# Ethnobotanical Survey on Medicinal Plants for Treatment of Covid-19 Symptons on Human Used by Indiginious People of Sekhukhune, Limpopo, South Africa

***Dr Jacobus Kori Madisha**

**Limpopo Education, 84 Limpopo Street, Modimolle, South Africa**

***Corresponding Author**

**DOI: https://dx.doi.org/10.47772/IJRISS.2025.90300214**

**Received: 11 June 2024; Review 28 June 2024; Accepted: 02 July 2024; Published: 08 April 2025**

## ABSTRACT

The COVID-19 pandemic has been termed as the most consequential global crisis since the World Wars. The first line of defences against the COVID-19 spread are the non-pharmaceutical measures like social distancing and personal hygiene which only reduce the spread. In this study, an ethnobotanical survey was conducted to document the indigenous knowledge of medicinal plants used to treat Covid-19. Using semi-structured interviews and questionnaires, ethnobotanical data were collected from 35 traditional healers in Sekhukhune region. The results showed that 47 plant species were used to manage respiratory livestock diseases. Plant leaves were commonly used, being crushed in water, and administered orally or topically. During the survey, it was noted that this forty seven plants were traditionally used by indigenous people to treat various human and veterinary diseases such as basic first aid for pneumonia, respiratory, flu, bronchitis, tonsillitis, influenza, TB and chronic conditions like anthrax or chronic obstructive pulmonary disease. The information provided in this study would bring new insights on the development of environmental friendly, effective medicines and vaccines to control human and veterinary diseases in the future especially the covid-19. Future research directions for data-driven COVID-19 research are also debated. We hope that the article will provide the scientific community with an initiative to start open source extensible and transparent research in the collective fight against the COVID-19 pandemic.

**Keywords:** Covid-19, Pandemic, Perception, Stress, Transmission, COVID-19, Infectious disease

## INTRODUCTION

One can track day by day news about the number of new cases and deaths resulting from this respiratory disease since its very commencement in China to several hundreds of thousands of cases in over one hundred countries worldwide. In December 2019, a novel virus named COVID-19 emerged in the city of Wuhan, China [5]. In early 2020, the COVID-19 virus spread in all continents of the world except Antarctica, causing widespread infections and deaths due to its contagious characteristics and no medically proven treatment. After the outbreak of the novel corona virus disease (n-Covid-19), the socioeconomic status, working schedule, psychological behaviour and overall lifestyle of people of the entire world has been changed in a great scale [4]. As a part of these measures, all the educational institutions were closed, different hospitals were prepared for isolating the Covid-19 patients, all type of public gatherings were banned and different law enforcement organization worked together to reduce the transmission of the virus [9]. However, the cause of the fear was related with several factors which includes brittle healthcare management systems, few test rates, weak healthcare infrastructures, fragile planning and implementation by the governments [8]. The system is fragmented and the government hospitals are not usually furnished with good equipment. Private hospitals provide good services but limited to rich people only. Due to the lack of Covid-19 preventing equipment, most of the private hospitals remained closed [10].

The COVID-19 virus has been declared a pandemic by the World Health Organization (WHO) with more than ten million cases and 503862 deaths across the world as per WHO statistics of 30 June 2020 [1]. COVID-19 is

caused by Severe acute respiratory syndrome Corona virus 2 (SARS-CoV-2) and was declared pandemic by WHO on March 11, 2020. The cure to COVID-19 can take several months due to its clinical trials on humans of varying ages and ethnicity before approval. The cure to COVID-19 can be further delayed due to possible genetic mutations shown by the virus [2]. The pandemic circumstances is distressing billions of people socially, economically, and medically with drastic changes in social relationships, health policies, trade, work, and educational environments. The global pandemic is a menace to human the general public and calls for instantaneous actions. The COVID-19 pandemic has motivated the research community to aid front-line medical service staff with cutting edge research for mitigation, detection, and prevention of the virus [3].

The main symptoms of these disorders are often very similar in all mammals and are manifested in the following ways: Fever ,Coughing, Shortness of breath, Trouble breathing, Fatigue, Chills, sometimes with shaking, Body aches, Headache, Sore throat, Congestion/runny nose, Loss of smell or taste, Nausea, Diarrhoea. Some people who are hospitalized for COVID-19 have also have dangerous blood clots, including in their legs, lungs, and arteries [4,5]. Imran et al. [6] exploited the fact that cough is one of the major symptoms of COVID-19. What makes this exploitation process complex, is the truth that cough is a symptom of over thirty non-COVID-19 related medical conditions. Breathlessness or shortness of breath is a symptom in nearly 50% of the COVID-19 patients which can also indicate other serious diseases such as pneumonia [7]. Automated detection of breathlessness from the speech is required in remote medical care and COVID-19 screening applications. Patient speech can be recorded for breath patterns with a simple microphone attached to smart devices. Abnormality related to COVID-19 can be detected from the breath patterns.

The Covid-19 treatment is dedicated to pharmacologic therapies, their mechanism(s) of potential benefit, safety considerations and optimal study design for planned and ongoing clinical trials [22,23,24] .The focus is on chloroquine and hydroxychloroquine- two oral drugs that have been available and used widely for the prevention and treatment of malaria and in the management of autoimmune infections. Both drugs are currently inexpensive [25,26,27,28,29,30].The public health emergency caused by Covid-19 is a call to action as the scientific community embraces its role and shows through selfless rigor, collaboration, compassion and resolve the power of science to heal and to comfort [22,23].In the process of seeking answers to complex questions of import near and far we must endeavour always to be guided by facts and both irrefutable and reproducible scientific evidence [23,24].

Medicinal plants have always played a significant task within the traditional health care system of South Africa. In the rural Sekhukhune area of the Limpopo Province, South Africa, veterinary professionals as well as a state sponsored animal health care are unavailable. Limited research has, however, been conducted on the importance of traditional healing on animal health care in the communities in Sekhukhune. It is clear, therefore, traditional healing is a practice in this area due to pressure of lack of other options in the community of different animal health care. The conducted an overall study of the traditional healers on human use only of Limpopo and recommended further research with larger sample sizes for each municipality in order to verify their findings [26].This research will facilitate future scientific authentication through animal model pharmacological and phytochemical studies**.**

### Theoretical perspective

Ethnobotanical studies emphasis on the multifaceted joining amongst indigenous occupants and vegetation, comprising the perceives, preparation and ethnic theories supplementary with diverse procedures of custom [11,14].Since of the recent actions concerning the spread of the corona virus and for the reason that our scientists have struggle discovering its medication, this study can offer undeveloped evidence about remedial plants that people use to pleasure communal infections connected to the symptoms of COVID-19 and conemporary the status of therapeutic plants [13,14].

## METHODS

### Description of study area

The study was conducted in five local municipalities Elias Motswaledi, Ephraim Mogale, Tubatse, Fetakgomo and Makhuduthamaga. of the Sekhukhune District, Limpopo Province, South Africa. Geographically

Sekhukhune District lies between 24°50′S and 29°50′E (Fig. 1). The district is located in the south east part of Limpopo Province, and covers an area of 13,528 km$^2$, making it the largest district in the province. A large portion of the district is identified as rural areas. Semenya et al. (2013) [19] noted that the high floristic diversity of the area coupled with high unemployment rate resulted in a heavy reliance of natural resources such as plants to meet livelihood needs. The vegetation of the district was classified by as aris-semi savannas. It is characterized by a mixture of trees, shrubs and grasses. This type of vegetation has provided a diverse flora with rich medicinal plants that the people of the study areas have always used to treat many illnesses. The ethnic group use herbal medication either alone or in combination with orthodox medicines for the treatment of several infections [36,37].

Figure 1 South Africa


Figure 2 Sekhukhune District Municipality

**The Study area population**

The study was conducted in the Sekhukhune district, in Elias Motswaledi, Ephraim Mogale, Tubatse, Fetakgomo, and Makhuduthamaga in Limpopo province in South Africa. The surveyed district is inhabited by Black African 98.6%, Coloured 0.1%,Indian/Asian 0.2%,White 1.0% .Black people Northern Sotho 82.2%,Southern Ndebele 4.4%,Zulu 3.3%,Tsonga 2.0%, Other 8.1% mostly from Bapedi ethnic group, as well

as few Ndebele. The Bapedi ethnic group constitutes the largest cultural group in the Limpopo Province (South Africa), comprising 57% of the total provincial population (Limpopo Provincial Government,2012) The study was, however, restricted to the area around Sekhukhune in order to ensure that healer interviewed, livestock owners, elderly were Sepedi speaking and use mountain, bush and river as their closest source of medicinal plants.

**Data collection**

The study was, however, restricted to the area around Sekhukhune in order to ensure that healer interviewed were Sepedi speaking and use mountain, bush and river as their closest source of medicinal plants. The vegetation of the district was classified by as aris-semi savannas [32]. It is characterized by a mixture of trees, shrubs and grasses [33]**.** This type of vegetation has provided a diverse flora with rich medicinal plants that the people of the study areas have always used to treat many illnesses. The ethnic group use herbal medication either alone or in combination with orthodox medicines for the treatment of several diseases [20]. Most of people live in the rural area in Sekhukhune, hence use of plants for corona treatment with symptoms such as: Fever ,Coughing, Shortness of breath, Trouble breathing, Fatigue, Chills, sometimes with shaking, Body aches, Headache, Sore throat, Congestion/runny nose, Loss of smell or taste, Nausea, Diarrhoea Fourteen villages were selected from around Sekhukhune district. Villages further away were not used, due to financial constrain. Face-to-face meetings were held with individual traditional healers. The reasons for the one on one meetings were to introduce the project, to determine how active traditional healers were in the area and to enlist them for the study. The traditional healers included in this research were of the Bapedi tribe as they are the dominant cultural group custodians of plants remedies in the Limpopo Province South Africa.

**Field survey**

This survey focused on the use of traditional plant resources with specific reference to the treatment of respiratory infections on animals. Fieldwork was performed between 01 April 2021 to 30 July 2021. Collectively, 35 participants were interviewed after receiving their prior informed consent. Data was collected from native indigenous health practitioners and local participants (female and males of different ages, experiences and education levels). During field surveys, face to face interviews and semi-structured interviews were also conducted. The questionnaire was explained in Sepedi, the local language. The questionnaire was divided into sections that relate to various aspects of respiratory infections/corona virus such as local names, medicinal plants use, collection sites, growth forms, plants part used, preparation methods, dosage, combinational uses and toxicity of reported plants. Documentation of data while field survey was evaluated and organized by usage of quantitative and qualitative analysis. In addition, data was compared with previously published research articles on alien plants uses with higher medicinal values for various infections.

**Ethical compliance**

The present study was carefully designed with strict compliance of bio-ethics and approved by the ethics Committee of University Pretoria, South Africa under the approval No REC029-19. Prior to data collection, a brief group discussion was held with the participants for agreement, to tell the objectives of research and to guarantee the safety of indigenous knowledge. These practices clear the aim of research and develop confidence in participants so they give reliable knowledge without any hesitation. Initially, 50 participants were selected of them were but among them, 5 were hesitant in providing knowledge, and 10 could not be located during the data collection due to personal commitment, leaving a total of 35( male 29 and females 21) participants for data collection. This 5 traditional healers were prepared to identify no more than five medicinal plants and their uses. These healers informed the researcher that they were unwilling to divulge information about certain medicinal plants, the properties of which they considered to be very powerful. They clearly wished to keep this knowledge to themselves as something belonging to their own private domain. The ability to use plants of such purported potency apparently serves as these healers' speciality trade marks in their communities, conferring upon them the status of being the best among their peers. All plants in this survey are alien listed by the biodiversity action plan for control. The native communities of the area have knowledge about the use of these plants and but not the dangers the can cause to the ecology of their area.

Table 1 Demographic Data of Participants

| **Parameters** | | **Participants(N)** | **N (%)** |
|---|---|---|---|
| **Gender** | Female | 10 | 29 |
| | Male | 25 | 71 |
| **Age** | 36–46 | 3 | 8 |
| | 47–57 | 6 | 17 |
| | 58–68 | 7 | 20 |
| | 69–79 | 11 | 32 |
| | 80-90 | 6 | 17 |
| | 90-100 | 2 | 6 |
| **Education** | No Formal Education | 10 | 29 |
| | Primary | 13 | 37 |
| | Secondary | 7 | 20 |
| | Tertiary | 2 | 6 |
| | Others | 3 | 8 |
| **Collaboration with modern medicine** | Collaboration | 15 | 43 |
| | Non Collaboration | 20 | 57 |
| **Occupation** | Herbalists | 30 | 86 |
| | Retirees | 4 | 11 |
| | Housewives | 1 | 3 |
| **Residence** | Urban | 3 | 9 |
| | Rural | 32 | 91 |
| **Marital status** | Single | 13 | 37 |
| | Married | 15 | 44 |
| | Widowed | 6 | 17 |
| | Divorced | 1 | 2 |

**Data analysis**

The collected datasets were captured in MS Excel 2013 and analysed using descriptive and inferential statistics. Different quantitative tools such as Frequency of citation (FC) and relative frequency of citation (RFC), Jaccard

index (JI), Chi-square test, Family importance value (FIV), Fidelity Level (FL), Informant Consensus Factor (ICF) and Use Value (UV) were used to analyse the importance of medicinal plants and informants' knowledge about categories of respiratory infections.

**Use value (UV)**

Use value is calculated to assess all probable usage of plant species. UV of plants gives a quantitative analysis for plant citation. UV tells the relative importance of plant flora recognized locally. UV was analysed according to [15].

UV =u/N

Where u is the total participants stating various uses of a plant and N is whole number of participants. UV is usually (1) if the number of usages is greater, and (0) if the usage report for plants species is less. UV not deliver data on multiple or single usage of plant flora is considerably low. UV does not deliver any data on the single or multiple uses of plant species.

**Frequency of citation (FC) and relative frequency of citation (RFC)**

FC is used for evaluating the most preferred plants or more used plant species. RFC was analysed to intricate the knowledge of traditional flora about usage of therapeutic flora in the study site.

RFC = FC/N $(0 < RFC < 1)$

Where RFC is denoted by relative frequency citation, FC (Frequency of Citation) is the number of participants who stated the plant flora and N is whole number of informants [39].

## RESULTS

**Socio-demographic characteristics of participants**

Communally 35 participants were selected from several villages of Sekhukhune district, Limpopo, South Africa. The majority of traditional healers were males (71%). Based on age, the participants were divided into seven groups ,36–46 (8%),47–57 (17%), 58–68 (20%), 69–79 (32%), 80-90 (17%) ,90-100 (6%). Participants constitute, 30 herbalists, 4 retirees and 1 housewives. Regarding education, 29% of the participants were uneducated, 37% of the had attended primary school, 20% secondary education level, 6% tertiary education and only 8% of participants had attended universities. The majority of traditional healers (44%) in the study area were married, followed by single (37%), widowed (17%) and 2% divorced. Most of the participants were living in rural areas (91%) and only 9% living in urban areas, the plant flora was herbs 51%, followed by shrubs (23%)followed by trees (18%) and lastly climber (8%). The 28 medicinal plants belonged to 17 families, with Fabaceae (5 species), Asteraceae (4 species) represent the most dominant family in this survey site followed by Rutaceae, Anacardiaceae with 2 species each and the rest with one (table 3).

**Plant parts used in herbal medicines**

Among the different parts of medicinal plants used by traditional healers, the underground parts (root, rhizome, tuber, corn, leaves) were most frequently used to make the prescriptions for healing treatments, while the whole plant and leaves were second and third respectively. The most sustainable use of the plants to ensure viability is to use leaves to avoid the threat of extinction of most of the medicinal plants. Tabuti mentioned that the uses of root and tuber parts can threaten medicinal plant populations or species viability. The interview result on different plant parts utilized revealed that leaves (60,7%) were reported to be the most frequently used plant part to prepare herbal medicine either by singly or mixes by other plant parts. Leaves were followed by roots (14,28%), whole (10,71%) followed by bark and seed with (7,14%) contributed (Fig.1).

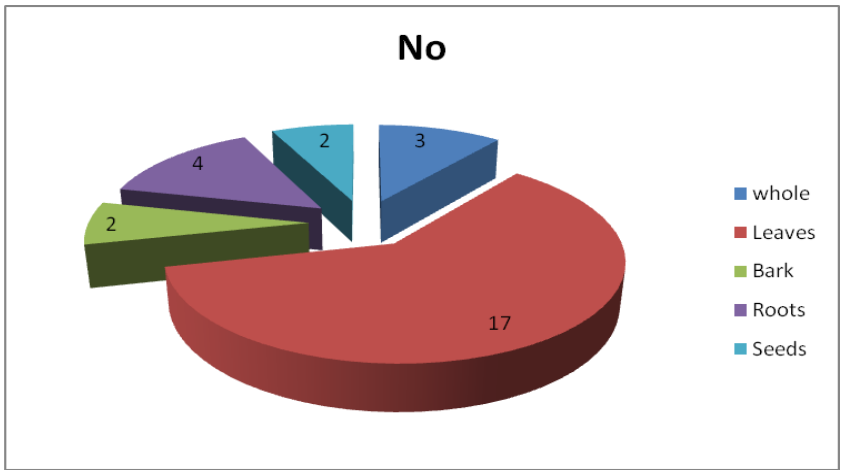


Figure 1 Parts used

**Collection sites**

Plants were mostly harvested from roadsides (41%), followed by Abandoned land (23%), disturbed habitats (15%), home gardens (10%), mountain 8% and Rivers 3% as sources of medicinal plants (Fig. 6).

**Collection sites of plant in Sekhukhune District**

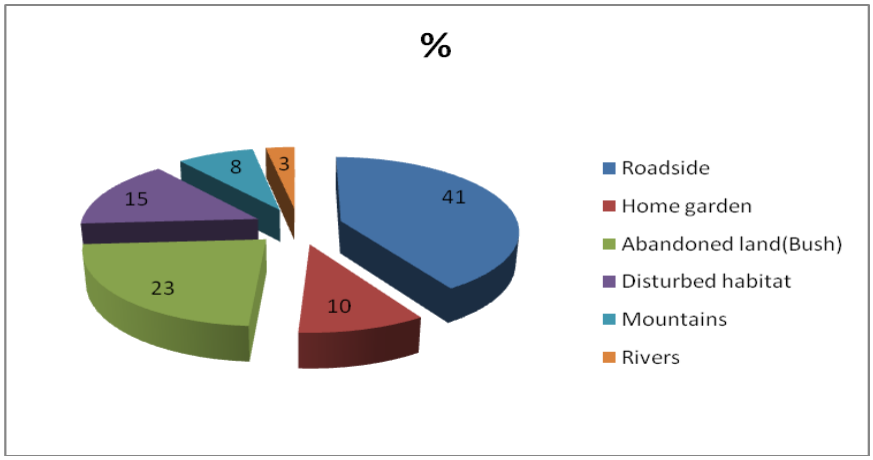


Figure 2 Collection site

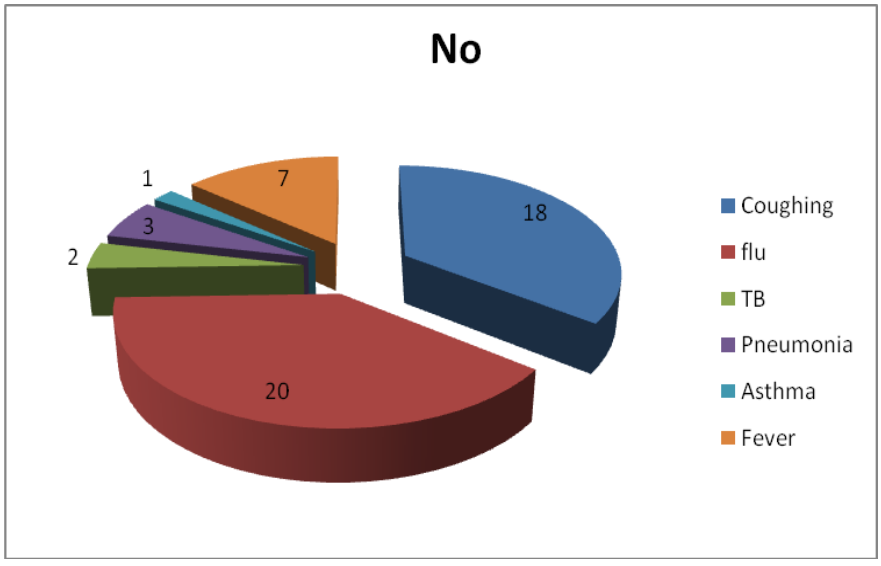


Figure 3 Symptoms of Respiratory infections

**Quantitative ethnoveterinary analysis**

**Fidelity level**

High FL was observed for treatment of coughing and flu. The plant used *Artemisia afra* (0.98), Aloe marlothii (0.98), *Citrus limon* (0.96), *Aloe aborescens* (0.95) Terminalia sericea (0.94), *Elephantorrhiza Elephantina*(0.91), *Lippia javanica* (0.89), Tarchonanthus camphoratus (0.87), Senna italica (0.86), Senna italica (0.86), *Pterocarpus angolensis* (0.79) (Table 2).

**Use value**

Plants with the highest UV values were Aloe marlothi (0.98*), Artemisia afra* (0.98*), Citrus limon* (0.96*)*. The lowest UV was on Alepidea amatymbica (0.21*) Zanthoxylum capense* (0.22*)* each with a UV value of 0,28 and 0.4 (Table 2). Use value calculation of Syzygium cordatum (0.14*)* was not considered because of less than ten use-report.

**Relative frequency of citation (RFC %)**

The RFC represented the prominent species used for respiratory related infections based on the ratio between the number of participants (FC) for a plants and the overall number of participants in the research survey.RFC ranged from 0 to 0.95 and we classified all species into 3 groups: RFC 0. to 0.35(0-49) (8 species); RFC, 0.357 to 0.707(50-99) (9 species); RFC 0.714 to 0.957(100-140) (11 species) (Table 2). According to this ethnoveterinary records, the majority of plants in the third group were reported with high medicinal potential. The highest values were recorded for *Artemisia afra,* Aloe marlothii (0.98) used in the form for Coughing, influenza, Fever and TB. Other high RFC species were *Aloe aborescens, Citrus limon,* Terminalia sericea *Lippia javanica, Pterocarpus angolensis,* Tarchonanthus camphoratus, Senna italica.

**Individual versus combination use**

Table 4 most common combinations

| **Symptoms** | **Plants combination** | **Participants** |
|---|---|---|
| Fever, General weakness, Runny nose, Loss of smell, Loss of taste | *Eucalyptus camaldulensis/ Artemisia afra/ Cannabis sativa +*<br><br>*Aloe Marlothii/Zebrina/ Schotia brachy petala* | 6 |
| Fever, Shortness of breath at rest, Loss of smell, Loss of taste | *Eucalyptus camaldulensis/ Artemisia afra/ Cannabis sativa+Carpobrotus edulis* | 5 |
| Sore throat, Fever, Runny nose, Shortness of breath at rest, Chills, Fatigue, General weakness, Loss of appetite, headache | *Eucalyptus camaldulensis/ Artemisia afra/ Cannabis sativa+ Peltophorum africanum/ Sclerocarya birrea/ Aloe marlothii* | 8 |
| Sore throat, Fever, Shortness of breath at rest, General weakness, headache, Loss of smell, Loss of taste | *Eucalyptus camaldulensis/ Artemisia afra/ Cannabis sativa+ Aloe marlothii* | 9 |
| Sore throat, Fever, Runny nose, Shortness of breath at rest | *Eucalyptus camaldulensis/ Artemisia afra/ Cannabis sativa +Aloe marlothii/ Senna didymobotrya* | 4 |
| Sore throat, Fever, Runny nose, Shortness of breath at rest, Chills, Fatigue, General weakness, Loss of | *Eucalyptus camaldulensis/ Artemisia afra/ Cannabis sativa+ Aloe marlothii Senna didymobotrya* | 3 |

| | | |
|---|---|---|
| appetite, headache, Loss of smell, Loss of taste | | |

Preparations of the remedies constituted 8 individual extracts from 8 species depending on the infection and 27 combinations with 12 species were recorded 5 species with one indigenous species across different municipalities (Table 4).

Species that were used individually include *Artemisia afra*, Terminalia sericea, Ozoroa Sphaerocarpa, *Schotiabrachy petala*, *Geigeria aspera* , *Maerua angolensis* , *Lippia javanica* , *Pterocarpus angolensis, Sutherlandia frutescens*, *Aloe aborescens*, *Drimia elata* , *Zanthoxylum capense* , *Elephantorrhiza Elephantina* , *Citrus limon* , *Dicoma anomala* were used individually and in combinations. Only prominent combination and common or well known combination were recorded. Traditional health practitioners prefer combinations generally as they say it prevent feather infection and reduced toxicity in those plant that have toxicity.

## RESULTS AND DISCUSSION

### Qualitative ethno veterinary analysis

### Fidelity level

Plant species such as *Zanthoxylum capense and Alepidea amatymbica* were not necessarily important in management of respiratory infections due to a low number of use reports [38].Plants with one use report such as *Syzygium cordatum* were not computed for Fidelity Level (FL) due to very few use-report in respiratory. Important plant species with high FL values and with a considerable number of use-report were *Artemisia afra*(1), Aloe marlothii (0,98) , *Citrus limon* (0,96) *Aloe aborescens* (0,95) and Terminalia sericea (0,94).These plants need further antimicrobial studies against pathogens of respiratory infections.

### Use value

The plants with the highest Use Value (UV) were considered important due to high use-reports. Despite being considered important, [38] noted that the UV cannot distinguish if the plant is used for single or multiple purposes. Despite that, the FL values indicated the importance of plant species to various respiratory infections.

## CONCLUSION

The study suggests that there is a vast amount of indigenous knowledge on medicinal plant and this knowledge plays an important role for the treatment of different ailments in the study districts. The healers have a very high intention to keep their traditional knowledge secrete and none of them was ready to transfer their knowledge either freely or on incentive bases to other people; they need to convey their knowledge only to their selected scions after getting very old. The knowledge is passed from generation to generation in an oral manner. Without being properly documented this information it could easily be lost or distorted. Commonly reported plant species need to be tested for their antimicrobial activities *in vitro* and validated their active ingredients in order to recommend effective preparations and treatments to this community. In particular, the bioactive compounds found in plants can be used as a source of new antiviral agents. These compounds form the basis for drug discovery that may combat various diseases in humans and animals can be industrialized across the world. The use of natural products in drug discovery is a lead for finding new novel antiviral agents that can produce effective and curative agents for opportunistic viral infections.

### Further Study

Further research and collaboration with local communities are necessary to fully appreciate the vast wealth of knowledge and practices involving plant use worldwide.

## ACKNOWLEDGEMENT

All traditional health practitioners who participated in this study are highly thanked for sharing their knowledge.

### Authors' contributions

Author read the final manuscript and agreed to its submission.

### Funding

No funding

### Availability of data and materials

Not Applicable.

### Ethics approval and consent to participate

Verbal consent was taken from participants before carrying out the study as most if the participants were illiterate. Present study was carefully designed with strict compliance of bio-ethics.

### Consent for publication

Not applicable.

### Competing interests

The author declare that they have no competing interests.

## REFERENCES

1. World Health Organization (2020) Coronavirus disease 2019 (covid-19): situation report 162
2. Keeling MJ, Deirdre Hollingsworth T, Read JM (2020) The efficacy of contact tracing for the containment of the 2019 novel coronavirus (covid-19). MedRxiv
3. Boccaletti S, Ditto W, Mindlin G, Atangana A (2020) Modeling and forecasting of epidemic spreading: the case of covid-19 and beyond. Chaos, Solitons, and Fractals
4. Kucharski AJ, Russell TW, Diamond C, Liu Y, Edmunds J, Funk S, Eggo RM, Sun F, Jit M, Munday JD et al (2020) Early dynamics of transmission and control of covid-19: a mathematical modelling study The lancet infectious diseases
5. Lopez CE, Vasu M, Gallemore C (2020) Understanding the perception of covid-19 policies by mining a multilanguage twitter dataset. arXiv:2003.10359
6. Imran A, Posokhova I, Qureshi HN, Masood U, Riaz S, Ali K, John CN, Nabeel M (2020) Ai4covid-19:, Ai enabled preliminary diagnosis for covid-19 from cough samples via anapp. arXiv:2004.01275
7. Greenhalgh T, Koh GCH, Car J (2020) Covid-19:, a remote assessment in primary care. bmj 368
8. Shammi, M., Bodrud-Doza, M., Islam, A. R. M. T., & Rahman, M. M. (2020). COVID-19 pandemic, socioeconomic crisis and human stress in resource-limited settings: A case from Bangladesh. Heliyon, e04063.
9. WHO calls for urgent, aggressive actions to combat COVID-19, as cases soar in South-East Asia Region. Available at: https://www.who.int/southeastasia/news/detail/17-03-2020-who-calls-for-urgent-aggressive-actions-to-combat-covid-19-as-cases-soar-in-south-east-asia-region. (August 15, 2020).
10. Islam, M. D., & Siddika, A. (2020). COVID-19 and Bangladesh: A study of the public perception on the measures taken by the government.
11. World Health Organization. (2019). WHO Global Report on Traditional and Complementary Medicine. https://www.who.int/traditional-complementary-integrative-medicine/WhoGlobal Report On Traditional And Complementary Medicine 2019.pdf.

12. Amjad, M. S., Zahoor, U., Bussmann, R. W., Altaf, M., Hussain Gardazi, S. M., & Abbasi, A. M. (2020, October 27). Ethnobotanical Survey Of the Medicinal Flora Of Harighal, Azad Jammu & Kashmir, Pakistan - Journal Of Ethnobiology And Ethnomedicine. BioMed Central. https://ethnobiomed.biomedcentral.com/articles/10.1186/s13002-020-00417-w.
13. Khadka, D., Dhamala, M.K., Li, F. (2021). The use of medicinal plants to prevent COVID-19 in Nepal. J Ethnobiology Ethnomedicine 17, 26. https://doi.org/10.1186/s13002-021-00449-w
14. Van Wyk, B.-E., Wink, M. **2004**. Medicinal Plants of the World. First edition, 480 pages. Timber Press, Portland, Oregon, USA and London, UK. ISBN-13: 978-0-88192-602-6
15. Umair M,Altaf M,Abbasi AM.Plos one.2017:12(6)e017792
16. de Oliveira PC, Braga J.J Medicinal Plants. 2017;5(1):164–70.
17. Kayani S, Ahmad M, Sultana S, Shinwari ZK, Zafar M, Yaseen G, Hussain M, Bibi T.J Ethnopharmacol.2015;164,186–202
18. Trotter RT, Logan MH.Redgrave Publisher, Bedford Hills.1986; 91–112
19. Semenya, S.S., Potgieter, M.J., Erasmus, L.J.C., 2013. Exotic and indigenous problem plants species used by the Bapedi to treat sexually transmitted infections in Limpopo Province, South Africa. African Health Sciences 13 (2), 320–326
20. Kose LS, Moteetee A, Van Vuuren S. Journal of Ethnopharmacology. 2015;170, 184–200.
21. Semenya S.S (2012).Bapedi Phytomedicine and the Treatment of Sexual Transmitted Diseases in Limpopo Province, South Africa. M.Sc. Dissertation, Sovenga: University of Limpopo.
22. Morens DM, Daszak P, Taubenberger JK (2020) Escaping Pandora's box— another novel Coronavirus. N Eng J Med 382:1293–1295
23. Wu Z, McGoogan JM (2020) Characteristics of and important lessons from the Coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72314 cases from the Chinese Center for disease control and prevention. JAMA.
24. Kupferschmidt K, Cohen J (2020) Race to find COVID-19 treatments accelerates. Science (New York, NY) 367:1412–1413
25. Jakhar D, Kaur I (2020) Potential of chloroquine and hydroxychloroquine to treat COVID-19 causes fears of shortages among people with systemic lupus erythematosus. Nat Med
26. 5. Plowe CV (2005) Antimalarial drug resistance in Africa: strategies for monitoring and deterrence. Curr Top Microbiol Immunol 295:55–79
27. 6. Savarino A, Boelaert JR, Cassone A, Majori G, Cauda R (2003) Effects of chloroquine on viral infections: an old drug against today's diseases. Lancet Infect Dis 3:722–727
28. Boone BA, Murthy P, Miller-Ocuin J, Doerfler WR, Ellis JT, Liang X, Ross MA, Wallace CT, Sperry JL, Lotze MT, Neal MD, Zeh HJ 3rd (2018) Chloroquine reduces hypercoagulability in pancreatic cancer through inhibition of neutrophil extracellular traps. BMC cancer 18:678
29. Zhang Q, Tsuji-Hosokawa A, Willson C, Watanabe M, Si R, Lai N, Wang Z, Yuan JX, Wang J, Makino A (2020) Chloroquine differentially modulates coronary vasodilation in control and diabetic mice. Br J Pharmacol 177:314–327
30. Yuan X, Xiao YC, Zhang GP, Hou N, Wu XQ, Chen WL, Luo JD, Zhang GS (2016) Chloroquine improves left ventricle diastolic function in streptozotocin-induced diabetic mice. Drug Des Dev Ther 10:2729–2737
31. Ben-Zvi I, Kivity S, Langevitz P, Shoenfeld Y (2012) Hydroxychloroquine: from malaria to autoimmunity. Clin Rev Allergy Immunol 42:145–153
32. Umair M, Altaf M, Abbasi AM. PloS one. 2017;12(6):e0177912.
33. de Oliveira PC, Braga J.J Medicinal Plants. 2017;5(1):164–70.
34. Kayani S, Ahmad M, Sultana S, Shinwari ZK, Zafar M, Yaseen G, Hussain M,Bibi T.J Ethnopharmacol.2015;164,186–202.
35. Musa MS, Abdelrasool FE, Elsheikh EA, Ahmed LA, Mahmoud A L E, Yagi SM. Journal of Medicinal Plants Research.2011; 5, 4287–4297.
36. Saikia AP, Ryakala VK, Sharma P, Goswami P, Bora U.J Ethnopharmacol. 2006;106(2):149–57.
37. Van Wyk B-E, Gorelik B. S Afr J Bot. 2017;110:18–38..
38. Kayani S, Ahmad M, Zafar M, Sultana S, Khan MPZ, Ashraf MA, Hussain J, Yaseen G. J Ethnopharmacol. 2014;156:47–60.
39. Yaseen G, Ahmad M, Sultana S, Alharrasi AS, Hussain J, Zafar M. J Ethnopharmacol. 2015;163:43–59.

Table 2 of medicinal plants use for Covid 19 and other related infection used before covid-19

| **Scientific name (Voucher no.)** | **Botanical family** | **Vernacular name** | **Part/s used** | **Mode of preparation and administration** | **Ailment/ Infections** | **FrequencyCitation (FC)** | **Frequency index (FI)(%)** |
|---|---|---|---|---|---|---|---|
| *Acacia senegal* var. *Kerensis*(JKM 1) | Fabaceae | Mookanat hutlwa | Seed & bark | Mixed and burned thrice a day; smoke inhaled | Nose bleeding | 31 | 88.57 |
| *Aframomum melegueta* (Rox.) K.Schum.(JKM2) | Zingiberaceae | Unknown | Root | Boiled for 10 minutes and one tin cup of extract is taken orally. Thrice a day | Tuberculosis | 32 | 91.42 |
| *Agapanthus inarpetus* P. Beauv. subsp. *inarpetus*(JKM3) | Agapanthaceae | Leta-la-phofu | Root | Boiled for 10 minutes and one tin cup of extract is taken orally. Thrice a day | Tuberculosis | 32 | 91.42 |
| *Aloe aborescens* Mill. (JKM4) | Asphodelaceae | Kgopha-ya-fase | Root | Boiled for 20 minutes and one tin cup of extract is taken orally. Thrice a day | HIV/AIDS | 29 | 82.87 |
| *Aloe falcata* Baker (JKM5) | Asphodelaceae | Kgopha | Leaf | Boiled for 5 minutes and one tin cup of extract is taken orally. Thrice a day | Hypertension | 27 | 77.14 |
| *Aloe angolensis* Baker (JKM6) | Asphodelaceae | Sekgophane | Leaf | Boiled for 25 minutes and one tin cup of extract is taken orally. Thrice a day | Appetite | 28 | 80 |
| *Aloe marlothii* A. Berger subsp. *marlothii*(JKM7) | Asphodelaceae | Kgopha-ya-go-ema | Leaf & root | Mixed and boiled for 5–20 minutes and one tin cup of extract is taken orally. Thrice a day | Diabetes mellitus and Chlamydia | 34 | 97,14 |
| *Artemisia afra* Jacq. ex Willd. var. afra | Asteraceae | Lengana | Leaf | Crushed and smoked with a newspaper. Twice a day | Tuberculosis | 35 | 100 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ( JKM8) | | | | Boiled for 15 minutes and one tin cup of extract is taken orally. Thrice a day | Tuberculosis | | |
| | | | | Crushed and mixed with *Mentha* spp (crushed leaves) and smoked with a newspaper. Thrice a day | Tuberculosis | | |
| | | | | Burned in a hut thrice a day; smoke is inhaled<br><br>Deposited in the hot water thrice a day; steam is inhaled | Tuberculosis | | |
| *Asparagus falcatus* L. (JKM9) | Asparagaceae | Mophatlalatsa-maru | Root | Mixed with *Aloe aborescens* (root), *Elephantorrhiza elephantina* (root). Boiled for 5 minutes. One tin cup of extract is taken orally. Thrice a day | Blood clotting | 26 | 74.28 |
| *Boscia albitrunca* (Burch.) Gilg & Gilg-Ben.(JKM10) | Capparaceae | Mohlophi | Root | Mixed with *Elephantorrhiza elephantina* (root), *Plectranthus ciliatus* (root), *Peltophorum africanum* (root). Boiled for 20 minutes. One tin cup of extract is taken orally. Thrice a day | HIV/AIDS | 21 | 60 |
| *Cannabis sativa* L. var. *sativa*(JKM11) | Cannabaceae | Mopatse | Leaf | Macerated in warm water for 24 hours and one tin cup of decoction is taken orally. Thrice a day | Tuberculosis | 35 | 100 |

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume IX Issue III March 2025

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Carissa bispinosa* (L.) Desf. ex Brenan(JKM12) | Apocynaceae | Motshukudu<br><br>Thorn | | Boiled for 20 minutes thrice a day; steam is inhaled | Body pains | 19 | 54.42 |
| *Carpobrotus edulis* (L.) L. Bolus subsp. *Edulis* (JKM13) | Mesembyanthemaceae | Lepolomo-la-go-naba<br><br>Leaf | | Squeezed juice and one tin cup of juice is taken orally. Thrice a day | Diabetes mellitus and goiter | 32 | 91.4 |
| *Chironia baccifera* L. (JKM14) | Gentianaceae | Mahlo-a-Mmutla | Root | Boiled for 20 minutes and one tin cup of extract is taken orally. Thrice a day | Blood clotting | | |
| | | | | | Tuberculosis | | |
| *Cinnamomum verum* J. Presl(JKM15) | Lauraceae | Mokwere-kwere-o-mogolo | Root | Mixed with *Burkia africana* (root), *Hypoxis hemerocallidea* (tuber), *Geigeria aspera* (entire plant). Boiled for 5 minutes. One tin cup of extract is taken orally. Thrice a day | HIV/AIDS | 19 | 54.42 |
| *Croton pseudopulchellus* Pax (JKM16) | Euphorbiaceae | Sehlare sa pelo | Leaf | Boiled (undisclosed time) and one tin cup of extract is taken orally. Thrice a day. | Asthma and heart problem | 17 | 48.57 |
| *Cussonia spicata* Thunb. (JKM17) | Araliaceae | Motšhetšhe | Root | Boiled for 5–10 minutes and one tin cup of extract is taken orally. Thrice a day | Appetite and diabetes mellitus | 18 | 51.14 |
| *Dodonaea viscose* var. *angustifolia* (JKM18) | Sapindaceae | Mofenshe | Root | Mixed with *Citrullus lanatus* (root), *Euclea crispa* (root) and boiled for 20 minutes. One cup of extract is taken | HIV/AIDS | 15 | 42.8 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | orally. Thrice a day | | | |
| *Elephantorrhiza elephantina* (Burch.) Skeels(JKM19) | Fabaceae | Mosehlana/ moshisane | Root | Mixed with *Peltophorum africanum* (bark). Boiled for 20 minutes and one tin cup of extract is taken orally. Thrice a day | HIV/AIDS | 25 | 71.4 |
| | | | | Boiled for 5–20 minutes and one tin cup of extract is taken orally. Thrice a day | Blood clotting | | |
| | | | | | Blood purifier | | |
| *Equisetum ramosissimum* Def, subsp. *ramosissimum* L.(JKM20) | Equisetaceae | Unknown | Root | Boiled for 5 minutes and one tin cup of extract is taken orally. Thrice a day | Asthma | 24 | 68.57 |
| *Englerophytum magalismontanum* (Sond.) T.D. Penn.(JKM21) | Sapotaceae | Mohlatswa | Bark | Boiled for 5–20 minutes and one tin cup of extract is taken orally. Thrice a day | Diabetes mellitus | 19 | 54.28 |
| *Eucalyptus camaldulensis* Dehnh. (JKM22) | Myrtaceae | Mopilikomo | Leaf | Boiled for 5–20 minutes and one tin cup of extract is taken orally. Thrice a day | Tuberculosis | 35 | 100 |
| *Euphorbia maleolens* E. Phillips (JKM23) | Euphorbiaceae | Rofa-bja-Tau | Whole plant | Mixed with *Triumfetta* sp. (root), *Zanthoxylum humile* (root); pounded and 5 teaspoons taken orally with a bowl of soft porridge. Thrice a day | HI/AIDS | 17 | 48.57 |
| | | | | Boiled for 20 minutes and one tin cup of extract is | HIV/AIDS | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | taken orally. Thrice a day | | | |
| | | | | Mixed with *Myrothamnus flabellifolius* (entire plant); pounded and 5 teaspoons taken orally with a bowl of soft porridge. Thrice a day | HIV/AIDS | | |
| | | | | Mixed with *Triumfetta* sp. (root) and *Zanthoxylum humile* (root); pounded and 5 teaspoons taken orally with a bowl of soft porridge. Thrice a day | HIV/AIDS | | |
| *Ficus carica* L. subsp. rupestris (Hausskn.)Browicz(Dncir)(JKM24) | Moraceae | Mofeiye | Bark | Boiled for 10 minutes and one tin cup of extract is taken orally. Thrice a day | Tuberculosis | 30 | 85.71 |
| *Ficus platypoda* A. Cunn. ex Miq.(JKM25) | Moraceae | Unknown | Root | Boiled for 20 minutes and one tin cup of extract is taken orally. Thrice a day | Tuberculosis | 32 | 91.14 |
| *Geigeria aspera* Harv. var. *aspera*(JKM26) | Asteraceae | Makgonatsohle | Whole plant | Burned in a hut thrice a day; smoke is inhaled | Nose bleeding | 27 | 77.14 |
| *Helichrysum caespititium* (DC.) Harv. (JKM27) | Asteraceae | Bokgatha/ Mabjana/ Mmeetse | Whole plant | Boiled for 10–20 minutes or pounded and taken orally with a tin cup with warm water or a bowl of soft porridge. Thrice a day | Diabetes mellitus | 32 | 91.14 |
| | | | | Boiled for 20 minutes and one | Hypertension | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | tin cup of the extract is orally taken. Thrice a day | Blood purifier | | |
| *Hermannia quartiniana* A. Rich.(JKM28) | Malvaceae | Unknown | Root | Boiled for 20 minutes and one tin cup of extract is taken orally. Thrice a day | Diabetes mellitus | 32 | 91.14 |
| *Hypoxis hemerocallidea* (Fisch.) Mey. & Avé–Lall (JKM29) | Hypoxidaceae | Titikwane / sesogadi | Tuber | Pounded and 5 teaspoons taken orally with a bowl of soft porridge. Thrice a day | HIV/AIDS | 33 | 94.24 |
| | | | | Boiled for 10 minutes and one tin cup of extract is taken orally. Thrice a day | Tuberculosis | 29 | 82.85 |
| *Hypoxis iridifolia* Baker (JKM30) | Hypoxidaceae | Monna maledu, modiboya | Root | Boiled for 5–10 minutes. One tin cup of extract is taken orally. Thrice a day | Diabetes mellitus | 27 | 77.14 |
| *Hypoxis obtusa* Burch. ex Ker Gawl. (JKM31) | Hypoxidaceae | Monna maledu/ Swikiri poo | Tuber | Boiled for 20 minutes and one tin cup of warm extract is administered by healer anally via fatal bulb syringe. Thrice week | Blood clotting | 25 | 71.42 |
| *Lippia javanica* (Burm. F.) Spreng. (JKM32) | Verbenaceae | Mosunkwane | Leaf | Boiled for 5 minutes and one tin cup of extract is taken orally. Thrice a day | Chest complain and tuberculosis | 30 | 85,7 |
| | | | | Burned in a hut thrice a day; smoke inhaled | Nose bleeding and tuberculosis | | |
| | | | | Deposited in hot water thrice a day; steam is inhaled | Tuberculosis | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Mentha* spp (JKM33) | Lamiaceae | Mominti | Whole plant | Crashed and smoked with a newspaper. Twice a day | Tuberculosis | 31 | 88.57 |
| *Merwilla plumbea* (Lindl.) Speta. (JKM34) | Hyacinthaceae | Sekakgopha | Leaf | Boiled for 5–10 minutes and one tin cup of extract is taken orally. Thrice a day | Diabetes mellitus | 21 | 60 |
| *Myrothamnus flabellifolius* Welw (JKM35) | Myrothamnaceae | Boka, fenya, Makgonatsohle/Tsoga | Whole plant | Burned in hut twice a day; smoke is inhaled | Nose bleeding | 15 | 42.85 |
| | | | | Boiled for 5–15 minutes one tin cup of the extract is taken orally. Thrice a day | Tuberculosis | | |
| | | | | Burned in a hut four times a day; smoke is inhaled | Tuberculosis | | |
| *Pelargonium* spp (JKM36) | Geraniaceae | Selumi | Root | Boiled for 10–20 minutes and one tin cup the extract is taken orally. Four times a day | Hypertension | 17 | 48.57 |
| | | | | Boiled for 20 minutes and undisclosed volume is taken orally. Thrice daily | HIV/AIDS | | |
| | | | | Pounded and six table spoons taken orally. Thrice daily with either warm water or porridge | HIV/AIDS | | |
| *Pellaea calomelanos* (Sw.) Link. var. *calomelanos*(JKM37) | Sinopteridaceae | Lehorometso | Root | Boiled for 15 minutes and one tin cup of extract is taken orally. Thrice a day | Tuberculosis | 13 | 37.14 |
| | Fabaceae | Mosehla | Bark | Mixed with *Elephantorrhiza* | HIV/AIDS | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Peltophorum africanum* Sond. (JKM38) | | | | *elephantina* (root) and boiled for 20 minutes. One tin cup of extract is taken orally. Thrice a day | | 31 | 88.57 |
| | | | | Boiled for 7 minutes and one tin cup of extract is taken orally. Thrice a day | Hypertension | | |
| *Salix mucronata* subsp. *capensis*(JKM39) | Salicaceae | Mmilo | Fruit | Six-10 fruits are taken orally as raw. Four times a day | Chest complain | 26 | 72,28 |
| | | | Seed and fruit | Pounded and 5 tablespoons are taken orally with a tin cup of warm water. Thrice a day | Tuberculosis | | |
| *Sclerocarya birrea* sub sp. *birrea* (JKM40) | Anacardiaceae | Morula | Bark | Mixed with *Drimia elata* (bulbs) and boiled for 5 minutes. One tin cup of the extract is taken orally. Thrice a day | Blood clotting | 32 | 91,41 |
| *Senna didymobotrya* (Fresen.) H.S. Irwin&Barneby(JKM41) | Fabaceae | Mothekele /Morotwa naditshoshi wa go ema | Leaf | Boiled for 10 minutes and one tin cup of the extract taken orally. Thrice a day | Blood clotting | 24 | 68,57 |
| *Siphonochilus aethiopicus* (JKM42) | Zingiberaceae | Serakulu | Rhizome | Boiled for 5 minutes; steam is inhaled | Asthma | 26 | 74,28 |
| *capense* (Thunb.) Harv.(JKM43) | Rutaceae | Senokomaropa | Leaf | Burned in a hut; smoke is inhaled. Twice a day | Nose bleeding and tuberculosis | 21 | 60 |
| *Carica papaya* L.(JKM44) | Caricaceae | Mophopho “wapoo” | Root | Boiled for 20 minutes and one tin cup of extract is | Diabetes mellitus | 29 | 82,85 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | taken orally. Thrice a day | | | |
| *Combretum hereroense* subsp. grotei(JKM45) | Combretaceae | Mokata, and Molepa | Seed | Burned in a hut thrice a day; smoke is inhaled<br><br>Boiled for 20 minutes and one tin cup of extract is taken orally. Thrice a day | Tuberculosis | 19 | 54.28 |
| *Euclea crispa* subsp. *crispa*<br><br>(JKM46) | Ebenaceae | Mokwere kwere | Root | Mixed with *Aloe falcata* (root) and boiled or 20 minutes. One tin cup of extract is taken orally. Thrice a day | HIV/AIDS | 17 | 48.57 |
| *Eucomis pallidiflora* subsp. *pole-evansii*<br><br>(JKM47) | Hyacinthaceae | Mathuba-difala | Bulb | Boiled for 5–8 minutes and one tin cup of extract is taken orally. Thrice a day<br><br>Mixed with *Ziziphus mucronata* (root) and boiled for 20 minutes. One tin cup of extract taken orally three thrice a day | Tuberculosis | 21 | 60 |