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ORIGINAL RESEARCH article

Health-seeking pathways in the management of non-communicable diseases: Evidence from traditional medicine use in Iringa, Tanzania

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Abstract: Non-communicable diseases (NCDs) remain a major public health and clinical concern worldwide. In many parts of Africa, traditional medicine remains a vital source of primary healthcare. This study examines the role of traditional medicine in managing of NCDs within the Iringa Care Utilization Model and the concept of medical pluralism. The study assessed how individual perceptions, structural access conditions, and health needs interact to influence treatment choices. To evaluate the knowledge and practices of traditional healers, the types of remedies used, and patient perceptions regarding traditional medicine for NCD management. This study employed a cross-sectional design to examine health-seeking pathways for NCD management in Iringa Region, Tanzania. A mixed-methods, cross-sectional design was employed with 120 respondents, comprising 18 traditional healers and 102 patients. Quantitative data were gathered using structured questionnaires and analyzed using descriptive statistics, while qualitative insights were obtained through in-depth interviews and analyzed thematically. The majority correctly defined NCDs as non-transmissible conditions. The main risk factors identified were low awareness and sugar consumption. Traditional healers administered remedies via oral, topical, and inhalation routes, primarily using plants such as *Moringa oleifera, Psidium guajava*, and *Annona muricata*. While half of the respondents found traditional medicine effective and affordable, others expressed concerns about side effects and inconsistent dosages. Traditional medicine was commonly used alongside biomedical care rather than as a substitute, reflecting adaptive and pragmatic responses within a plural health system. This study demonstrates that traditional medicine forms an integral part of health-seeking pathways for NCD management in Iringa Region. These practices should be understood within a plural health system rather than framed as alternatives to biomedical care. Public health policies addressing NCDs should acknowledge medical pluralism and develop context-sensitive strategies that improve coordination, safety, and patient-centered care.

Introduction

Non-communicable diseases (NCDs) have emerged as a major public health challenge globally, accounting for over 70.0% of all deaths worldwide, with a rapidly increasing burden in low- and middle-income countries [1, 2]. In sub-Saharan Africa, health systems historically oriented toward infectious disease control are now confronted with the growing prevalence of chronic conditions such as hypertension, diabetes mellitus, and

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cardiovascular diseases, which require long-term and continuous care [3, 4]. The world is experiencing tremendous changes in weather conditions, which affect the distribution patterns of disease vectors and the occurrence of infectious diseases, emerging and re-emerging, as well as non-infectious NCDs [5]. NCDs, including cardiovascular disorders, diabetes, cancers, and chronic respiratory conditions, account for nearly 74.0% of global deaths annually [6-8]. Taking care of such ailments has a long-standing history, involving precolonial cultural and traditional healing, then modern synthetic drugs, and divine powers intertwined [9-12]. The use of traditional, or alternative, medicine is common worldwide [13]. In low- and middle-income countries, the burden is especially severe due to limited access to medical services and lifestyle transitions associated with urbanization [14].

Across Africa, traditional medicine has remained central to healthcare, particularly in rural and low-income settings. According to a WHO report [15], about 80.0% of the population in low-income countries relies on traditional remedies as their primary form of health care. In Ethiopia, for example, traditional healers' clinics play a significant role in treating many diseases, and people use traditional healers and traditional medicine as options to address health problems [16]. Also, the practice of Traditional Healers in rural Senegal suggests the need for collaboration among Traditional Healers, health professionals, and patients, given the increasing burden of NCDs in Sub-Saharan Africa [17]. In Tanzania, the use of traditional medicines and consultation with Traditional Healers are paramount, and people use traditional medicines alongside biomedical treatments. For NCDs, Traditional Healers are frequently consulted as the first point of care, providing affordable, culturally familiar care. Due to strong cultural beliefs and traditional practices, some tribes in Tanzania, such as the Hehe of the Iringa region, the Maasai of Arusha and Manyara, and the Sukuma around the lake zone, regard and rely on Traditional Healers and traditional medicine for NCDs and other disorders [18]. Thus, Traditional Healers make a significant contribution to the well-being of the societies they serve; however, their role in managing NCDs has not been well documented. The use of traditional medicine in the management of NCDs should not be interpreted as a rejection of biomedical care. Rather, it reflects medical pluralism, in which individuals navigate among multiple therapeutic systems based on perceived effectiveness, cultural legitimacy, illness experience, and structural constraints within the health system [19, 20]. Empirical studies across sub-Saharan Africa show that patients often combine biomedical treatment with traditional remedies, especially for chronic and poorly controlled conditions [21, 22]. Guided by the Health Belief Model (HBM) and the concept of medical pluralism, this study examines health-seeking pathways in the management of NCDs in Iringa Region, Tanzania. Specifically, this study was guided by the following objectives: Assess traditional healers' and patients' knowledge of NCDs, analyze treatment approaches employed by traditional healers, and explore patient perceptions toward traditional medicine use.

Theoretical Framework

The health belief model and medical pluralism: This study is guided by the HBM and the concept of medical pluralism to explain health-seeking pathways in the management of NCDs in Iringa Region, Tanzania. The HBM was first developed in the 1950s by social psychologists working within the United States Public Health Service, notably Irwin M. Rosenstock, in response to low uptake of disease prevention and screening programs. The model was later refined and formalized in the 1970s and 1980s to explain individual engagement with health-related behaviors [23, 24]. The HBM is grounded in the assumption that individuals' health decisions are shaped by subjective beliefs rather than objective medical knowledge alone. According to the HBM, health-related behavior is influenced by six core constructs: perceived susceptibility to illness, perceived severity of the condition, perceived benefits of taking action, perceived barriers to action, cues to action, and self-efficacy. In the context of chronic diseases such as hypertension and diabetes, individuals continuously assess the seriousness of their condition, the effectiveness of available treatments, and the

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barriers associated with sustained biomedical care. These perceptions strongly influence treatment choices and adherence behaviors. The HBM has been widely applied in public health research to examine preventive behaviors, treatment adherence, health service utilization, and chronic disease management across diverse cultural and socioeconomic contexts. In sub-Saharan Africa, the model has been used to explain health-seeking behaviors related to HIV, tuberculosis, maternal health, and increasingly, NCDs [25]. Its flexibility allows it to be adapted to settings where health decisions are shaped by both individual beliefs and structural constraints [26-29]. Despite its strengths, the HBM has notable limitations [30-32]. It places strong emphasis on individual cognition and may underplay the influence of social relations, cultural norms, and structural inequalities. The model assumes rational decision-making and may not fully capture collective or culturally embedded health practices. For this reason, reliance on the HBM alone may be insufficient in contexts characterized by pluralistic health systems and deep-rooted cultural traditions. To address these limitations, this study integrates the concept of medical pluralism, which recognizes the coexistence and interaction of multiple therapeutic systems within a single social setting [19]. Medical pluralism emphasizes that individuals do not operate within a single, unified health system but rather navigate between biomedical services, traditional medicine, spiritual healing, and informal care based on accessibility, affordability, cultural legitimacy, and experiential knowledge. In African contexts, medical pluralism is particularly relevant given the historical and ongoing significance of traditional medicine alongside formal biomedical services [20]. The integration of the HBM and medical pluralism provides a robust analytical framework for this study. While the HBM helps explain individual perceptions and motivations underlying treatment choices, medical pluralism situates these choices within broader cultural and structural contexts. Together, the two frameworks allow for a nuanced understanding of why individuals living with NCDs adopt plural health-seeking pathways, combining biomedical and traditional medicine in response to chronic illness, health system constraints, and lived experiences. The adoption of these frameworks is therefore highly relevant to the current study, which seeks to move beyond simplistic interpretations of traditional medicine use as either resistance to or ignorance of biomedical care. Instead, the study conceptualizes traditional medicine use as a rational, contextually grounded health-seeking strategy shaped by belief systems, past treatment experiences, and the realities of Tanzania's plural health system.

The Andersen health care utilization model: In addition to the HBM and the concept of medical pluralism, this study draws on the Andersen Health Care Utilization Model to explain patterns of health service use among individuals living with NCDs. The model was originally developed by Ronald M. Andersen in the late 1960s to explain factors influencing access to and utilization of health services [33, 34]. The Andersen Model posits that health service utilization is determined by three interrelated components: predisposing factors, enabling factors, and need factors. Predisposing factors include socio-demographic characteristics and health beliefs that shape individuals' propensity to seek care. Enabling factors are the resources and conditions that facilitate or constrain access to services, such as income, facility availability, distance, and affordability. Need factors reflect perceived and clinically evaluated illness severity, which directly influence treatment-seeking decisions. The model has been widely applied in public health research to examine health service utilization and access disparities, including in low-resource settings where structural constraints strongly influence health-seeking behavior. However, the Andersen Model primarily focuses on biomedical health services and may not fully capture culturally embedded forms of care such as traditional medicine. In the present study, the Andersen Model complements the HBM and medical pluralism by providing a structural perspective on access and utilization. While the HBM explains individual perceptions and motivations, and medical pluralism situates health-seeking behavior within a plural therapeutic landscape, the Andersen Model highlights the enabling and constraining factors that shape actual use of biomedical and traditional health services in Tanzania.

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Conceptual Framework

The conceptual framework for this study is informed by the HBM [23, 24], the Andersen Health Care Utilization Model [33, 34], and the concept of medical pluralism [19, 20]. The framework illustrates how individual perceptions, structural access factors, and health needs interact within Tanzania's plural health system to shape health-seeking pathways for the management of NCDs. At the individual level, predisposing factors such as age, sex, education, cultural beliefs, and health beliefs influence how individuals perceive susceptibility to and severity of NCDs, as well as the perceived benefits and barriers associated with different treatment options. These factors are central to the HBM, which emphasizes the role of subjective perceptions in shaping health-related decisions. At the structural level, enabling factors determine individuals' ability to access and utilize health services. Drawing on the Andersen Health Care Utilization Model, these factors include income, cost of care, distance to health facilities, availability of medicines, and the organization of health services. In resource-constrained settings, such factors significantly influence whether individuals rely on biomedical care, traditional medicine, or a combination of both. In addition, need factors, including the type of NCD, duration of illness, perceived severity, and previous treatment outcomes, shape treatment-seeking behavior by defining both perceived and evaluated health needs. Chronic and recurrent conditions often prompt individuals to explore multiple therapeutic options in search of symptom relief and long-term management. Within a plural health system, these predisposing, enabling, and need factors interact to produce diverse health-seeking pathways, including exclusive use of biomedical care, reliance on traditional medicine, or combined use of both systems. Medical pluralism provides the conceptual lens for understanding how individuals navigate between coexisting therapeutic systems that are culturally legitimate and socially embedded.

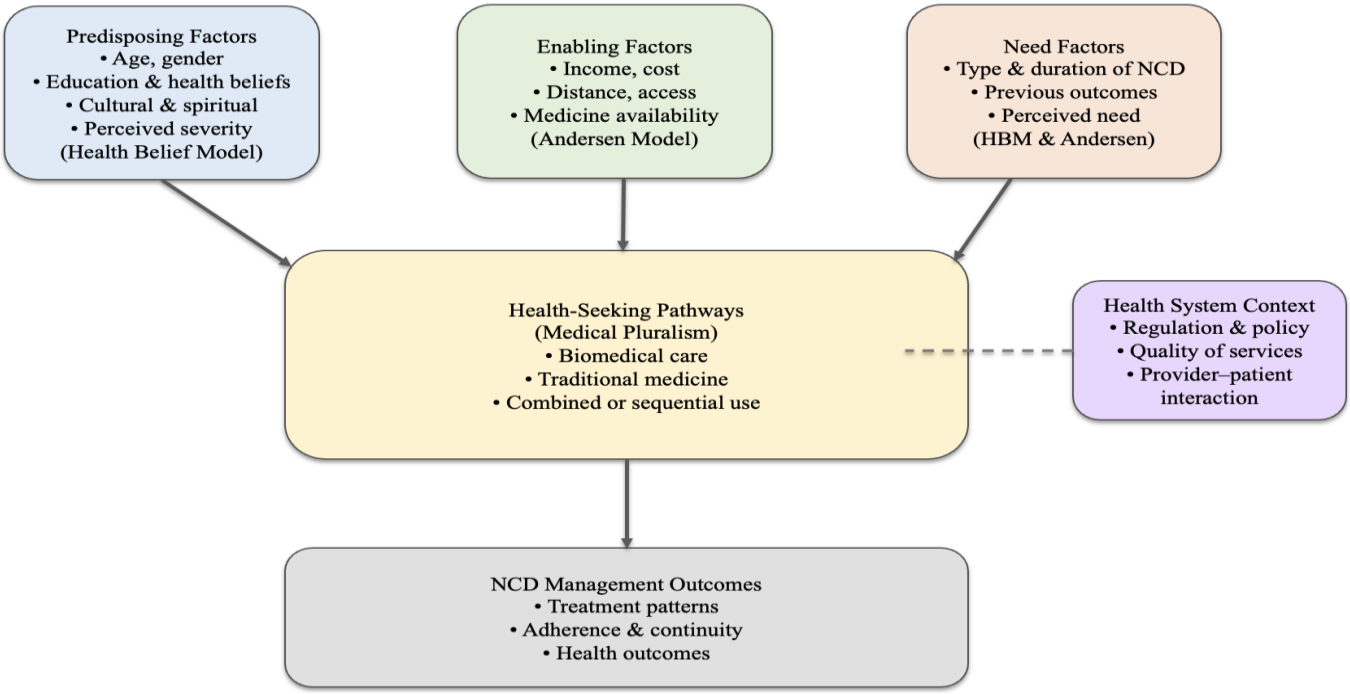

Figure 1: Analytical framework for health-seeking pathways in non-communicable diseases management in Tanzania (Source: Researchers, 2024)

The framework, therefore, conceptualizes the use of traditional medicine not as a rejection of biomedical care but as a rational and contextually grounded response to individual beliefs, structural constraints, and chronic health needs. These pathways ultimately shape patterns of NCD management and treatment outcomes in Tanzania.

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Materials and methods

Study area: The study was conducted in 12 wards within Iringa Municipality, located in the Southern Highlands of Tanzania. According to the National Bureau of Statistics, the municipality has an estimated population of 205,649 [35]. The area has an average annual temperature of 18.5°C and receives about 704 mm of rainfall. Iringa region is famous for the harvesting and processing of natural bamboo juice into local beverages, including alcohol, which is affordable and easily distributed at homes and almost every local pub. Thus, consumption of such beer is high, catalyzed by the region's cold weather. The cold weather, alcohol consumption, and unhealthy dietary practices make people inactive, hence, prone to NCDs disorders.

Study design and participants: This study employed a cross-sectional design that integrated quantitative and qualitative methods. The quantitative method was the primary method, complemented by the qualitative method [36]. The qualitative method was incorporated to strengthen communities' insights into traditional medicine and treatment practices for NCDs, and to explore practitioners' experiences and perceptions of traditional medicines and NCDs. The study population comprised 18 traditional healers and 102 patients aged 18 years or older who had used traditional medicine to manage NCDs.

Sampling and data collection: Participants for the survey were selected randomly from the list of patients who attended traditional healers for treatment of NCDs. Data collection tools included structured questionnaires administered to 102 respondents and an interview guide used to facilitate interviews with 18 respondents. The structured questionnaire was designed to investigate reasons community members use traditional medicines to treat NCDs, while the interview guide included questions on knowledge, practices, and perceptions of traditional medicine.

Ethical approval: Permission to conduct the study was granted by the Iringa Municipal Health Department (D-x-2025). Verbal informed consent was obtained from all participants, and confidentiality was maintained throughout the research process.

Data analysis: Quantitative data were analyzed using Statistical Product and Service Solutions to produce descriptive statistics, including frequencies and percentages. Qualitative data from interviews were transcribed and thematically analyzed to identify key patterns and narratives.

Results

Demographic characteristics of respondents: In **Table 1**, a total of 120 respondents participated in the study, with slightly more females (53.3%) than males (46.7%). This corresponds to the 2022 census of people and properties [31]**,** which showed that Iringa Municipal has a higher proportion of females (52.4%) than males (47.6%). Although the sample included people from different categories, the majority (60.0%) lacked formal education. This might imply that a lack of formal education limits their knowledge of how to protect themselves against factors that can lead to the development of NCDs, and that when they are sick with NCDs, they should seek conventional treatments. However, the opposite may be true: individuals with higher education may prefer conventional medical care, unless influenced by family traditions, cultural beliefs, or dissatisfaction with biomedical outcomes. The few educated respondents might have sought alternative care due to family or social influences, or because conventional medicine failed.

Knowledge of non-communicable diseases and treatment practices: Traditional healers have knowledge and experience with various traditional materials and plant species with healing effects for NCDs and other impairments. As for NCDs, traditional healers mentioned several plant species used for various NCD treatments. The species include *Moringa oleifera*, *Psidium guajava*, *Annona muricata*, *Hibiscus sabdariffa*,

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and *Citrullus lanatus*, to mention a few. These species are known for their antioxidant and anti-inflammatory properties, which support their traditional applications. Most of the people are aware of NCDs as diseases that cannot be transferred from a sick person to a healthy one. 75.8% of the participants accurately described NCDs as diseases that are not transmissible between individuals (**Table 2**). This suggests growing community awareness of NCDs in Iringa. As for the causes of NCDs, the majority of respondents (37.5%) mentioned low knowledge of factors causing the diseases, lack of physical exercise, and excessive sugar intake (23.3%), and alcohol (15.8%) as the main reasons for the prevalence of NCDs. The respondents proposed providing health education, especially on risk factors for NCD development, as a mechanism to minimize cases.

Table 1: Socio-demographic characteristics of the respondents

Characteristics	Category	Frequency (%)
Age group	20-30	47 (39.2)
	31-40	33 (27.5)
	41-50	24 (20.0)
	51-60	16 (13.3)
Gender	Male	56 (46.7)
	Female	64 (53.3)
Education	Certificate	17 (14.2)
	Diploma	11 (09.2)
	Degree	17 (14.2)
	Masters	3 (02.5)
	Other	3 (02.5)
Marital status	Single	41 (34.2)
	Married	79 (65.8)

Table 2: Community knowledge on non-communicable diseases

Understanding NCDs	Frequency (%)
Chronic diseases	20 (16.7)
Diseases with high severity	08 (06.7)
Cannot be transmitted to another person	91 (75.8)
Don't know	01 (00.8)
Total	120 (100.0)

Traditional treatment approaches: **Table 3** shows the Traditional Healers used various methods to administer drugs to their patients. These include oral administration, smoking/steaming, topical application, and food-based integration. As shown in **Table 3**, the majority of respondents reported using multiple routes of drug administration interchangeably (87.5%), while only a small proportion relied on a single route.

Table 3: Routes of drug administration among respondents

Route of drug administration	Frequency (%)
Drinking only	08 (06.7)
Taking with food only	07 (05.8)
Multiple routes (interchangeable)	105 (87.5)
Total	120 (100)

Perceptions of respondents on traditional medicine: Regarding perceptions of traditional medicine, just over half of respondents reported a negative perception, while 30.1% reported a positive perception. Some have associated traditional medicine with low cost (13.3%), and 5.8% considered it the best treatment option. These findings indicate that although traditional medicine is widely used, it is often viewed with caution rather than strong preference. Respondents complained about the side effects of the traditional medicines that are caused by uncontrolled dosage, excessive use, and hyperreaction of the medicines to the human body (**Table 4**).

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Table 4: Perceptions towards the use of traditional medicine

Perception	Frequency (%)
Bad	55 (50.8)
Good	33 (30.1)
Low cost	14 (13.3)
Best option	06 (05.8)
Total	**120 (100)**

Discussion

The current study examined health-seeking pathways for the management of NCDs in Iringa Region within the context of a plural health system. Guided by the HBM, the Andersen Health Care Utilization Model, and the concept of medical pluralism, the findings demonstrate that the use of traditional medicine is not an isolated or oppositional practice but part of a broader, rational navigation of available therapeutic options shaped by individual perceptions, structural constraints, and health system context.

Individual-level factors and health beliefs: The knowledge and use of traditional medicine are increasingly common in Tanzania. Previous studies described widespread practices among Traditional Healers in managing NCDs, such as hypertension [11, 37]. The continued use of traditional medicines for NCDs is catalyzed by incomplete treatment in conventional settings. Patients are desperate for their health status and eager to be healthier, quicker than conventional medicine can provide. Thus, resorting to alternative care is inevitable; the only thing to be strengthened is knowledge of traditional medicine use among Traditional Healers, patients, and society. This will lead to the proper use of medicine. The present data demonstrates that the use of traditional medicine in the management of NCDs in Iringa Region is embedded within broader health-seeking pathways shaped by structural, cultural, and experiential factors. Consistent with findings from other sub-Saharan African settings, traditional medicine use did not represent a rejection of biomedical care but rather a complementary and adaptive response to the challenges of managing chronic illness within constrained health systems [21, 38]. At the individual level, predisposing factors such as health beliefs, cultural and spiritual interpretations of illness, and perceived severity of NCDs played a significant role in shaping treatment choices. Consistent with the HBM, respondents' decisions to initiate or complement biomedical care with traditional medicine were influenced by perceived benefits and barriers, including expectations of symptom relief, fear of side effects from long-term biomedical treatment, and prior experiences with illness management [23, 24]. These findings echo previous studies in sub-Saharan Africa, which show that chronic illness often prompts patients to seek therapies perceived as holistic and culturally meaningful [21, 22]. Structural and access-related factors further shaped health-seeking pathways. Drawing on the Andersen Model, enabling factors such as the cost of care, distance to health facilities, availability of medicines, and service continuity emerged as critical determinants of health service utilization. Limited access to biomedical services, recurrent medicine stock-outs, and financial constraints reduced the feasibility of exclusive reliance on formal healthcare, thereby encouraging the use of traditional medicine as a primary or complementary option. Similar patterns have been documented in other Tanzanian and African contexts, where health system limitations significantly influence treatment-seeking behavior for chronic conditions [11, 37]. Similar patterns have been documented among patients with hypertension and diabetes mellitus in Tanzania and other African countries [39]. These findings align with global evidence linking lifestyle factors to NCD risk**.** Given its importance, the government of Tanzania enacted the Traditional Alternative Medicine Act of 2002 to promote, control, and regulate the practice of traditional alternative medicine [40]. The current study underscores the continuing importance of traditional medicine in managing NCDs in Tanzania. The findings from this study align with research by Haque in Ethiopia and Hammond in Senegal, which showed that traditional healers play a vital role in health-seeking behavior for chronic diseases [16, 17].

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Medical pluralism and health-seeking pathways: Medical pluralism emerged as a central organizing principle in respondents' therapeutic choices. Rather than viewing biomedical and traditional systems as mutually exclusive, individuals navigated between them based on affordability, accessibility, and perceived effectiveness. The coexistence of widespread use and predominantly negative perceptions highlights the pragmatic nature of medical pluralism, in which treatment choices are shaped more by access constraints and lived experience than by positive evaluations alone. Structural barriers such as medicine stock-outs, transportation costs, and long waiting times within biomedical facilities reinforced the use of traditional medicine, echoing broader critiques of health system inequities in low-resource settings [3, 4]. Medical pluralism provides a critical lens for understanding how these individual and structural factors operate within a plural health system. Rather than choosing between mutually exclusive systems, respondents navigated between biomedical and traditional therapeutic options in a complementary and sequential manner. This pluralistic navigation reflects deeply embedded cultural norms and the social legitimacy of traditional medicine in Tanzania [19, 20]. The findings challenge simplistic interpretations that frame traditional medicine use as resistance to biomedical care and instead position it as a pragmatic response to chronic illness and health system realities. The use of traditional medicines as alternative care and reliance on traditional healers as health service providers have a long-standing history in Tanzania and East Africa, with amplitudes and crests varying over time. As a matter of fact, the rise and fall of *"Babu wa Loriondo"* in the 2010-2011 period signifies the active but hidden trust of Africans in cultural and traditional medicines, religion, and traditional healers for the treatment of maladies, including the devastating NCDs [12]. These findings carry important policy implications. Although traditional medicine is widely used, Tanzania's national NCD strategies largely emphasize biomedical management while paying limited attention to pluralistic health-seeking practices [40]. Ignoring the role of traditional medicine risks undermining treatment adherence, patient safety, and continuity of care. Public health policy should therefore acknowledge medical pluralism by strengthening regulation, improving patient-provider communication, and promoting safe and informed use of traditional therapies within integrated care frameworks [15]. Despite widespread use and practice, the medicine derived from herbal species like *Carissa edulis,* locally known as the Mugarika tree, has resulted in devastating outcomes for patients, including deaths, among those who relied solely on it, abandoning biomedical treatments [18, 41]. To address the shortcomings, studies such as Liheluka and Makulilo have highlighted the need for additional collaboration between biomedical and traditional practitioners to ensure the safety and efficacy of traditional medicines [11, 37]. As of now, these medicines are lacking scientific validation, efficacy, safety, and quality.

Overall, the findings demonstrate that health-seeking behavior for NCD management is best understood through a multi-level analytical framework that integrates individual perceptions, structural access conditions, and plural health system dynamics. The combined application of the HBM, Andersen Health Care Utilization Model, and medical pluralism enhances explanatory power and provides a nuanced understanding of treatment pathways in low-resource settings. Policy and programmatic interventions aimed at improving NCD outcomes should therefore move beyond biomedical-centric models and incorporate culturally informed, structurally responsive strategies that reflect the realities of Tanzania's plural health systems.

Conclusion: This study highlights the mediating role of the health system context, including regulation, quality of services, and provider-patient interactions, in shaping trust and utilization patterns. Also, the current findings demonstrate the value of a multi-level analytical framework for understanding NCD management in low-resource settings. Policy and programmatic efforts should move beyond biomedical-centric approaches and incorporate structurally responsive, culturally informed strategies that reflect the realities of Tanzania's plural health systems.

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