

Challenges facing indigenous medicinal knowledge management practices: A case of Ludewa District, Njombe, Tanzania

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ABSTRACT

Indigenous medicinal knowledge management practices are taken as essential tools that facilitates effective use of traditional medicine. These practices stand as foundation for availability and development of traditional medicine around the communities. Yet, Traditional Medicine is facing with significant challenges of community acceptance and trust. This study aims to assess the challenges of Indigenous medicinal knowledge management practices in Ludewa, District, Njombe Tanzania. Specifically, the study examines challenges facing indigenous medicinal knowledge management practices in Ludewa District. The study was guided by the Probst knowledge management model. A cross-sectional research design with a concurrent mixed-method approach was used. The target population for the study comprised 29,864 Ludewa community members. However, 252 participants were studied and 8 traditional healers were interviewed. The study sample was selected using purposive, simple, and snowball sampling techniques. Collected data was coded on IBM SPSS version 27. Descriptive statistical analysis, such as mean, frequency, and percentages, was used and inferential statistics such as multiple linear regression was conducted. Findings revealed that challenges such as shortage of structured systems, secrecy, contempt for traditional healers, death of elders, and shortage of technological tools showed positive associations with the dependent variables, although, Migration among communities ($\beta = 0.205$, $p < 0.001$) statistically significantly predict challenges in indigenous medicinal knowledge management practices in Ludewa district, Similarly, occupation ($\beta = -0.108$, $p = 0.046$) had a statistically significant negative effect on indigenous medicinal knowledge management practices. Furthermore, the study emphasizes on the importance of indigenous medicinal knowledge protection, preservation, and sharing practices among communities to enhance usage of traditional medicine. The study recommends that Government should make much emphasizes on integrating traditional knowledge systems that is found from all local tribes into contemporary health services.

Keywords: Indigenous Medicinal Knowledge, Ludewa, Protection Practices, Preservation Practices, Traditional Medicine, Tanzania.

I. INTRODUCTION

Since time immemorial, across successive centuries, indigenous medicinal knowledge management practices have played a fundamental function in shaping, transforming, and sustaining human livelihoods (Carroll et al., 2025). Although their foundation and expression vary across different cultural and ecological contexts, through practices Indigenous communities have safeguarded and stewarded their indigenous medicinal knowledge for millennia (Mashoto, 2024). Practices remain extremely embedded within specific societies and traditions. Nonetheless, their cross-cutting nature has made them a critical resource for human development, significantly causative not only to crucial sectors such as agriculture, livestock keeping, fisheries, and environmental conservation, but also to the organization, preservation, and utilization of traditional medicine (Devi & Singh, 2022).

These Indigenous medicinal practices inherently intergenerational, having not invented from a single generation but rather evolving through the cumulative contributions of many generations over extended periods of time (Shi et al., 2022). They are not the product of a single moment in history, but instead represent medicinal knowledge systems developed progressively over thousands of years through continuous experience, observation, and adaptation (McGregor, 2021). As time advanced, these medicinal practices were refined, preserved, and transmitted, ultimately

contributing to the improvement and stabilization of human livelihoods and elevating the quality and organization of human life. These were not formally taught through classroom-based education; rather, they were acquired predominantly through observation, imitation, and experiential learning within community settings (Liheluka et al., 2023). Due to the absence of formal documentation systems, this knowledge was neither written nor systematically recorded, but instead preserved in human memory and transmitted orally across generations. Consequently, much of this knowledge lacks formal scientific validation, as it is rooted in indigenous worldviews, cultural experiences, and localized contexts rather than conventional scientific methodologies (Carroll et al., 2025),

Worldwide, Nations like China, United States, United Kingdom, have rapidly emerged in the use of traditional medicines, these countries have integrated natural medicines with formal health systems. Establishment of databases which contains all data, knowledge and expertise facilitates knowledge to be easily accessible, usable and serve millions of citizens (Bhoi et al., 2026). Despite global commitments on sustainable use of traditional medicine, majority have relied on wild edible plants, especially fruit species, as key sources of health systems (Ouma, 2022).

In Africa, countries like, Ghana, Kenya, Uganda, Nigeria, Tanzania and many other places, there has also been a large use of traditional medicines (Ngonyani et al., 2025). Although challenges have continued to emerge in these countries at a rapid pace as well, the continued use of these medicines has been controversial due to the fact that the preservation of medicinal knowledge has been a challenge (Malekani, 2022). A nation like Tanzania, is made up from different ethnic groups, traditions and customs and all of these have been the cause of major challenges in the preservation of medicinal knowledge and its use. Noteworthy limitations in environmental conservation factors such as exhaustive human activities including deforestation, National and international environmental policy frameworks have mutually contributed to challenges in the preservation and transmission of indigenous medicinal knowledge (Kibonde, 2020). Furthermore, population mobility, mechanization, infrastructure development, and nomadic pastoralism have further contributed the continuousness and accessibility of such knowledge and associated remedies). The mystery surrounding indigenous medicinal knowledge, dishonest practices in traditional healing, spiritual embargos, and deep-rooted cultural norms and customs, have contributed to the erosion and, in some cases, complete decline of sustainable utilization of traditional medicine (Alum, 2024).

Climatic variability manifested through drought, seasonal changes, delayed rainfall, or excessive precipitation has also negatively affected the availability of medicinal plants, thereby limiting access to traditional remedies (Ayeni et al., 2026). The intergenerational transmission of indigenous medicinal knowledge has become progressively uncertain in both rural and urban settings. Globalization and migration determined by trade and employment opportunities, have led to cultural interruption and loss of identity among many populations (Ouma, 2022). As a result, the continuity of cultural heritage, including traditional medicinal practices, has been significantly disrupted (Id & Blondin, 2020). Furthermore, development of formal Western education systems and extensive access of digital technologies and social media facilitates public awareness of modern healthcare options.

Therefore, indigenous medical practices are increasingly noticed as burdensome, particularly due to their complex preparation processes. Many individuals now prefer more accessible and standardized biomedical healthcare services (Kacholi, 2024). Regulatory authorities responsible for pharmaceutical oversight, research institutions, national policy frameworks, and ministries of health have, in many cases, revealed limited commitment in promoting the integration and validation of indigenous medicinal knowledge (Chigwada et al., 2025). Furthermore, communities doubt dosage standardization, formal classification of remedies, and the lack of officially recognized sources of traditional medicines. This resulted into significant challenges of community acceptance and trust. This study aims to assess the challenges of Indigenous medicinal knowledge management practices in Ludewa, District, Njombe Tanzania.

1.1 Statement of the Problem

Indigenous medicinal knowledge management practices is taken as a vital components that is embedded into daily life practices to facilitates restoration of human health (Omary et al., 2026). For centuries and centuries this practices developed competence based on diagnosis, healing, preventing and curing health related disorders found in a particular geographical context (Kibonde, 2020). Despite of the effectiveness of indigenous medicinal knowledge management practices and community reliance on traditional medicine, currently traditional medicine is facing with significant challenges of community acceptance and trust (Tugume et al., 2026). This resulted into substantial deny on medicinal knowledge practices, and higher reluctance of biomedical healthcare services among communities (Alum, 2024).

Previous studies done by (Alum, 2024) discusses about the role of indigenous knowledge in advancing the therapeutic use of medicinal plants, challenges and opportunities in Uganda, Study done by (Devi & Singh, 2022) discusses on the folk medicine among the Meitei: Cultural Significance, practices, and contemporary challenge in India. Study done by (Ayeni et al., 2026) concentrate on the challenges of collaboration between indigenous knowledge system

and scientific Knowledge System on biodiversity conservation in West Africa: a semi-systematic narrative review .Study done by (Mashoto, 2024) discusses on protection of rights of knowledge holders and practitioners of traditional medicine in Tanzania. There is little empirical studies that concentrates on challenges of indigenous medicinal knowledge management practices in Ludewa District Njombe Tanzania. So, this study focusses on assessing the challenges of indigenous medicinal knowledge management practices.

1.2 Research Objectives

- i. To assess indigenous medicinal knowledge management practices in Ludewa District, Njombe Tanzania.
- ii. To evaluate challenges facing indigenous medicinal knowledge Management practices in Ludewa District, Njombe Tanzania.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Probst knowledge management model

This is the model developed by Gilbert Probst, Steffen Raub, and Kai Romhardt in 1999 as a framework for managing knowledge. Gilbert et al. (1999) conceptualized the model into eight components of two internal and external phases. The internal phase is constructed by knowledge recognition (identification), knowledge obtaining (acquisition), knowledge development, knowledge sharing, knowledge usage (utilization), and preservation and maintaining the knowledge. The external phase includes the knowledge goals blocks and knowledge evaluation, which determines the cycle of knowledge management. Knowledge goals are the goals of knowledge that are actively determined at two strategic and operational levels within an organization. The theoretical framework, specifically Probst's knowledge management model. Therefore, this study will use four components from the internal phase of Probst knowledge management model, which are knowledge sharing, knowledge usage (utilization), knowledge maintaince(Protection) and knowledge preservation. Although Probst knowledge management model does not clearly explain the socio-demographic factors as challenges that influence indigenous knowledge management practices, it delivers an approach for examining different indigenous practices varies across different population group. In this study, socio-demographic characteristics are reflected as factors that may influence the model.

2.2 Empirical Review

2.2.1 Indigenous medicinal knowledge management practices.

Around the World, traditions and customs have been a major factor in identifying people from a particular community (Id & Blondin, 2020).The way indigenous communities practice agriculture, environmental preservation, usage of medicine, food, sports and games, ceremonies has created a sense of identity and greatly enhanced their value.

Study done by Kacholi (2024) revealed that availability of traditional medicines around the communities plays a significant role in improving health care. As it varies into practices communities identify, acquire, prepare and use this medicinal knowledge as the continuation from previous generations, Similarly study done by Mashoto (2024) show that the origin of this indigenous medicinal knowledge began from ancestors when they practiced, through demonstration and practical training they taught their children. Inherited communities acquire this knowledge and made it as their own.

Study done by Mbelebele et al. (2024) revealed that practices make the community easily identifiable, they have made life a certain pleasure, through daily practices People have been transferring this knowledge without even knowing it. Children have learned these techniques without even knowing they are learning. Also, informal practices of transferring knowledge to people have made knowledge to be acquired easier, people do not need classrooms learning, or informal conversations of people, traditional ceremonies, dances and community meetings have led knowledge to be transferred easily. Similarly, study done by Gichuru et al. (2025) revealed that demonstration and mentoring practices have led people to learn and develop the use of traditional medicine, custodians of traditional medicine have learned through training. This training made these custodians to become aware on preparing, digging, planting, identifying and knowing the exact measurements and doses. Therefore, when emergence disease occurs, it is easy to ask others. Despite of communities to stand as custodians of traditional medicine, through daily indigenous practices, this indigenous medicinal practice critically varies with geographical context, and tribes, each community comprises with their medicinal practices regarding to their originality. Furthermore, although various studies have been conducted worldwide, there is a lack of empirical research on the relationship among indigenous medicinal practices based on geographical zones, tribes and different ethnic groups.

2.2.2 Challenges facing indigenous medicinal knowledge Management practices

Globally, challenges related to indigenous medicinal knowledge are not uniform, they vary consecutively depending on ecological, cultural, and socio-economic context (Alum, 2024). In many African countries, including Tanzania, indigenous medicinal knowledge is largely stored mentally and transmitted informally through oral systems (Sultana et al., 2018). This practice makes this venerable indigenous knowledge to be lost. Especially when elders who are custodians of medicinal knowledge pass away without sufficiently transferring their knowledge.

Study done by Mbelebele et al. (2024) revealed that lack of modern storage technologies and expertise restrict struggles to systematically document and preserve this knowledge, as a results of permanently loss and destruction. furthermore, study done by Ouma (2022) highlighted that formalization of indigenous medicinal knowledge is another challenge that hinder availability and continuous usage of this knowledge, registration and patenting the practices to most of African communities it is a challenge, although formal authorities are available concentrating much on registration of traditional healers and herbalist rather than imparting much effort on restructuring and preserving indigenous medicinal knowledge. Similarly, a study done by Chaudhuri (2015) emphasizes that many practitioners are hesitant to officialize indigenous medicinal knowledge due to variety of spiritual and cultural reasons. Others revealed that their medicinal knowledge is acquired through spiritual means so it is strictly prohibited to officialize as well as share to others.

In addition, there is growing confirmations that younger generation are increasingly disinterested in traditional medicinal practices. Many recognizes them as outdated, unscientific, or associated with superstition. The labor-intensive nature of preparing traditional remedies such as collecting, processing, and ad mistering herbal treatments further discourages youth engagement, especially when compared to the modern pharmaceuticals. Furthermore, study done by Bhoi et al. (2026) revealed that other challenges like regulatory authorities are also play a role. Currently awareness on the community level, on the preservation and usage of traditional medicine is not sufficient. Effort is exposed by international organization such as world health organization (WHO) who focuses much on preparation of training programs, seminars, and workshops, contrary to many developing countries remained limited due to resources constrains. Also, comprehensive databases for documenting and preserving medicinal knowledge is also challenge, this factor pose a challenge for integrating these two health systems, as a results traditional medicine to continue diminishing and paratheatrical medicine to shine as much. Furthermore, although various studies have been conducted worldwide, there is a lack of empirical research on the extent of indigenous medicinal knowledge management practices.

III. METHODOLOGY

3.1 Research Design

Across sectional research design was adopted were by data was collected at a single point of time. A concurrent mixed research approach was used in this study, where by Quantitative and qualitative data was collected at a single point of time then analysis is done separately. The study was adopted pragmatism research paradigm so as to allow solving practical solution of the problem.

3.2 Study Area

The study was carried out at Ludewa district Njombe Tanzania. According to 2022 Population and Housing Census, the population of Ludewa district was 128,520 people in 2022. The district is found between latitudes 10°06' & 10.10°00'S and longitudes 34°45' & 34.68°00'E. Ludewa district is bordered by Mbeya region to the southwest, Makete district to the west, Njombe district to the north while Ruvuma region borders Ludewa district to the southeast. The major economic activities of people in the district is peasant farming growing food crops (maize, beans, wheat) and cash crop (coffee) (Mgaya, 2020). These District was purposively selected because the district is home of diverse ethnic groups rich with traditional knowledge systems that are still actively used and respected.

3.3 Target Population

The target population of the study were community members from Ludewa district, and the unit of analysis were traditional medicine users from four wards included Lugarawa (9683), Mlangali (9434), Ugela (7376), Mkongobaki (3371) to make a total target population of 29,864 across all wards.

3.4 Sampling and sample size

The study uses purposive sampling techniques to select four wards and one village from each ward. The method was adopted due to the focus of assessing two wards which was found nearby health-related services which were Mlangali and Lugarawa and the villages were mdilidili and Lusala and two wards which are far from health-related

services which are Mkongobaki and Ugela and the villages were Ikowo and Maholongwa. The respondents (beneficiaries) were purposefully selected because of their availability, readiness, consent to participate in the study also, study focus much on the participants who use traditional medicine. In addition, Key informants were selected using simple random sampling, which involve the use of excel randomization program. The researcher uses a list of practitioners (traditional healers) names from registered traditional healers' leader of the Ludewa District, and entered into Ms. Excel. A randomization process then took place to create the list of respondents for non-registered traditional healer's researcher uses snowball sampling. The Israel table for sample size determination was used to get a sample for this study. The table provides guidelines for determining an appropriate sample size for a given population size and desired confidence level. According to Israel sample size table, if a precision of $\pm 7\%$ is chosen when the population is 29,864 this justifies the sample used in this study which is 252.

3.5 Data Collection Instruments and procedures.

Data was collected using questionnaire and interview methods. A total of 252 questionnaires were distributed. Additionally, semi-structured interviews were conducted with a total of eight (08) key informants, two from each ward. The study utilized both quantitative and qualitative methods. Quantitative method was used to collect numerical data, while qualitative methods were employed to collect non-numerical data. Quantitative data were collected using a semi structured questionnaire, and qualitative data were collected by using interview guide

3.6 Data Analysis.

Quantitative data were analyzed using IBM SPSS version,27, Descriptive statistics, such as the mean, were used to analyze the indigenous medicinal knowledge management practices, while the influence of challenges on indigenous medicinal knowledge management practices was analyzed by using multiple linear regression. In addition, Qualitative information from Key Informant Interview was conceptualized, summarized, and analyzed using content analysis.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_{21} X_{21}$$

Where:

Y = Indigenous Medicinal Knowledge Management Practices index score

β_0 = Interception

$\beta_1 \dots \beta_{11}$ = Régression coefficients

X1 = Little interest from youth

X2 = Poor documentation

X3 = Death of elders

X4 = Shortage structured systems

X5 = ICT facilities/ tools

X6 = Government Policy

X7 = Intellectual property right

X8 = Western life style

X9 = outdated

X10 = Collaboration

X11 = Secrecy

X12 = Religious Influence

X13 = Local beliefs

X14 = Disrespect Traditional healers

X15 = Migration among communities

X16 = Years lived in the community

X17 = Age

X18 = Gender

X19 = Education Level

X20 = Occupation

X21 = Religion

(Before running multiple linear regression analyses, key assumptions were tested to ensure the model's validity. Multicollinearity was examined using Variance Inflation Factors (VIFs) and Tolerance values; autocorrelation was assessed using the Durbin-Watson statistic.

3.7 Ethical Considerations

Ethical issues were taken into consideration where by research follow and adhere all required principles for data collection and privacy of respondents. The study was ensured the validity of an instrument by borrowing the already validated instruments from other studies, after editing researcher submit the tool to academic supervisors to confirm the consistency of the tool, and enhancing the overall validity of the research results. The validation process also involved piloting the instrument with a small sample of 30 respondents from Kinole village which have same indigenous characteristics with Ludewa District. Reliability of the instrument was assessed using Cronbach's Alpha (α), a widely used measure of internal consistency. The instrument was subjected to a pre-test on a few participants, and reliability was calculated based on the pretest data. A Cronbach's Alpha score of $\alpha = 0.972$ was achieved, indicating a high level of internal consistency. This ensured that the instrument produced stable and consistent results across repeated trials.

IV. FINDINGS & DISCUSSION

4.1 Demographic Characteristics of respondents.

This section aims to presents the demographic characteristics of the study respondents. Understanding the characteristics of the sample population provides important context for the study findings, especially in relation to challenges of indigenous medicinal knowledge management practices. The demographic information provides a picture of participants from four selected wards of Ludewa district Njombe, Tanzania, the findings indicate that 132 (52.8%) Majority of the respondents were male and 120 (47.2%) were female. This gender imbalance may mirror the indigenous medicinal practices is highly practiced by male compared to female due to the fact that indigenous medicinal knowledge management practices is performed in high risk related environment (wild places) so the environment does not fever women to practices medicine (Ngonyani, et al. 2025). Moreover, most of respondents were between 31-35 years of age, this revealed that the dominance of youth in indigenous medicine practices reflect the reality of Tanzania population census 2022 (URT, 2022) which indicate that majority of Tanzanians were youth. Most of respondents 75 (29.8%) lived in the community between 11-20, This distribution shows that there is a migration process among communities due to urbanization, trade and educational purpose. And most of respondents 105 (41.7%) attain secondary education, this indicate that majority are educated they are aware on the essential factor regarding health-related matters that's why participation on the study is higher.

Table 1

Demographic Characteristics of respondents

Variable		Frequency	Percentage
Wards	Mkongobaki	70	27.8%
	Lugarawa	90	35.7%
	Mlangali	42	16.7%
	Ugela	50	19.8%
Age	18-25	61	24.2%
	26-30	53	21%
	31-35	71	28.2%
	36-40	25	9.9%
	41+	42	16.7%
Age lived in a community	Years 0-5	66	26.2%
	Years 6-10	61	24.2%
	Years 11-20	59	23.4%
	Years 20-40	32	12.7%
	Years 41+	34	13.5%
Sex	Male	132	52.8%
	Female	120	47.2%
Education level	No Formal Education	18	7.1%
	Primary	64	25.4%
	Secondary	105	41.7%
	Tertiary	65	25.8%
Occupation	Business personnel	47	18.7%
	Farmer	128	50.8%
	Government employee	48	19.0%
	Student	26	10.3%
	Elder/Herbalist	3	1.2%

Religion	Christianity	210	83.3%
	Islam	40	15.9%
	Traditional beliefs	2	.8%
Experience	Years 0-5	67	26.6%
	Years 6-10	63	25.0%
	Years 11-20	75	29.8%
	Years 20-40	24	9.5%
	Years 41 +	23	9.1%

4.2 indigenous knowledge Acquisition.

This section presents sources of indigenous medicinal knowledge. The respondents were asked to indicate the sources from which they acquired indigenous medicinal knowledge. Findings indicate that 76(30.2%) of respondents acquired indigenous medicinal knowledge from elders, 67(26.6%) acquired medicinal knowledge from Family members, 60(23.8%) acquire medicinal knowledge from peers / friends. This indicate that the main custodians of indigenous medicinal knowledge are elders who pass down this medicinal knowledge to family members and family members shares this knowledge to their peers. During interview one of the traditional healers recommend that *“Amakoda kavele molofyi sana,kikhiyotelwa hofyo hofyo tu mmashamba ka khunyumba vanu vitumila tu khatali avasee vatulondelaka” traditional medicine are so many with variety of species are just found around home gardens communities use to treat themselves, elders take it for us.*”(Traditional healers 4th February 2026).

This postulates that safeguarding and sharing of indigenous medicinal knowledge is important factor globally, it does not preserve the cultural heritage of the particular context only rather contributes significantly global knowledge base. Communities passed down traditional medicinal knowledge orally, as from families, clans and communities' knowledge is passed down via informal discussions, and other communal gatherings. Similarly study done by (Kibonde, 2020), revealed that elders are postulated to have with higher traditional medicinal knowledge compared to youth, elders have termed to be with long-term experience which is attained through cultural practices. Also, study done in India, revealed that greater effort about science is conducted on western or industrialized societies, here they put much effort on modern scientific and innovation, this factor is contrary to local science communities who focuses much on generating local knowledge base from elders and pass down orally from one generation to another (Chaudhuri, 2015).This indicate that communities accumulate medicinal knowledge from elders and utilize it for health benefit, as family members focus on observing practical demonstration from medicinal custodians' members also become competent in finding and using traditional medicine. In similar vein, elders as the custodians of medicinal knowledge have long employed their expertise and build up the repository of indigenous medicinal knowledge for years and years, this heritage of indigenous medicinal knowledge are passed down to other members of families (Alum, 2024). As it is acquired from accumulated wisdom of elders which is developed through close contact with natural environment, guided through practical experience, observation and cultural necessities, it is disseminated to neighbors and peers once there is emergence of illness.

Table 2

How indigenous medicinal knowledge is acquired

Indigenous knowledge acquisition					
Sources	Not at all	Rarely	neutral	frequency	Very frequency
Elders	38(15.1%)	24 (9.5%)	42(16.7%)	72(28.6%)	76(30.2%)
Family members	34(13.5%)	51(20.2%)	53(21.0%)	67(26.6%)	47(18.7%)
Friends / peers	30(11.9%)	48(19.0%)	56(22.2%)	58(23.0%)	60(23.8%)
Traditional healers/ herbalist	100(39.7%)	47(18.7%)	30(11.9%)	34(13.5%)	41(16.3%)

4.2.1 Indigenous medicinal knowledge management practices

This section aims to presents indigenous medicinal knowledge management practices in Ludewa District. below are three components of indigenous medicinal knowledge management practices which are knowledge sharing practices, knowledge preservation practices and knowledge protection practices. Findings from knowledge sharing practices indicate that 73(29.0%) of respondents show that peer learning on social cultural events are the major sharing practices in Ludewa district. Followed by 57(22.6%) indicate that community of practices is the following practices that facilitates medicinal knowledge to be shared. This implies that active socialization has positive significant in facilitating knowledge sharing in the community, furthermore. Findings from knowledge preservation indicates that 62(24.6%) of respondents preserve indigenous medicinal knowledge via Taboos and rituals so as to protect knowledge from being lost or forgotten. Followed by 63(25.0%) indicate that the use databases in preservation of medicinal knowledge ensures

continuous use of traditional medicine. This postulates that taboos and rituals are the essential components in a particular community that insist community to follow their customs and its related practices such as traditional medicinal practices. Furthermore, findings from protection practices indicate that majority 75(29.4%) of respondents shows that traditional healers and other community members face challenges when trying to formally register or protect their knowledge. Followed by 72(28.6%) of respondents indicate that majority are aware of communal regulations, and taboos for protecting indigenous medicinal knowledge. This indicates that during protection of indigenous medicinal knowledge community are facing with a lot of challenges to make indigenous medicinal knowledge formal as they are aware of legal frameworks but the application of this framework is still challenging.

This result postulates that socialization are essential means of sharing indigenous medicinal knowledge. In indigenous societies, traditional ceremonies promote socialization and togetherness. Though social cultural events communities stay together and exchange indigenous techniques, practices and proper usage of traditional medicine. Through this informal means people are not formally share what they have, but this juncture creates rooms of sharing indigenous medicinal knowledge. This is consistent with study conducted in Iran revealed that the longstanding histories and the different ethnic groups, races and languages facilitates different indigenous medicinal experiences and beliefs. This experiences raised from several factors includes communal gatherings and celebrations which acts as a point of socialization and improve oral communication (Nejat et al., 2021). This means that though meetings and communal congregations people from different clans, beliefs, and experience constituted with greater chance of sharing indigenous medicinal knowledge once they meet, experiences makes communities to be competent, this competence build confidence of using traditional medicine.

Furthermore, taboos and rituals protect knowledge from being lost or forgotten. Also, databases are the essential tool used in recording indigenous medicinal knowledge. This postulates that for centuries and centuries, medicinal knowledge has emerged across the globe, indigenous society has with greater association and experience to specific traditional, culture and even spatial to a certain environment. This uniqueness of indigenous medicinal knowledge is preserved in the mindset of people, resulting into being forgotten and lost (Sultana et al., 2018). Taboos and rituals that are really embedded from a certain cultural context facilitate remembrance of indigenous medicinal knowledge and critically reminding up the usage of traditional medicine. This is similarly to study done by Kacholi (2024) revealed that traditional medicinal knowledge as any knowledge originated from local context it includes know how, skills, innovation, practices and learning. This knowledge is embedded in the particular traditional lifestyle of a community, as it is not codified in the particular format it is preserved in the mindset of people, resulted into lost and deterioration. Currently presence of information and communication technology facilitate communities to preserves indigenous medicinal knowledge via databases to allow safe preservation and sharing of indigenous medicinal knowledge. This indicates that although indigenous medicinal knowledge has been generated over years and years, poor preservation measures facilitate deterioration to take over for years also. The emergence of ICT stimulates worthily preservation of indigenous medicinal knowledge, where community have assurance of accessing and using the knowledge for all most life time.

Furthermore, Community face challenges when tries to formally register indigenous medicinal knowledge. Also, majority reported to be aware of legal frameworks for protecting indigenous medicinal knowledge. This postulates that indigenous communities are the owners of medicinal knowledge. Through daily practices, life experiences and interactions with environment, communities become competent enough in practicing and holding this medicinal knowledge. The holded knowledge it is informal; it is not constituted in a logical and structured format therefore, following registration it is challenge. Also, registration process needs elites person, payment of fees, accessing electronic systems, long-distance travelling, and the registration process are not accommodated within a single day, this factor seems to be challenge for many knowledge holders. During interview one of traditional healers stated that

“khuuma khatali niwa nilola kwa fitendo tu, nimanyile ngodo khuyandika finofi nielewa kwakulola tu” Since I stated this practices I only learn through observation, I don't know to how to read properly, so through observation I understand” . (Traditional healers 4th February 2026).

“Unene nisomile ngodo, khuyandikha kene mambo kamadawa nilemwa, ifinu vyakisasa khupata ivele sida na avana vangu vibela viyokopa mambo kautamaduni, lino baasi y akene madawa nivangile khusemwa” I am not attended to school, idont know how write, acceseing technological infractructure it is a challenge to me, my children rejected traditional medicine practices, currently some of medicine and how to practice I starts forgetting. (Traditional healers 4th February 2026).

This is consistent with study done by (Mashoto, 2024) revealed that Tanzania traditional medicine act, 2002 stated that any medicinal products, services and practices must be licensed so as to be officially known and controlled. This factor promotes challenges for almost high number of traditional medicinal custodians. Majority faces challenges in registration of this knowledge due to higher cost of registration, heavy and bureaucratic registration process.

Therefore, study recommends that implementation of policies must be embedded with rising of awareness among knowledge holders, they supposed to understand critically the process of registration and benefits arises from the process rather than forcing communities to participate without understanding the process

Table 3*Indigenous medicinal knowledge management practices*

Indigenous medicinal Knowledge sharing practices	SD	D	N	A	SA
Mentorship and Apprenticeship	57(22.6%)	40(15.9%)	60(23.8%)	54(21.4%)	41(16.3%)
Cultural practices and storytelling	44(17.5%)	47(18.7%)	72(28.6%)	51(20.2%)	38(15.1%)
Community of practices.	42(16.7%)	35(13.9%)	65(25.8%)	57(22.6%)	53(21.0%)
Peer learning	31(12.9%)	40(15.9%)	58(23.0%)	73(29.0%)	50(19.8%)
Demonstration and practical training.	49(19.4%)	52(20.6%)	52(20.6%)	50(19.8%)	49(19.4%)
Indigenous medicinal Knowledge preservation practices	SD	D	N	A	SA
Notebooks or personal records	87(34.5%)	48(19.0%)	55(21.8%)	33(13.1%)	29(11.5%)
Local symbols	71(28.2%)	45(17.9%)	70(27.8%)	47(18.7%)	19(15.1%)
Oral histories and songs	60(23.8%)	40(15.9%)	62(24.6%)	59(23.4%)	13(12.3%)
video recordings	60(23.8%)	38(15.1%)	69(27.4%)	51(20.2%)	34(13.5%)
Taboos and rituals	58(23.0%)	36(14.3%)	51(20.2%)	62(24.6%)	45(17.9%)
Data bases	39(15.5%)	43(17.1%)	54(21.4%)	63(25.0%)	53(21.0%)
Indigenous medicinal Knowledge protection practices	SD	D	N	A	SA
Legal frameworks	36(14.3%)	34(13.5%)	56(22.2%)	60(23.8%)	66(26.2%)
Formal registration,	30(11.9%)	28(11.1%)	65(25.8%)	75(29.4%)	55(21.8%)
Communal regulations, and taboos	27(10.7%)	34(13.5%)	87(34.5%)	72(28.6%)	32(12.7%)
Healers Secrecy	33(13.1%)	38(15.1%)	64(25.4%)	72(28.6%)	45(17.8%)
community property	59(23.4%)	53(21.0%)	60(23.8%)	48(19.0%)	32(12.7%)
Non-commercial use.	45(17.9%)	33(13.1%)	69(27.4%)	45(17.9%)	45(17.9%)

4.2.2 Challenges of indigenous medicinal knowledge management practices

The respondents were asked to indicate the challenges of indigenous medicinal knowledge management practices in Ludewa District. Findings indicate that 73(29.0%) lack of appropriate intellectual property right to govern indigenous medicinal knowledge. Followed by 70(27.8%) who reported that Government policies does not pay attention on formal sharing of indigenous knowledge on traditional medicine. Then 68(27.0%) of respondents show that traditional medicine is little documented and preserved, and young people show little interest in practicing indigenous knowledge of traditional medicine. Followed by 66(26.2%) who indicate that lack of collaborations between traditional and modern medicine practitioners, 62(24.6%) of respondents indicate that there is lack of ICT facilities to share and preserve indigenous knowledge in traditional medicine (Parliament of the United Republic of Tanzania, 2002). This indicate that formal means of sharing and preserving indigenous knowledge of traditional medicine is a great challenge especially in rural context where ICT infrastructure is not available (Iwata, 2024).

This indicates that protection of medicinal knowledge is essential aspect that need to be kept in action. Currently there is no formal process for protecting medicinal knowledge in many rural settings. Also, there is disappointment from traditional intellectual property systems which deals with protecting knowledge generated by local communities Omary et al. (2026). Community perceives that Patents, copyrights, trademarks were special for western societies, indigenous medicinal knowledge is taken as the community-based knowledge, passed down orally from generation to generation. This resulted into lack of fit between traditional intellectual property systems and traditional medicinal knowledge. This indicates that there is a need for several international and regional efforts to create legal and regulatory frameworks to ensure sustainable use of traditional medicine. Similarly, to study done by Mashoto (2024) who explore that legal and policy frameworks concerning protection of indigenous medicinal knowledge need to be assessed effectively. Knowledge from a particular context need to be kept with people who is originated in a particular geographical context. Any form of recognition either financial or otherwise be accorded to the individual or community by commercial firm who use their knowledge. In addition, Knowledge act as a source of power, needs to be respected and recognized, through any official process all custodians of traditional medicinal knowledge who acts as the main beneficiaries of this knowledge they have rights of being benefited.

Furthermore, study done by Mashoto (2024) revealed that in Tanzania government council of traditional and alternative medicine which is responsible for registration and monitoring of traditional medicine services, including management and controlling safe use of traditional medicine products, under TMDA stands for trial and approval of medicinal products (Parliament of the United Republic of Tanzania, 2002). This government entities focuses much on registration and approval of medicinal product but proper way of sharing knowledge is still a challenge to majority of indigenous community. This indicate that government should create a way forward to emphasize sharing and preservation of medicinal knowledge in local communities.

Furthermore, study conducted by Alum (2024) postulate that indigenous medicinal knowledge is based on flora and fauna, other countries like Ethiopians put greater efforts to document medicinal practices but majority of communities in Sierra-Leone and Nigeria, facilitates indigenous medicinal knowledge to be preserved via community stewardship, this indicate that nature of indigenous knowledge as it has been obtained locally also most of practices are preserved locally. In same line, Alum (2024) explore that despite of ancestral knowledge to be preserved in the community mindset, this indigenous medicinal knowledge faces challenges including contemporary globalization, urbanization, and erosion of native language which kills the interest of young generation to practices traditional medicinal therapies. This shows that our cultural practices are highly diminished due to existence of western culture, process of urbanization and migration. Efforts should be made to make traditional medicine formal, these practices will enhance accessibility and promote sustainable use. Study done by Ikhoyameh et al. (2024) explore that formulating collaborative link between traditional and modern medicine will be a strategy that will harmonize the accessibility and improve sustainable use of traditional medicine, although records shows that formal medicinal professional show little interest in engaging with traditional medicine experts. Efforts should be made to unit this two groups and work in silos allowing this medicinal knowledge to be shared and improve healthcare. This indicate that government should create initiatives to ensure these two joints are becoming a single entity, while the choice of usage will remain to the beneficiaries. In similar vein study done by Ikhoyameh et al. (2024) also explore that there is a need of resources to facilitate scientific validation of medicinal knowledge. This includes effective polices, that facilitate proof of local medicinal knowledge practices. Furthermore, the advancement of science and technology facilitate accessibility and use of traditional medicine. Through establishment of ICT tools knowledge is preserved in the matter that it can't be lost for years and years. Study done by Beebwa et al. (2019) revealed that there is a massive increase in the use of technological devices such as smartphones, computers, and internet in Tanzania (TCRA) report of 2017. Although the usage is higher but there is less effort in digitizing this indigenous medicinal knowledge so that it can be accessed via electronic devices. Similarly, study done by Iwata (2024) explore that although communities owned smartphones, and other devices, their use was obliged by financial limitations, insufficient ICT skills, and inadequate technological infrastructure. Despite of these challenges, Communities recognized the significance of using ICT in supervision of indigenous medicinal knowledge and expressed readiness to use it. However, ICT was not fully applied in management of such knowledge in Tanzania. Improving ICT infrastructure, implementing targeted training programmes for communities, and establishing clear policies and guidelines for ICT use in managing indigenous medicinal knowledge are recommended.

Table 3
challenges of indigenous medicinal knowledge management practices

Statement	SD	D	N	A	SA
Little Interest from youth	35(13.9%)	44(17.5%)	62(24.6%)	68(27.0%)	43(17.1%)
Poor documentation	27(10.7%)	36(14.3%)	63(25.0%)	58(23.0%)	68(27.0%)
Death of elders	33(13.1%)	43(17.1%)	54(21.4%)	61(24.2%)	61(24.2%)
No structured systems	23(9.1%)	42(16.7%)	60(23.8%)	66(26.2%)	61(24.2%)
ICT Facilities/ tools	25(9.9%)	41(16.3%)	57(22.6)	67(26.6%)	62(24.6%)
Government policy	40(15.9%)	46(18.2%)	63(25.0%)	70(27.8%)	33(13.1%)
Intellectual property right	33(13.1%)	35(13.9%)	66(26.1%)	73(29.0%)	45(17.9%)
Western lifestyle	46(18.3%)	35(13.9%)	69(27.4%)	55(21.8%)	47(18.7%)
Backward or outdated	59(23.4%)	53(21.0%)	60(23.8%)	48(19.0%)	32(12.7%)
Collaborations	36(14.3%)	34(13.5%)	56(22.2%)	60(23.8%)	66(26.2%)
Secrecy	100(39.7%)	47(18.7%)	30(11.9%)	34(13.5%)	41(16.3%)
Religious influence	71(28.2%)	45(17.9%)	70(27.8%)	47(18.7%)	19(15.1%)
Local beliefs	23(9.1%)	42(16.7%)	60(23.8%)	66(26.2%)	61(24.2%)
Disrespect traditional healers	87(34.5%)	48(19.0%)	55(21.8%)	33(13.1%)	29(11.5%)
Migration among communities	38(15.1%)	24 (9.5%)	42(16.7%)	72(28.6%)	76(30.2%)

4.3 Summary of indigenous medicinal knowledge management practices

This subsection presents a summary of indigenous medicinal knowledge management practices. Table 04 presents the summary for indicators of indigenous knowledge management practices in Ludewa District. The results revealed that three indicators, such as sharing practices (mean=3.0690), preservation practices (mean=2.8261), and protection practices (mean=3.2364) have differences mean scores, meaning that indigenous protection practices recorded to have highest mean score, followed by sharing practices while preservation practices had the lowest mean score. Meaning that the overall mean score was 3.04(SD=0.84) indicating a moderate level of indigenous knowledge practices. Although there is a moderate level of all this practices but protection practices seem to have higher mean score compared to others. Meaning that Ludewa communities practices protection practices than all other practices. This result is consistent with traditional and alternative act of 2002,14 no.23 which provides detailed explanation about protection practices which is registration process, including registration and monitoring of traditional medicine services, management and controlling safe use of traditional medicine products, under TMDA stands for trial and approval of medicinal products. For traditional healers in Ludewa district, most of traditional healers are reported to register the business.

Table 4

Summary of indigenous medicinal knowledge management practices

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Sharing Practices	252	1.00	5.00	3.0690	1.06617
Preservation Practices	252	1.00	5.00	2.8261	.99604
Protection Practices	252	1.00	5.00	3.2364	.97572
TOTAL_ID	252	1.00	5.00	3.0438	.84388
Valid N (listwise)	252				

4.4 The influence of challenges on indigenous medicinal knowledge management practices.

This subsection focuses on the influence of challenges on indigenous medicinal knowledge management practices in Ludewa district. Table 8 presents these influences, including the challenges and socio-demographic factors. Multiple linear regression was conducted to examine the influence of challenges on indigenous medicinal knowledge management practices in Ludewa district. The model revealed significant results, with p-values less than 0.005, indicating that challenges are significantly influence indigenous medicinal knowledge management practices. Based on the multiple regression results, fifteen challenges and demographic characteristics were examined, two predictors are statistically significant at the 5% level for challenges of indigenous medicinal knowledge management practices variable. Migration among communities ($\beta = 0.205$, $B = 0.129$, $t = 3.322$, $p < 0.001$) are statistically significantly predict challenge in indigenous medicinal knowledge management practices in Ludewa district, Similarly, occupation had a statistically significant negative effect on indigenous medicinal knowledge management practices ($B = -0.100$, $\beta = -0.108$, $t = -2.007$, $p = 0.046$). This finding indicates that factors such as shortage of structured systems, secrecy, disrespect for traditional healers, death of elders, and shortage of technology showed positive associations with the dependent variables, their effect were not statistically significance.

This implies that migration among communities is the most vital challenge influencing indigenous medicinal knowledge management practices in Ludewa district. This indicates that population movement may contributes to the loss of knowledge, Knowledge is transmitted in the context where people get to know each other, and share common goal. The vise versa, encourage resistance on sharing knowledge. Furthermore, migration makes communities who originated from different tribes, religions, origin, and customs to live under same geographical context, transmission process of medicinal knowledge become challenge due to lack of relationship among community members. This finding is consistent with the study that has been done by Ouma (2022) who revealed that transfer of indigenous medicinal knowledge to the new generation of traditional medicinal practitioners takes places through place-based intergenerational learning processes, which are increasingly challenged by intensified rural–urban migrations and accelerating biodiversity loss. Furthermore, occupation is one of the challenges that significantly influence indigenous medicinal knowledge management practices in Ludewa district. Occupation such as government employee, students, business personnel seem to have challenges in indigenous medicinal knowledge management practices due to nature of activity, nature of people, and context to whom they come from, this factor makes this indigenous medicinal knowledge management practices to be practiced and taken into little consideration. Contrary to occupation such as farmers, herbalist or traditional healers have significantly influence on indigenous medicinal knowledge management practices. Research conducted in the Kilombero Valley found that traditional medicinal knowledge is closely associated with

people's occupation and daily dependence on natural resources. Individual who engages in farming and traditional healing process possess indigenous medicinal knowledge because of their regular interaction with medicinal plants and local ecosystems (Salinitro et al., 2017).

Table 5
influence of challenges on indigenous medicinal knowledge management practices.

Model Summary								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson			
1	.653 ^a	.427	.390	.65889	1.674			
Coefficients								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.481	.315		4.697	.000		
	Little Interest from youth	.057	.050	.087	1.140	.255	.414	2.416
	Poor documentation	-.017	.052	-.027	-.329	.742	.366	2.730
	Death of elders	.067	.050	.107	1.345	.180	.383	2.609
	Shortage of structured systems	.093	.058	.140	1.592	.113	.313	3.194
	ICT Facilities/ tools	-.005	.056	-.008	-.097	.923	.327	3.057
	Government policy	.022	.059	.033	.377	.706	.315	3.177
	Intellectual property right	.050	.058	.075	.866	.388	.318	3.146
	Western lifestyle	-.070	.059	-.105	-1.188	.236	.310	3.231
	Backward or outdated	.056	.063	.085	.885	.377	.260	3.846
	Collaborations	.080	.057	.125	1.397	.164	.300	3.339
	Secrecy	-.075	.058	-.117	-1.284	.200	.292	3.422
	Religious influence	.062	.051	.095	1.224	.222	.403	2.482
	Local beliefs	.009	.051	.014	.172	.864	.353	2.830
	Disrespect traditional healers	.091	.053	.136	1.701	.090	.376	2.661
	Migration among communities	.129	.039	.205	3.322	.001	.632	1.582
	Years Lived in the Community	.009	.047	.014	.183	.855	.419	2.389
	Age	-.051	.042	-.083	-1.202	.230	.509	1.963
	Gender	-.008	.085	-.005	-.099	.921	.922	1.084
	Education Level	.064	.054	.067	1.185	.237	.750	1.333
Occupation	-.100	.050	-.108	-2.007	.046	.832	1.202	
Religion	-.024	.109	-.012	-.224	.823	.905	1.106	
a. Dependent Variable: TOTAL_ID IMKMP Index								

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

Indigenous medicinal knowledge management practices face with several challenges that hinders its sustenance and growth. Results revealed that challenges such as shortage of structured systems, secrecy, disrespect for traditional healers, death of elders, and shortage of other technological tools showed positive associations with the dependent variables, although, Migration among communities statistically significantly predict indigenous medicinal knowledge management practices in Ludewa district, Similarly, occupation had a statistically significant negative effect on indigenous medicinal knowledge management practices. Furthermore, the study emphasizes on the importance of knowledge protection, preservation, and sharing practices among communities to enhance sustainable use of traditional medicine.

5.2 Recommendations

The study recommends that Government with the aid of policy makers should formulate policy that will align and strengthen local sharing, protection and preservation of indigenous medicinal knowledge within a geographical locality. Government should make much emphasizes on integrating indigenous medicinal knowledge systems into contemporary health services, this will enhance the relevance and sustainability of traditional medicine. Furthermore,

the adoption of technological solutions to monitor sharing of indigenous medicinal knowledge, the use of mobile phones particularly smartphones would facilitate continuity sharing of medicinal knowledge through direct communication, community of practices, other social media platforms and web-based platforms. Establishment of structured training programs, these initiatives should focus on building capacity for both traditional medicine beneficiaries and traditional medicine practitioners on the aspect of knowledge capturing, documentation, storage, sharing and protection and ethical use of indigenous medicinal knowledge. By empowering communities with these skills, it facilitates to safeguard indigenous medicinal knowledge from being lost and distortion.

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Declaration of Interest

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