



Associations of Treatment Effort, Economic Income, and Accessibility with the Utilization of Herbal Medicine in Medan City

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INTRODUCTION

Herbal medicine has become an integral component of public health systems in many countries, including Indonesia, which is renowned for its rich biodiversity and abundant sources of herbal raw materials (Subagiyo et al., 2023). Government endorsement of herbal therapy is reflected in formal regulations and the active promotion of traditional medicine as a complementary or alternative approach to conventional healthcare (Park et al., 2022). The implementation of such policies not only impacts the healthcare sector but also prompts broader socio-cultural transformations, influencing individual treatment preferences and reshaping traditional values associated with herbal practices (Bokhour et al., 2018). In this context, it is crucial to examine how these policies affect the socio-cultural dynamics of communities—particularly in culturally diverse regions—where traditional healing systems and modern medicine intersect.

In alignment with these efforts, global health authorities have increasingly acknowledged the strategic value of traditional and complementary medicine (World Health Organization, 2019). Herbal medicine continues to play a significant role in global healthcare systems. According to WHO estimates, approximately 80–85% of the global population relies on medicinal plants to meet their primary health needs, with usage rates ranging from 60–90% in low- and middle-income countries. In Ethiopia, a systematic review reported that 56.94% of patients with chronic illnesses used herbal medicine—a prevalence rate comparable to those in Nigeria and India, and markedly higher than in many Southeast Asian nations (Tassew et al., 2024). Within Southeast Asia, the use of herbal medicine varies considerably. Malaysia reported the highest rate at 55.6%, followed by Singapore, with 42.7% usage among older adults. In contrast, significantly lower rates were observed in the Philippines (6.3%), Cambodia (5.4%), Vietnam (3.5%), Thailand (2.6%), and Indonesia (2.0%) (Al Baihaqi & Levita, 2021). These disparities may be attributed to differences in policy integration, regulatory frameworks, public trust, and accessibility to formal herbal healthcare services across the region.

Consistent with global and regional trends, the use of herbal medicine in Indonesia has shown a steady increase, reflecting national efforts to promote traditional health practices. According to the Ministry of Health of the Republic of Indonesia (2018), approximately 49% of Indonesians use herbal remedies; however, only 10% obtain them through formal health institutions. Data from the 2023 Indonesian Health Survey further illustrates this pattern. In North Sumatra Province, 44.2% of respondents reported using commercially produced (ready-to-consume) herbal products, 53.7% utilized homemade preparations facilitated by traditional health practitioners, and 63.4% independently prepared and consumed herbal remedies. These findings, based on a sample of 9,223 individuals, underscore a significant reliance on herbal medicine outside the formal healthcare system (Badan Kebijakan Pembangunan Kesehatan, 2023).

Despite the growing reliance on herbal medicine in North Sumatra—particularly through informal channels—empirical research on the determinants of its use remains limited. One of the principal barriers to optimizing traditional health programmes is unequal access, which is shaped by both the cost and the perceived quality of herbal products. Nutbeam and Lloyd (2020) note that individuals with higher levels of education and income are more likely to choose modern medical services, as they have greater access to health information and the financial resources to pay for such treatments. By contrast, low-income communities—especially those with strong cultural ties—tend to depend more heavily on herbal therapies, which are both affordable and deeply embedded in local traditions.

Multiple studies have underscored the importance of socio-economic, behavioral, and structural factors in shaping the utilization of herbal therapies. Syukur and Asnawati (2021) found that education level, financial capacity, and access to health information significantly influence individuals' decisions to choose between herbal and modern medical treatments. Similarly, Hindratno et al. (2021) observed that individuals with strong traditional beliefs are more likely to prefer herbal remedies, whereas those with higher levels of health literacy tend to favor conventional medicine. Cultural norms also play a critical role in shaping treatment preferences. As noted by Rosaliza et al. (2024), perceptions of the efficacy of herbal medicine are often transmitted through familial traditions and intergenerational narratives. Structural accessibility—particularly at the policy and service delivery level—is equally pivotal. Welz et al. (2018) argue that effective public health strategies must incorporate public education, integration of herbal services into formal healthcare systems, and the implementation of quality assurance measures for herbal products. In support of this, Arwidiana and Sudiari (2024) found that introducing herbal services into community health centers significantly enhanced public acceptance, especially when accompanied by comprehensive educational campaigns.

Given the growing reliance on herbal medicine and the multifaceted influence of socio-economic, behavioral, and structural factors on its use, there is an urgent need to investigate these determinants within specific local contexts. While previous research has often examined these variables in isolation or focused primarily on rural populations, urban settings—where healthcare choices are more varied and influenced by complex social dynamics—remain relatively understudied. Medan City, a major urban center in North Sumatra known for its cultural diversity, offers a distinctive context in which to explore these patterns. Accordingly, this study aims to analyze the relationship between treatment effort, economic income, and accessibility and the utilization of herbal medicine among residents of Medan City.

METHODS

This study employed a quantitative approach with a cross-sectional design to examine the relationship between treatment effort, economic income, and accessibility and the utilization of herbal medicine in Medan City. The research was conducted from January to March 2025.

The study population consisted of Medan residents who had used herbal medicine—either independently or through formal traditional health services—based on data from the 2023 Indonesian Health Survey (N = 9.926). A total of 369 participants were selected through stratified proportional sampling, with strata based on the socio-cultural characteristics and

population size of sub-districts across 21 districts. The sample size was determined using Lemeshow's formula with a 7% margin of error.

Primary data were collected using a validated structured questionnaire that measured four key variables: treatment effort, economic income, and accessibility as independent variables, and herbal medicine utilization as the dependent variable.

- Treatment effort refers to individual actions taken to seek and use herbal therapies.
- Economic income reflects household financial capacity.
- Accessibility measures the ease of access to herbal health services.
- Herbal medicine utilization captures the frequency, preference, and usage patterns of herbal remedies.

Data were collected through face-to-face interviews using the questionnaire administered by trained enumerators. Informed consent was obtained from all participants prior to data collection. Instrument validity was assessed using the Pearson Product-Moment correlation ($p < 0.05$), and reliability was confirmed with Cronbach's Alpha coefficients exceeding 0.60, indicating acceptable internal consistency.

Data were analyzed using IBM SPSS Statistics version 25. The analysis was conducted in three stages:

1. Univariate analysis to describe the distribution of respondent characteristics and study variables.
2. Bivariate analysis using the chi-square test to assess the association between each independent variable and the utilization of herbal medicine.
3. Tertiary data from published literature, government health reports, and World Health Organization (WHO) documents were incorporated to support contextual interpretation.

This study was approved by the Ethics Committee of the Faculty of Public Health, Prima Indonesia University (Ethical Approval No. 009/KEPK-MH/I/2025).

RESULTS

Univariate Analysis

Table 1. Frequency Distribution of Herbal Medicine Utilization in Medan City

Variable	f	%
Treatment Efforts		
Doing It Yourself	285	77.2
Herbal Medicine Facility	84	22.8
Economic Income		
Low <Rp. 2.809.915	179	48.5
High >Rp. 2.809.915	190	51.5
Accessibility		
Not Often	117	31.7
Often	252	68.3
Utilization of Herbal Medicine		
Not Often Utilized	163	44.2
Utilize Frequently	206	55.8

The univariate analysis showed that the majority of respondents (77.2%) reported engaging in self-initiated herbal treatment, while only 22.8% utilized formal herbal medicine facilities. In terms of economic income, 51.5% of participants were classified as having higher income levels, while 48.5% had incomes below the threshold of IDR 2,809,915 per month. Regarding accessibility, 68.3% of respondents reported frequent access to herbal health services, whereas 31.7% experienced limited access. Notably, 55.8% of respondents reported frequent utilization of herbal medicine, reflecting a strong cultural and behavioral orientation toward traditional health practices.

Bivariate Analysis

Table 2. Relationship between Type of Treatment Business, Economic Income, and Accessibility to Herbal Medicine Utilization in Medan City

Variable	Utilization of Herbal Medicine				Total		<i>p-value</i>	PR (95% CI)
	Not Often Utilized		Utilize Frequently					
	n	%	n	%	n	%		
Treatment Efforts							0.636	0.889(0.545–1.449)
Doing It Yourself	124	33.6	161	43.6	285	77.2		
Herbal Medicine Facility	39	10.6	45	12.2	84	22.8		
Economic Income							0.146	1.357(0.889–2.049)
Low <Rp. 2,809,915	86	23.3	93	25.2	179	48.5		
High >Rp. 2,809,915	77	20.9	113	30.6	190	51.5		
Accessibility							0.011	1.773(1.139–2.760)
Not Often	63	17.1	54	14.6	117	31.7		
Often	100	27.1	152	41.2	252	68.3		
Total	163	44.2	206	55.8	369	100		

The bivariate analysis explored the associations between treatment effort, economic income, and accessibility with the utilization of herbal medicine in Medan City. The results revealed that treatment effort—whether self-initiated or facilitated through formal herbal

medicine services—was not significantly associated with the frequency of herbal medicine use ($p = 0.636$; $PR = 0.889$; 95% $CI: 0.545–1.449$). Similarly, economic income did not exhibit a statistically significant relationship with utilization ($p = 0.146$), although participants with higher income levels were marginally more likely to use herbal medicine frequently ($PR = 1.357$; 95% $CI: 0.889–2.049$).

In contrast, accessibility showed a statistically significant association with herbal medicine utilization ($p = 0.011$). Respondents who reported frequent access to herbal health services were 1.77 times more likely to regularly use herbal remedies compared to those with limited access ($PR = 1.773$; 95% $CI: 1.139–2.760$). These findings suggest that while treatment behavior and income level may influence usage patterns, accessibility emerges as the most prominent determinant and represents a critical leverage point for policy enhancement and service delivery improvement in traditional health care systems.

DISCUSSION

Relationship between Type of Treatment Business and Utilization of Herbal Medicine in Medan City

Treatment effort refers to an individual's initiative and behavior in selecting and applying specific health treatments, including the use of herbal medicine. It encompasses the personal agency exercised in health-seeking decisions, often shaped by beliefs, experiences, and perceived treatment outcomes. A study by Nketia et al. (2022) in Ghana found that individual preferences for herbal therapies were largely influenced by past experiences, perceived effectiveness, and dissatisfaction with modern medical treatments. Similarly, Zörgo et al. (2018) reported that patients frequently turned to herbal remedies when conventional medicine failed to alleviate chronic or persistent conditions. These choices illustrate a high degree of personal engagement and belief-driven behavior—key components of treatment effort as a behavioral health determinant. Such patterns underscore that treatment effort is not only a reflection of unmet health needs, but also deeply rooted in cultural norms, perceptions of safety, and familiarity with traditional healing modalities.

The findings indicated that treatment effort was not significantly associated with the utilization of herbal medicine. Respondents who accessed formal herbal medicine services were slightly less likely to use herbal remedies compared to those who practiced self-treatment; however, this difference was not statistically significant. This suggests that individual initiative alone may not serve as a strong determinant of herbal medicine use within the studied population. Although self-treatment remains prevalent—particularly in culturally rooted contexts—its effect on the frequency of utilization appears to be influenced by other factors,

such as service accessibility and health literacy. These moderating variables may play a more critical role in shaping treatment behavior than treatment effort alone, highlighting the need for a multidimensional understanding of health-seeking practices.

This finding contrasts with previous studies that position personal initiative as a central driver of herbal medicine use. For example, Nketia et al. (2022) reported that individual perceptions and prior experiences played a significant role in shaping treatment choices. However, Zörgő et al. (2020) offered a more nuanced view, suggesting that individuals often resort to herbal remedies as a secondary option when conventional medicine fails—indicating a reactive rather than proactive pattern of utilization. Similarly, Hook and Rose Markus (2020) emphasized that cultural and social contexts frequently exert greater influence than individual agency, particularly in urban environments where diverse healthcare options are available. Furthermore, Zuo et al. (2025) highlighted that the perceived effectiveness of herbal medicine is often condition-specific, implying that personal treatment effort alone may not consistently translate into increased utilization or therapeutic benefit. These perspectives underscore the complexity of health-seeking behavior and suggest that individual initiative must be understood in relation to broader structural and contextual factors.

Field observations revealed that most respondents preferred self-directed treatment efforts when utilizing herbal medicine. This preference was largely driven by the perceived practicality and affordability of sourcing raw herbal ingredients independently. Many participants reported acquiring knowledge of specific herbal remedies through intergenerational transmission and peer networks, which enabled them to identify, prepare, and administer treatments without seeking formal consultation. These findings suggest that self-treatment is not merely a matter of individual preference, but rather a culturally embedded practice shaped by communal knowledge systems, economic pragmatism, and the accessibility of herbal resources. This contextualized understanding may also explain why treatment effort, when considered in isolation, did not exhibit a statistically significant association with the frequency of herbal medicine utilization. It is likely that such efforts are closely intertwined with broader structural and cultural determinants, which collectively influence health-seeking behavior in this population.

Relationship between Economist's Income and Herbal Medicine Utilization in Medan City

Economic income is a critical determinant of health-seeking behavior, particularly in contexts where modern medical services are either financially prohibitive or geographically inaccessible. In such settings, herbal medicine—often perceived as more affordable and

culturally congruent—emerges as a practical and appealing alternative, especially among lower-income populations. Anheyer et al. (2025) found that individuals with chronic conditions frequently opted for herbal therapies due to their lower cost and greater accessibility. Similarly, Y. Huang et al. (2025) highlighted the increasing reliance on traditional remedies in low-resource environments, where conventional treatments may be limited or unaffordable. These findings underscore the significant role of economic considerations in driving the utilization of herbal medicine, positioning it as a cost-effective solution for populations facing financial constraints.

This study found no statistically significant association between respondents' economic income and their utilization of herbal medicine. While individuals with higher income levels appeared slightly more likely to use herbal remedies, the difference was not meaningful. This finding suggests that income alone may not be a dominant determinant of herbal medicine use within the urban context of Medan. Given the widespread availability of herbal products across local markets and communities, individuals from diverse economic backgrounds may access and use herbal treatments regardless of their financial status. In this setting, herbal medicine utilization appears to be more strongly influenced by shared cultural norms, traditional health beliefs, and personal treatment preferences than by economic constraints.

A number of studies have examined the influence of socioeconomic factors on the use of herbal medicine. Y. Huang et al. (2025) reported that herbal treatments are increasingly preferred in low-resource settings due to their relative affordability and accessibility. Anheyer et al. (2025) similarly found that financial constraints and dissatisfaction with conventional treatments prompted patients with chronic conditions to seek lower-cost herbal alternatives. Supriadi et al. (2022) observed that individuals with limited income often rely on familial knowledge and cultural familiarity when selecting herbal remedies. Syukur and Asnawati (2021) emphasized that economic disparities can restrict access to formal healthcare services, thereby encouraging low-income communities to depend on traditional medicine as a primary form of care. Wang et al. (2020) did not directly examine income as a variable, their findings highlighted the clinical value of herbal medicine when integrated with conventional care, particularly in supporting long-term recovery. Collectively, these studies suggest that although income may not consistently demonstrate a direct statistical correlation with herbal medicine use, it plays an important contextual role in shaping access, preferences, and treatment-seeking behavior.

Field observations indicated that individuals with incomes above the regional minimum wage were marginally more likely to utilize herbal medicine compared to those with lower

incomes. Although this difference was not statistically significant, the pattern suggests that cost may not be a determining factor in the decision to use herbal remedies within the studied population. Herbal medicine is widely perceived as affordable and readily accessible, making it a viable option across income groups. Notably, several respondents from higher income brackets reported using herbal treatments not due to financial constraints, but as a complementary practice alongside conventional clinical care. This finding implies that herbal medicine is increasingly regarded not merely as an alternative for the economically disadvantaged, but as an integrated health practice embraced across socioeconomic strata.

Relationship between Accessibility and Herbal Medicine Utilization in Medan City

Geographical and economic factors play a critical role in shaping accessibility to both general health services and herbal medicine. Aprianti et al. (2023) found that individuals residing in rural or remote areas are more likely to depend on herbal remedies, primarily due to limited access to modern healthcare facilities. Similarly, Goitom et al. (2022) highlighted that the availability of herbal products in local markets and small pharmacies significantly influences individuals' decisions to use herbal medicine. These findings underscore the importance of improving the distribution and availability of herbal products, particularly in underserved areas, to enhance equitable access and support broader utilization across diverse populations.

The study found a statistically significant association between accessibility to herbal medicine products and their utilization. Respondents who reported easier access to herbal products were 1.7 times more likely to use them compared to those with limited access. This finding aligns with Andersen's Behavioral Model, which emphasizes the role of enabling factors—such as physical availability of health services and related resources—in facilitating treatment utilization. Improved accessibility to herbal remedies enhances the likelihood of their use, particularly in communities where access to modern medical services is constrained. These results highlight the importance of strengthening distribution networks and ensuring the availability of herbal products to support equitable health-seeking behavior.

Accessibility has been widely recognized as a primary factor influencing the use of herbal medicine. Adiyasa and Meiyanti (2021), identified ease of access as one of the main reasons individuals choose herbal treatments, noting that traditional remedies are readily available in local shops and markets, or can be prepared at home using plants commonly grown in household gardens. Supriadi et al. (2022) further emphasized that traditional medicine is increasingly integrated into public health practices and is available in various forms to accommodate user needs. Getachew et al. (2024) found that pregnant women in rural areas

were 1.27 times more likely to use herbal remedies than their urban counterparts, highlighting the role of geographical accessibility. Huang et al. (2025) documented the widespread use of classical herbal formulations within traditional medical settings, while Lee et al. (2024) emphasized that access to evidence-based information regarding the efficacy and mechanisms of herbal treatments plays a critical role in promoting their utilization. Collectively, these studies underscore that both physical availability and informational accessibility are central to shaping herbal medicine use.

A study by Nenkova et al. (2025), reported that 70.4% of respondents obtained herbal medicines from pharmacies or drugstores, while only a small proportion relied exclusively on self-preparation. This finding indicates that the physical accessibility of herbal products is relatively high, positioning herbal medicine as a practical and readily available alternative therapy. Similarly, Bilia et al. (2024) noted that Traditional Chinese Medicine (TCM)-based herbal products are widely distributed across the European market in multiple forms, including dietary supplements, cosmetics, and medical devices, further illustrating their commercial accessibility. Bharathy and Thanikachalam (2024) highlighted the widespread use of over 23 types of traditional medicinal plants—such as *Aloe vera* and *Zingiber officinale*—across Asia and Africa for the treatment of diabetic wounds. The local availability of these plants and their multiple modes of application suggest that physical accessibility is a critical factor facilitating their use. These findings are consistent with the results of the present study, reinforcing the notion that accessibility to herbal products, whether through markets, pharmacies, or natural sources, plays a central role in encouraging their utilization in traditional medicine.

This finding can also be interpreted through the lens of Andersen's Behavioral Model, which classifies accessibility as an enabling factor that directly facilitates the utilization of health services. In contrast, predisposing factors such as individual motivation or treatment effort may be insufficient without supportive systemic or environmental conditions. In essence, ease of access provides the practical circumstances necessary for health-seeking behavior to be actualized, whereas intention alone may remain unrealized in the absence of accessible resources.

Accessibility to herbal medicine—through the availability of products and services within healthcare facilities—is thus essential for increasing public uptake and acceptance. To strengthen this dynamic, government initiatives should prioritize the integration of herbal medicine into the formal healthcare system, including hospitals and community health centers. Additionally, ensuring the widespread availability of safe, standardized, and high-quality herbal products in local markets and pharmacies is critical to sustaining accessibility. Such

efforts will not only promote broader utilization of herbal medicine but may also reduce dependence on costly conventional treatments, thereby improving affordability and equity in healthcare access.

These findings carry important implications for the development of locally responsive health policies. Local governments should prioritize accessibility as a central consideration in the regulation and distribution of safe herbal medicines. This includes implementing quality control measures, ensuring product certification, and promoting public education on proper usage. While health literacy campaigns remain essential, they must be accompanied by efforts to ensure that herbal products available to the public meet established safety and efficacy standards. Furthermore, the results underscore the need to strengthen the traditional healthcare system in urban areas by integrating certified herbal services within conventional health facilities—particularly targeting populations that already demonstrate habitual use of herbal remedies.

However, field data also revealed challenges in accessing quality-assured herbal products, particularly in rural areas. Several respondents reported difficulty obtaining safe and standardized herbal medicines in local markets, suggesting gaps in distribution infrastructure. The uneven availability of herbal products between urban and rural settings further compounds disparities in access, emphasizing the urgent need for equitable distribution policies and improved supply chain management to support safe herbal medicine utilization across regions.

CONCLUSION

This study found that among the three variables analyzed—treatment effort, economic income, and accessibility—only accessibility showed a statistically significant association with the utilization of herbal medicine in Medan City. This suggests that the ease of access to herbal products plays a crucial role in promoting their use, irrespective of an individual's income level or treatment-seeking motivation. These findings offer valuable insights into urban health behavior in the context of traditional medicine and highlight accessibility as a key determinant of herbal medicine utilization.

The results underscore the need for local governments and policymakers to strengthen the distribution systems for herbal medicines, ensuring that products are safe, affordable, and readily available, while also accompanied by public education initiatives that promote informed and appropriate use. To build on these findings, future research should adopt multivariate analytical approaches and longitudinal study designs to explore causal relationships more comprehensively. Additional variables—such as cultural preferences, perceived product quality, and media influence—should also be considered to provide a more

holistic understanding of the factors shaping herbal medicine use in diverse urban settings.

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