

Documentation of Traditional Knowledge on Medicinal Plants to Treat Respiratory Diseases in Yem Special Woreda, Southern Ethiopia

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Abstract: Respiratory diseases, which are caused by viruses and bacteria affect the upper and lower respiratory tract, are a leading cause of morbidity and mortality globally, accounting for approximately 5.8 million deaths worldwide. This study attempts to document some of the most selected medicinal plants found in the study area with respect to respiratory diseases infections. The study was conducted in Yem special woreda of which three kebeles namely (Angery, Kerewa, and shemona metelo). The kebeles were selected purposely based availability of medicinal plants. This study recorded more than 31 plant-derived medicines to cure various respiratory diseases and also corona virus-related diseases. Other questionnaire based results revealed that almost all 90 (98.9%) of the respondents know the causative agents of respiratory diseases. Majority of the communities 43 (86.8%) want to transfer their traditional knowledge to everyone and their source of knowledge for traditional healing is from their father, whereas 11 (12.1%) of them from their mother, 6 (6.6%) from their grandmother and father and 3 (3.3%). Thus, the government should strengthen the capacity of traditional healers with training, financial support and improve means of protecting their intellectual property rights. Moreover, detailed study on phytochemical analysis of these medicinal plants should be promoted so as to modernize the effort of these traditional healers.

Keywords: Respiratory Disease, Medicinal PLANTS, Corona Virus

1. Introduction

Traditional knowledge can be found in a wide variety of contexts, including: agricultural, scientific, technical, ecological and medicinal knowledge as well as biodiversity-related knowledge. It has great role in many research fields including drug development, rural engineering, resource management, and in bio-prospecting, and researching this field is vital for scientific community, conservation of the knowledge and protection from unethical patents [1].

It is known that respiratory diseases and COVID-19 pandemic nowadays is the threat of the world in which its spreading is very rampant and uncontrollable. World Health Organization (WHO) has classified diseases of the respiratory system in the International Classification of Diseases (ICD). Respiratory diseases are categorized

according to whether they affect the upper or lower part of the respiratory system [2]. Respiratory diseases, which are caused by viruses and bacteria that affect the upper and lower respiratory tract, are a leading cause of morbidity and mortality globally, accounting for approximately 5.8 million deaths worldwide [3]. Acute respiratory tract illnesses are the most frequent illnesses in humans and are an important cause of disability and days lost from school or work [4].

Many studies assured that farmers and pastoralists in several countries such in West Java, Indonesia, Mexico, Nigeria, Ormaland, Kenya, Zimbabwe, South Africa, China, Pakistan and India widely use medicinal plants to treat respiratory diseases. It is estimated that up to 90% of respiratory diseases are managed through the use of traditional medicines [5].

Currently, pharmaceutical companies, academia, research institutions and even traditional healers are in a tight race to

hunt possible medicines against the corona virus pandemic. Of which the drug companies have spent thousands of millions of money to get an effective and safe anti-corona virus drug either by developing a new one or repurposing those which are already in the market [6].

Thus far, dexamethasone, one of the known corticosteroids, has been recommended as COVID-19 caused death reducer (one-third) as per the WHO report [7].

There are now several vaccines that are in use. The first mass vaccination program started in early December 2020 and as of and as of 15 February 2021, 175.3 million vaccine doses have been administered. At least 7 different vaccines (3 platforms) have been administered.

WHO issued an Emergency Use Listing (EULs) for the Pfizer COVID-19 vaccine (BNT162b2) on 31 December 2020. On 15 February 2021, WHO issued EULs for two versions of the AstraZeneca/Oxford COVID-19 vaccine, manufactured by the Serum Institute of India and SKBio. WHO are on track to EUL other vaccine products through June.

Ethiopia is unique in having large young and mobile populations, a large informal job sector, and hotspots of political instability and insecurity, all of which will pose substantial challenges to vaccine roll-out strategies. The second wave of the pandemic in Ethiopia has spread more rapidly than the first wave and affected younger and healthier populations. The emergence of highly transmissible variants calls for mass immunization with COVID-19 vaccines. The first shipment of 2.2 million vaccine doses out of the total 7.62 doses planned to be deployed to Ethiopia by May 2021 are being administered in the national launch of the vaccine introduction. Ethiopia aimed to vaccinate 20% of the population by the end of 2021. But it is not enough to fight COVID-19 in our population number and also our life style is not easy to control COVID-19.

If this is so, what should we do? To us, we should turn our face towards the traditional medicine as the human kind has a strong familiarity with nature-based medications since time immemorial. It is also known that such traditional medical practices are the eye openers for the modern medicine for searching new drugs, leads and new chemical entities [6]. The botanical sources are the one which are in the front line of traditional medications, in which phytomedicines/ or herbal medicines have been found to be effective in reducing various ailments and were the only safeguards of the world's health care system before the introductions of antibiotics including antiviral drugs [8]. Beyond their traditional therapeutic uses against various viral infections, medicinal plants are reservoirs of untold numbers of chemical staffs in which their contribution to the modern drug discovery and development (MDDD) is invaluable. Plant species play a crucial role in the modern health system either by providing new, safe and effective drugs or as sources of lead compounds (which later can be used as starting materials in drug development) [9]. This is the reason why researchers have spent their precious time and effort on searching effective drugs against spreading infections including viruses. The effort has still been continued as far as the outbreaks of

viral diseases are on the place, in which the emergence of COVID-19 is one assertion. The faith in herbal medicine (as alternative therapies) has once again been revived for the re-exploration of anti-viral drugs [10]. Aromatic herbs, medicinal plants and their bioactive constituents have potential to inhibit viral replication [11].

To overcome such transmitted diseases including the respiratory one such as colds, flu, pneumonia, etc., the community heavily relies on traditional plant medicines thereby improving their quality of life, with a focus on disease prevention [12]. Yem special woreda of Ethiopia is one of the historic provinces in the country, which are very rich in flora biodiversity. The communities in this area have an adequate indigenous knowledge of traditional medicines and long history of using medicinal plants against various human and animal ailments. Most of the traditionally useful plant species reported in Yem special woreda of Ethiopia are used to treat infections showing similar symptoms as to COVID-19; in which flu, cough, cold, pneumonia, noise and throat infections are few of them [13].

Our intention in this review paper is therefore, to document some of the most selected medicinal plants found in the Yem special woreda, Southern Nations, Nationalities, and People's Region, Ethiopia. If the plant species that the people are using treat the respiratory diseases and diseases that are symptomatically similar to COVID-19, they may possibly have a capability of curing the diseases either as alternative traditional medicine (in the form of formulation, herbal preparation and capsulation) or as sources of anti-viral agents. Moreover, this may be a golden opportunity to Yem community as well as to the rest of the world if a great attention is given.

2. Objective

2.1. General Objective

The main objective of this study is to document the traditional knowledge of local community to treat respiratory diseases by using medicinal plants.

2.2. Specific Objective

- 1) To document the most selected medicinal plants.
- 2) To document medicinal plants used to treat COVID-19 like symptoms.
- 3) To document the way of treatment.

3. Methods and Materials

3.1. Study Area and Period

This study was conducted in Yem special woreda from January - November, 2022. Three kebeles were selected purposively from Yem special woreda accordingly the level of their use in medicinal plant. From each of 3 kebeles 30 households was purposively selected. Generally, a total of 90 households were participated to give their traditional knowledge on the medicinal plants that are using to treat

respiratory diseases and COVID-19 like symptoms.

3.2. Methods of Data Collection

Primary data was collected from the respondents by distributing questionnaires and focus group discussion.

The questionnaires focused on the traditional knowledge including the list of medicinal plants that they are using to treat respiratory diseases, their treatment system, consumption amount, and economic importance of the medicinal plants.

3.3. Method of Analysis

After the data checked for their completeness then the

Data was analyzed by using Microsoft Excel and SPSS software.

4. Results

Socio-demographic Characteristics:

This study has been conducted at Yem Special Woreda, SNNPE and the data was collected from 90 total households living in three Kebeles namely: Angery, Kerewa, and Shemona metelo. We did collect the data from both genders means that, male 59 (64.8%) and female 31 (34.1%). Majority 88 (96.7%) of the marital status of the respondent is married whereas 1 (1.1%) is single and 1 (1.1%) is widowed (Table 1).

Table 1. Demographic characteristics of the respondents.

Kebele	Frequency	Percent	Valid Percent	Cumulative Percent
Angery	30	33.0	33.3	33.3
Kerewa	30	33.0	33.3	66.7
shemona metelo	30	33.0	33.3	100.0
Total	90	98.9	100.0	
Position in Household	Frequency	Percent	Valid Percent	Cumulative Percent
Male	59	64.8	65.6	65.6
Female	31	34.1	34.4	100.0
Total	90	98.9	100.0	
Marital status	Frequency	Percent	Valid Percent	Cumulative Percent
Single	1	1.1	1.1	1.1
Married	88	96.7	97.8	98.9
Widowed	1	1.1	1.1	100.0
Total	90	98.9	100.0	

High Percentage 68 (74.7%) of the respondents are farmers followed by 15 (16.5%) of them are traditional healers and only 7 (7.7%) of them are government employer (Table 2). About 30 (33%) of the respondents have informal education, 25 (27.5%) of them are illiterate while the rest of the respondents were educated from grade one to high school level (Table 3).

Table 2. Occupation of the respondents.

Occupation		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Traditional Healer	15	16.5	16.7	16.7
	Farmer	68	74.7	75.6	92.2
	Employee	7	7.7	7.8	100.0
	Total	90	98.9	100.0	
Missing	System	1	1.1		
Total		91	100.0		

Table 3. Educational status of the respondents.

Education		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Illiterate	25	27.5	27.8	27.8
	Informal Education	30	33.0	33.3	61.1
	1-4	13	14.3	14.4	75.6
	5-8	14	15.4	15.6	91.1
	10-12	5	5.5	5.6	96.7
	Above 12	3	3.3	3.3	100.0
	Total	90	98.9	100.0	
Missing	System	1	1.1		
Total		91	100.0		

Majority of the communities 43 (86.8%) want to transfer their traditional knowledge to everyone who wants to know about medicinal plant and their uses. Many of them are also willing to transfer to for everyone. Next about 33 (36.3%) of the

respondents replied that they transfer their knowledge for everyone (Table 4).

Table 4. Willingness to transfer your knowledge, to whom.

	Frequency	Percent	Valid Percent	Cumulative Percent
For a person that wants	1	1.1	1.1	2.2
For everybody who wants to know	1	1.1	1.1	3.3
For everyone	33	36.3	36.3	39.6
For everyone that wants to know	43	47.3	47.3	86.8
For my boy	1	1.1	1.1	87.9
For my child	8	8.8	8.8	96.7
For my son	3	3.3	3.3	100.0
Total	90	100.0	100.0	

According to data collected from the respondents about 43 (47.3%) of them replied that modernization has no negative impact on traditional medicine. In opposite the others 36 (39.6%) of the respondents believe that modernization has negative impact on traditional medicine because many peoples are attracted to modern medicine than traditional one (Table 5).

Table 5. Do you think that modernization has positive or negative impact on using traditional medicine.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	43	47.3	47.3	48.4
Peoples are not using the traditional medicine so it is impacting the Traditional medicines	1	1.1	1.1	49.5
the modern medicine is not curing us	1	1.1	1.1	50.5
Yes	9	9.9	9.9	60.4
Yes peoples are attracted to modern medicine	36	39.6	39.6	100.0
Total	90	100.0	100.0	

Many 70 (76.9%) of the respondents got the knowledge of traditional healing from their father, whereas 11 (12.1%) of them from their mother, 6 (6.6%) from their grandmother and father and 3 (3.3%) of them got the knowledge of traditional healing from other relatives (Table 6).

Table 6. Source of traditional healing.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mother	11	12.1	12.2	12.2
	Father	70	76.9	77.8	90.0
	Grandmother & father	6	6.6	6.7	96.7
	Other relatives	3	3.3	3.3	100.0
	Total	90	98.9	100.0	
Missing	System	1	1.1		
Total		91	100.0		

Since there are different types respiratory diseases in the study area, almost all respondents of this study have known about respiratory diseases and they experience these diseases in their life time (Table 7).

Table 7. Do you know respiratory disease.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	90	98.9	100.0	100.0
Missing	System	1	1.1		
Total		91	100.0		

Respondents were asked about if they know about the causative agents of respiratory diseases. Almost all 90 (98.9%) of the respondents know the causative agents of respiratory diseases (Table 8). The 27 (29.7) concluded that respiratory diseases are caused as a result of environmental factors and spiritual matters together. Based on their response 24 (26.4%) of the respondents replied that respiratory diseases are caused by pathogenic microorganisms. On the

other side 12 (13.2%) of study respondents agreed that respiratory diseases are caused environmental factors like bad smell and other. 15 (16.5) of this study respondents replied as lack of hygiene is the main cause of respiratory diseases. Of course, some groups 4 (4.4%) of respondents agreed that they are caused as a result of spiritual reasons and lack of hygiene. The last group of respondents replied as respiratory diseases are caused as a result of environmental

factors, spiritual reasons and lack of hygiene (Table 9).

Table 8. Do you know the cause of respiratory diseases.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	90	98.9	100.0	100.0
Missing	System	1	1.1		
Total		91	100.0		

Table 9. If yes what are the Causes of respiratory diseases.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pathogenic Organisms	24	26.4	26.7	26.7
	Env'tal Factors	12	13.2	13.3	40.0
	Spiritual	1	1.1	1.1	41.1
	Hygiene	15	16.5	16.7	57.8
	All	7	7.7	7.8	65.6
	All except C	27	29.7	30.0	95.6
	All except A	4	4.4	4.4	100.0
	Total	90	98.9	100.0	
Missing	System	1	1.1		
Total		91	100.0		

With regard to the symptoms of respiratory diseases, all respondents have well known and can even explain the symptoms of respiratory diseases (Table 10).

Table 10. Do these respiratory infections have some visible symptoms.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	90	98.9	100.0	100.0
Missing	System	1	1.1		
Total		91	100.0		

Fortunately, all respondents have heard about corona virus since, two years. But they never heard about it before this time (Table 11).

Table 11. Have you heard about Corona virus.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	90	98.9	100.0	100.0
Missing	System	1	1.1		
Total		91	100.0		

Respondents listed 9 medicinal plants that are used to treat COVID-19 like symptoms and they have stated the used parts of the plants, the preparation method, the route of administration and the amount to take it (Dose) and all the stated medicines are accessible in market from the traditional healers (Table 12).

Table 12. Lists of plant species that are used to treat COVID-19 related diseases.

No	Name of the disease	Local name	Scientific name	Used part	Preparation	Route of administration	Dose	Accessibility in market
1	COVID-19	Lemon	Citrus limon (L.)	it's water				
		senafech	Brassica nigra (L.) Koch	seed	grind it together	oral	1 tea spoon	yes
		garlic	Allium sativum	seed				
		feto	Lepidium sativum	seed				
		ginger	Zingiber officinale Roscoe	seed	by boiling and distillation	nasal	3 drop	yes
		keteketa	Dodonaea angustifolia L. f	stem,				
		weyra	Olea europaea L.	stem				
		tekur azemud	Nigella sativa L.	seed				
		senafech	Brassica nigra (L.) Koch	seed				
		garlic	Allium sativum	seed				

Respondents listed more than 31 medicinal plants that are used to treat respiratory diseases and they have stated the used parts of the plants, the preparation method, the route of administration and the amount to take it (Dose) and all the stated medicines are accessible in market from the traditional healers (Table 13).

Table 13. Lists of plant species that are used to treat respiratory diseases.

No	Name of the disease	Local name in Yemegna/Amharic and Scientific name	Used part	Preparation	Route of administration	Dose	Accessibility in market
1	Asthma (Asem)	etse lebona (<i>Polygala abyssinica</i>), enechheber (sekeku) (<i>Rubia discolor</i> Turcz), babaya (wef teche), halege resa (kuske)	All parts of the plants	Drying parts of the plants grinding then mix it with warm water or boil it	Oral	1 cap	
2	Common Cold (gunfan)	etse zewzew (nekaloni gamdu) (<i>Cyphostemma junceum</i> (Barker) Desc. ex Wild. R. B. Drumm.), Yegib merkuz (<i>Pentas lanceolata</i> (Forssk.) Defiers.), etse selesos, yergeb senesaro, kao (yergeb metakekiya)	All parts of the plants	Gridding and boiling	Oral	1 cap	
		(kebericho), <i>Echinops kebericho</i> ,	root	by smoking or boiling	nasal, Oral by drink the boiled keberico water steam in our mouth and nose	1 cap	
		Nech bahirzaf (<i>Eucalyptus globulus</i>)	leaf	boil it in water		5-10 min steam	
3	Cough	nug (<i>Guizotia abyssinica</i>) garlic (<i>Allium sativum</i>), ginger (<i>Zingiber officinale</i> Roscoe), lemon <i>Citrus limon</i> (L.), black seed (<i>Nigella sativa</i> L.)	seed fruit	boil it in water			
		weyra (<i>Olea europaea</i> L.), senafech (<i>Brassica nigra</i> (L.) Koch)	leaf, shell	smooke	nasal, mouth		
4	Cough, TB, mech	besana (<i>Croton macrostachyus</i> Hochst. ex Del.), demakese (<i>Ocimum Lamiifolium</i>), togo, kmebewa, darsuqra, susemo, segu, Ye areb qetel (<i>Nicotiana glauca</i> Grah.), hulegeb (<i>Salvia nilotica</i> Juss. Ex Jacq.)	leaf	grind then extract the liquid	Nasal by smelling it		
5	Dry Cough	nekeshelo, zwen, Yebab hrge, tosegn (<i>Thymus schimperi</i>), tasita (nech ser) gezawa (<i>Withania somnifera</i> (L.) Dunal), etsemenaye (<i>Securidaca longepedunculata</i>) Fresen., sheu (yzenejro agam)	leaf, root	grind and boil	oral		
			All parts of the plants	mix it and grid it	nasal		
6	Tonsil	sesemo + lemon (<i>Citrus limon</i> (L.))	leaf, fruit	grid the leaf of sesemo and mix it with lemon	oral		

5. Discussion

The results of this paper come up with medicinal plants to treat respiratory diseases in yem special woreda, in particular the three districts: Angery, Kerewa and Shemona metelo of Southern Nations, Nationalities, and People's Region, Ethiopia. The study showed that majority of the traditional healers were above 48 years since it is very difficult to disclose their traditional medicinal information, which they considered their indigenous knowledge as a professional secret, only to be passed orally to their eldest son or interested family member in their old age. The gender distributions of medicinal plant knowledge showed most of the traditional healers are males (64.8%) as there were very few female (34.1%) practitioners. The very good reason why greater numbers of traditional practitioner are male might be related with the local tradition of restricting such practices mostly to males whereas females were not allowed to be involved in outdoor activities but remain home as they look after babies and carry out domestic activities. Additional reason was being transfer of medicinal plant knowledge from fathers (76.9%) of the respondents got the knowledge of traditional healing from their father only to their family members' son or other person that could keep the secret. Yirga *et al.* also reported consistent result in which

100% practitioners were males and the study conducted in china by Shen *et al.* also reported consistent finding in which majority (56.7%) of traditional practitioners were males [14]. In comparison of educational status, non-educated informants handled much knowledge of traditional medicine whereas educated informants had low knowledge of traditional medicine, which is an indicative of impact of modern education.

In general, the present study identified more than 31 medicinal plants that have been endemically used to treat 8 different types of respiratory diseases by traditional practitioners in Yem Special Woreda. In similar study that carried out in Eastern Hararghe of Ethiopia, preparation of 33 medicinal plants was documented scientifically to national ethnobotanists level [15].

Analysis of mode of administration showed oral route was the most common mode of administration followed by topical and nasal route, respectively. Those findings were almost consistent with studies within different regions in Ethiopia. This finding agrees with ethno-botanical study conducted in Tigray region by [16] who reported that about 20 (64.5%) species of the medicinal plants were taking by oral, about 8 (25.8%) species of medicinal plants were taking by dermal and the rest 3 (9.7%) were taken both by oral and dermal mode of application. The finding was showed that the

highest mode rout administration of these medicinal plants were oral which is in line with the report of [17] that reported the routes of administration are oral (65%), followed by topical (15%) in Tigray regional state of Ethiopia. The choice of oral administration may be related to the use of some solvents or additives (milk, butter, alcoholic drinks, boiled coffee, Honey, and food) that are commonly believed to serve as a vehicle to transport the remedies. The additives are also important to minimize discomfort, improve the taste and reduce adverse effects such as vomiting and diarrhea, and enhance the efficacy and healing conditions.

6. Conclusion and Recommendation

Ethiopia is rich in biological resources and home to different ethnic groups, many of which have adopted various techniques to protect their health care systems and uses traditional medicine derived from plants and animals. Plant-derived medicines are an alternative to treat ailments in rural areas. Thus, the results of this study revealed 31 parts and/or products used as traditional medicine to treat respiratory diseases in the study area. Moreover, this study recorded the most popular plant-derived medicine to cure various respiratory diseases.

The following recommendations are drawn from the study:

- a) The government must strengthen traditional healers with training, club formation, material and financial support, and improve means of protecting their intellectual property rights. Moreover, continual awareness-raising and training should be given to the community of the study area to avoid egocentric and abusive behavior and to enhance the participatory role of the local people regard to issues of traditional medicinal knowledge.
- b) Researchers such as chemists and pharmacists should undergo a detailed study to identify which chemical constituent of plant and plant products is responsible for the respective treatment of respiratory diseases in the study area.

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