity of such herb specie. Fire which represents (16.3%) according to the respondents is also factor that could lead to scarcity of herbs. Fire may results from uncontrolled burning, wrong use of fire, and extreme weather conditions among others. Over harvesting, fire outbreaks and scarcity in the long run would lead to extinction of some valuable and highly sought species of herbs. High cost of harvest represent (2.3%) and this is expressed in terms of the money used in the purchasing or renting equipment and tools, transportation cost, fines and taxes paid to obtain permissions especially in governments owned forest reserves.

Problems Faced in Administering Herbal Medicine

Apart from the problems faced or experienced during the collection process, these respondents also encounter problems in administering herbal medicine and they include: Graduation and dosage (63.4%), Problem of scientific backing (24.4%), Marketing/Patronage problem and problems of law enforcement agent represent 4.9% and others 2.4% as sought from the respondents. it could be observed that most of the respondents had graduation and dosage as a major problem facing administration of herbal medicine. It is important to note that different patients have different body systems and genetic make-up, and as such what is considered effective in a patient may not be considered effective in another. Most of the time these herbal practitioners are not Knowledgeable enough to conducting validity test on their products, they merely work with signs and symptoms observed by the patients and begin to administering drugs. A standardize means of dosage is required as the genetic makeup, degree of disease or sickness are differ for each patient and there is a possibility of over dosage. Also, some signs and symptoms are co-indicators of other diseases; hence, using symptom as major indicator of particular sickness may be too ambiguous and invalid.

Again the potency of the herbal materials themselves area also to be considered in dosage administration as genetic factors which may or may not be accompanied by environmental factors, this could pose a challenge. Therefore, standard graduation should be given (e.g a glass cup), the potency rate for the same herbal mixture is not the same for different patient. There should be a clear description of the standard of graduation to avoid ambiguity in dosage prescription, as there are different sizes and a particular size may not be at the disposal of each patient.

Most herbal medicines have low scientific backing though some persons would attest to the effectiveness of herbal medicines; this practice is yet to receive scientific prove. Though plant extracts are the main constituents of synthetic drugs just like the herbal drugs but they have gone through series and stages of quality and quantitative analysis scientifically that has proved their therapeutic efficiency and suitability for consumption, unlike the herbal drugs which most at times are not been tested using scientific standards, and as such there is difficulties in classifying them interns of their suitability and curative grades. Some of these herbal practitioners are not registered with the appropriate authorities like NAFDAC in Nigeria and very many of them are not even licensed to be trade on-health care practitioners. Hence, the safety of these drugs being administered is guaranteed by law neither having legal guarantee by the practitioners themselves.

These tradio-practitioners also experience problems in the area of marketing/patronage. Plant extracts used in ethno medical treatments is enjoying great popularity Farnsworth, (1996); however, it lacks scientific validation (Cowan, Pushpangadan and Atal, 1984, Ved and Goraya, 2008). Many persons especially with high level of education and exposure do not subscribe to the use of herbal medicine because there are many constraints to it. These include graduation levels, identification of plant, adverse effects of these different plants contained in the mixture, presentation, packaging and labeling, shelf-life etc. some of these factors deter people from patronizing these practitioners. Therefore, they experience low patronage.

Suggested means of Enhancing the Availability of herbs

It's important to ensure continuous supply of medicinal herbs, from the survey 31.9% of the respondents suggested the protection of these herbs in their natural environment, 23.4% were in support of their cultivation in farm land, 2.1% were of the opinion of the domestication and cultivation of all medicinal herbs in home gardens, while 40.4% suggested all of the above means for the conservation of medicinal herb in order to enhancing their availability. From the results it was observed that 40.4% of the respondents suggested that any of the afore listed means of ensuring sustainability and availability of these herbs should be adopted either in the home garden, forest or farm land and this will guarantee continuous supply of such herbs.

Mode of Storing prepared Herbal Medicines

The prepared phyto-medicine of Rheumatism can be stored for subsequent use. According to the respondents, different methods of storing the prepared mixtures are specified as follows: rapping in paper (32.6%), keeping whole in bottle (48.8%), well packaged and labeled (14.0%) extracted and bottled (4.7%). From the survey, it was observed that the major methods of storing this phyto-remedy of Rheumatism is to keep them in whole into a sealed bottle as the bottle cap help to prevent the influx of air thereby retaining pungent aroma and freshness and also the bottle enabled easy mixture. Rapping in paper was also another means of storing them, though, this method had its disadvantages amongst which is that does not ensure freshness of herbs due to penetration of air. Hence it becomes stale and again is not advisable in rainy seasons because it can destroy the paper unlike the bottle that can be used at anytime and anywhere. Blending increases the surface area, such that will not last long as compared to when they are in their whole state but this reduces the size of the constituents so that more can be contained in the same bottle.

Table 5. Storage methods and expiration period of Rheumatism Herbal medicine

S/No	Variable	Frequency	Percentage (%)
1.	Mode of storing of prepared herbal medicine		
	Rap in a paper	14	32.6
	Keep in the bottle	21	48.8
	Well package and labeled	6	14.0
	Blended and bottled	2	4.7
2.	Time taken before expiration		
	Less than 1 month	22	48.9
	1-2 month	11	24.4
	2-4 month	1	2.2
	5-7 month	3	6.7
	8 months and above	8	17.8

Time taken before expiration (Shelf-life)

The shelf-life of these herbs as given by the respondents include less than 1month (48.9%), 1-2 months (24.4%), 2-4months (2.2%), 5-7months (6.7%) and 8months and above (17.8%). We can therefore conclude from the results that these herbs have a short-life span. Therefore, it is advisable to prepare them close/around their time of need. Also, collection should be carried out in small quantities so as to avoid spoilage and potency reduction.

4. CONCLUSION AND RECOMMENDATIONS

This study has shown that plants may be used for the treatment of rheumatism; however the present knowledge on medicinal uses of these plants needs scientific investigation to confirm their medicinal efficacy in terms of graduation and dosages. It is observed from this study that majority of the traditional healer of rheumatism got their experiences through inheritance from their parents and elderly people of their community. Hence, little or virtually no modification had been added to the old and crude method of preparation and administration of these herbs. The study also revealed that there is high quest and pressure on the forest plants of high medicinal values, thus there is a critical need for cultivation and conservation of these species. There should be coordination between the government agencies and herbal organization both in the rural and rural community so as to enhancing proper utilization of the medicinal plant resources.

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(Received 10 June 2017; accepted 04 July 2017)