

Determinants of healthcare satisfaction and community-proposed service improvements: A study of Phonthong District, rural Laos

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Abstract

Achieving Universal Health Coverage requires understanding the socio-economic and geographic factors that shape rural healthcare experiences. This study identifies the determinants of public health service satisfaction and analyzes community-proposed service improvements in the multi-ethnic Phonthong District, Lao PDR.

Methods: A convergent mixed-methods study was conducted among 377 public health service users. Quantitative data on socio-demographic and geographic variables were analyzed using multiple linear regression to identify predictors of satisfaction. Concurrently, 465 open-ended community comments were analyzed thematically to determine grassroots priorities for health sector reform. The results found that the multiple regression model explained 45.7% of the variance in satisfaction ($R^2 = 0.457$, $p < 0.001$). Significant predictors included the reason for the visit ($p < 0.001$), health insurance status ($p = 0.004$), primary occupation ($p = 0.007$), distance to the health facility ($p = 0.022$), personal income ($p = 0.026$), and marital status ($p = 0.033$). Qualitatively, the community's top priorities were accelerating service delivery and improving staff attitudes (23.87%), upgrading basic infrastructure such as water, electricity, and patient rooms (20.43%), and enhancing doctor-patient communication (10.97%). In conclusion, healthcare satisfaction in rural Laos is deeply entangled with economic fragility and geographic isolation. To improve service quality, health policies must move beyond expanding access and prioritize upgrading foundational facility infrastructure, ensuring reliable medical supplies, and cultivating a culturally competent workforce that effectively communicates with multi-ethnic populations.

Keywords: User satisfaction; Rural healthcare; Health determinants; Community participation; Lao PDR

1. Introduction

The global commitment to Universal Health Coverage (UHC) emphasizes that health systems must not only be accessible but also responsive, equitable, and of high clinical quality [1]. In the Lao People's Democratic Republic (Lao PDR), significant national strides have been made to expand health infrastructure and provide financial protection through the National Health Insurance (NHI) scheme, aiming to bridge the gap between urban centers and remote provinces [2, 3]. This challenge is not unique to Lao PDR; strengthening primary health care at the grassroots level remains a central priority for achieving sustainable health development and equitable access across the broader ASEAN region [4]. However, achieving true health equity requires looking beyond broad infrastructural gains. Inequalities in access to health services remain a serious issue across Southeast Asia, particularly in remote agricultural areas [5]. In structurally

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vulnerable settings, measuring overarching satisfaction is often insufficient; it is critical to identify the specific socio-economic and geographic determinants that shape a patient's interaction with the healthcare system [6]. Recognizing these underlying factors is essential for ensuring that health services actively serve the nuanced human needs of economically fragile populations.

Phonthong District, a mountainous and geographically isolated region in Northern Laos, exemplifies the profound intersection of geography, poverty, and health access. For the predominantly agricultural communities residing in such remote areas, seeking medical care is complicated by challenging terrain, seasonal weather barriers, and limited household cash income [7,8]. In this context, a patient's satisfaction and their subsequent trust in the health system are deeply dictated by their personal socio-economic status, physical distance from a facility, and whether health insurance adequately shields them from the indirect costs of seeking treatment [9,10]. Consequently, evaluating rural healthcare requires examining how systemic barriers-such as clinical communication hurdles and long waiting times-impact the most vulnerable residents.

Despite the recognized importance of these intersecting challenges, much of the existing public health literature in Lao PDR relies heavily on descriptive evaluations of service quality [11]. There remains a critical gap in predictive research that can statistically isolate the unique socio-economic and geographic determinants driving these disparities in rural settings. Furthermore, top-down health policy assessments frequently overlook the qualitative, bottom-up voices of the patients themselves, missing the vital opportunity to harness community-driven solutions [12].

To bridge this critical gap, this mixed-methods study moves beyond descriptive metrics. The primary objective is to statistically identify the socio-demographic, economic, and geographic determinants that predict user satisfaction within the public health system. The secondary objective is to elevate the voices of the community by systematically analyzing their self-proposed service improvements, providing policymakers with an evidence-based roadmap for advancing genuine health equity in Northern Laos.

2. Methodology

2.1. Study design and setting

This research utilized a convergent mixed-methods design to capture both the statistical determinants and the lived experiences of rural healthcare users. The study was conducted at Phonthong District Hospital in Luang Prabang Province, a mountainous and multi-ethnic region in Northern Laos. This setting represents the profound geographic and socio-economic challenges typical of remote border districts.

2.2. Study population and sampling

The target population comprised individuals aged 15 to 70 years who had utilized public health services at the facility within the preceding 12 months. Using standard statistical formulas for a 95% confidence level, a sample of 377 community members was recruited. A multi-stage sampling approach ensured equitable representation across the district's 40 villages, capturing perspectives from both direct patients and their accompanying relatives.

2.3. Variables and data collection instrument

Data were collected using a culturally adapted, structured questionnaire. Content validity of the instrument was assessed by three public health experts, and reliability was confirmed through a pilot test which yielded an acceptable Cronbach's alpha coefficient (> 0.75) for the satisfaction scale. The instrument gathered 2 distinct datasets:

Quantitative predictive variables: The dependent variable was defined as the overall satisfaction score across 6 service dimensions. 11 independent socio-demographic and geographic variables were measured. Dummy variables were created for categorical data to facilitate regression analysis (gender, age, marital status, educational attainment, primary occupation, personal income, distance to the health facility, health insurance status, presence of underlying chronic disease, frequency of facility visits, and the primary reason for seeking care.).

Qualitative community voices: To capture grassroots solutions, participants were asked open-ended questions allowing them to freely express their opinions and formulate specific recommendations for improving public health services.

2.4. Data analysis

Quantitative data were analyzed using statistical software. A Pearson correlation matrix was first generated to test the independent variables for multicollinearity, utilizing a threshold of $r \leq 0.8$ to confirm that the variables were distinct. Subsequently, a Multiple Linear Regression analysis was performed to identify the significant socio-demographic and geographic predictors of healthcare satisfaction, with statistical significance set at $p < 0.05$.

Concurrently, the qualitative open-ended responses were transcribed, translated, and systematically categorized into thematic areas of improvement. These community-driven recommendations were quantified using frequencies and percentages to rank the most urgent systemic demands.

3. Results

3.1. Socio-demographic characteristics and service utilization

The study included 377 respondents with a mean age of 37.9 years (SD = 14.16). The cohort was predominantly female (59.4%) and married (84.6%). Regarding education, while nearly half (49.3%) had completed secondary school or higher, a significant portion (24.4%) reported having no formal education. Socio-economically, the community was largely agrarian, with 72.4% identifying their primary occupation as farming/agriculture. Personal income levels were generally low; 48.3% of families earned less than 1,000,000 Lao Kip per month, while only 11.7% earned more than 3,000,000 Lao Kip. In terms of healthcare access, over half of the participants (52.0%) resided within 1 km of the facility, and 54.9% were covered by health insurance. The most common reasons for visiting the facility were treatment for short-term acute illnesses (36.6%) and routine health check-ups (31.8%) (Table 1).

Table 1 Socio-demographic characteristics and service utilization profiles

Variables	Number (n)	Percentage (%)
Gender		
Female	224	59.4
Male	153	40.6
Age (Years)		
Mean = 37.9 (SD = 14.16)		
Marital Status		
Married	319	84.6
Single / Divorced / Widowed	58	15.4
Education level		
No formal education	92	24.4
Primary school	99	26.3
Secondary school or higher	186	49.3
Primary occupation		
Farmer / Agriculture	273	72.4
Non-Agriculture (Govt, Student, Private, etc.)	104	27.6
Personal income (Monthly Lao Kip)		
< 1,000,000	182	48.3
1,000,000 - 3,000,000	151	40.1
> 3,000,000	44	11.7
Distance to nearest health facility		

< 1 km	196	52
1 - 5 km	105	27.9
> 5 km	76	20.1
Health insurance status		
Insured	207	54.9
Uninsured / Unsure	170	45.1
Primary reason for latest visit		
Short-term acute illness	138	36.6
Routine health check-up	120	31.8
Chronic disease / Emergency / Others	119	31.6

3.2. Predictors of healthcare satisfaction

To determine which socio-demographic and geographic factors significantly influenced patient experiences, a multiple linear regression analysis was conducted. Prior to the regression, a correlation analysis confirmed that all independent variables had a correlation coefficient of $r \leq 0.8$, indicating that no multicollinearity existed, and the model was statistically sound for multiple regression testing.

The multiple regression model successfully explained a substantial portion of the variance in user satisfaction. The analysis yielded a coefficient of determination (R^2) of 0.457, meaning that 45.7% of the variance in overall satisfaction could be predicted by the 11 independent variables ($F = 6.195$, $p < 0.001$).

Within the model, 6 distinct variables emerged as statistically significant predictors of healthcare satisfaction ($p < 0.05$): reason for the visit ($B = -0.033$, $p < 0.001$), health insurance status ($B = -0.080$, $p = 0.004$), primary occupation ($B = -0.022$, $p = 0.007$), distance to the health facility ($B = 0.032$, $p = 0.022$), personal income ($B = 0.044$, $p = 0.026$), and marital status ($B = -0.081$, $p = 0.033$).

Conversely, variables such as gender ($p = 0.070$), age ($p = 0.103$), educational attainment ($p = 0.225$), underlying chronic diseases ($p = 0.559$), and the frequency of facility visits in the past year ($p = 0.793$) did not significantly predict user satisfaction in this rural context (Table 2).

Table 2 Multiple linear regression analysis of factors predicting healthcare satisfaction

Independent Variables	Coefficient (β)	T-value	Sig. (p-value)
Gender	0.048	1.82	0.07
Age	0.002	1.635	0.103
Marital status	-0.081	-2.136	0.033*
Educational level	0.015	1.214	0.225
Primary occupation	-0.022	-2.736	0.007*
Personal income	0.044	2.242	0.026*
Distance to health facility	0.032	2.307	0.022*
Health insurance	-0.08	-2.884	0.004*
Underlying disease	-0.017	-0.585	0.559
Frequency of visits (12 months)	-0.004	-0.263	0.793
Reason for visit	-0.033	-4.099	<0.001*
Constant	3.695	2226.219	<0.001*

$R^2 = 0.457$; $F = 6.195$; Sig. $F < 0.001$. Asterisk (*) indicates statistical significance at $p < 0.05$.

3.3. Community-proposed service improvements

To contextualize the statistical predictors and identify actionable pathways for reform, the study systematically analyzed 465 open-ended qualitative comments provided by 323 of the respondents. This community feedback revealed a strong desire for both operational efficiency and infrastructural modernization. The most frequently cited priority, representing 23.87% of all comments, was the urgent need to accelerate the speed of service delivery and improve the general work performance and attitude of the medical staff. This was closely followed by structural demands; 20.43% of the community's recommendations focused on upgrading patient rooms and bathrooms, ensuring reliable water and electricity systems, and improving general facility equipment.

Clinical capability was also a major theme. Approximately 15.48% of the feedback requested modern medical tools, a dedicated surgery room, and a more robust supply of essential medicines. Furthermore, 12.90% of comments emphasized the need to elevate the technical knowledge of existing staff and hire more specialized medical personnel.

Crucially, the community highlighted the importance of doctor-patient communication and cultural competency. Nearly 11% of the responses (10.97%) specifically requested faster, more detailed explanations of diagnoses and test results, along with better post-treatment follow-up. Additionally, 10.11% of comments advocated for hiring staff from local ethnic minority groups to bridge communication gaps, alongside a general plea for stronger medical ethics. The remaining comments (6.24%) addressed external logistical support, such as increasing the availability of ambulances and mobilizing community resources for patient transport (Table 3).

Table 3 Thematic categorization of community-proposed service improvements

Rank	Community feedback theme	Frequency	Percentage
1	Increase service speed and improve the work attitude of medical staff	111	23.87
2	Upgrade patient rooms, bathrooms, water/electricity systems, and general service equipment	95	20.43
3	Provide modern medical tools, establish a surgery room, and ensure a sufficient supply of medicines	72	15.48
4	Upgrade the academic/technical knowledge of staff and increase the number of general and specialized doctors	60	12.90
5	Improve diagnostic speed/thoroughness, explain test results clearly, and advise on post-treatment care	51	10.97
6	Ensure a doctor is in every room, employ ethnic minority staff, and maintain strong medical ethics	47	10.11
7	Others (increase ambulances, mobile community services, patient transport, mobilize social contributions)	29	6.24
	Total comments	465	100.0

4. Discussion

The convergent mixed-methods analysis reveals a complex healthcare landscape in Phonthong District. The multiple linear regression model accounted for 45.7% of the variance in patient satisfaction, demonstrating that the quality of the rural healthcare experience is deeply entangled with socio-economic vulnerabilities, geographic isolation, and interpersonal dynamics.

4.1. Financial protection and the agricultural reality

The statistical significance of personal income, primary occupation, and health insurance status underscores the profound economic fragility of rural healthcare users. Health insurance serves as a critical buffer; its significance as a predictor aligns with Ong et al., who identified the NHI scheme as the foremost driver of health-seeking behavior in Lao PDR [9]. Similarly, Akkhavong et al. noted that financial mechanisms are essential for protecting the rural poor from catastrophic health expenditures [10]. However, the qualitative data reveals that while insurance removes the financial barrier to entry, it does not guarantee a satisfactory experience. The highest frequency of community complaints

centered on slow service and poor staff attitudes (23.87%), suggesting that low-income farmers remain acutely frustrated by resource shortages and systemic inefficiencies [13].

4.2. Geographic barriers

Distance to the health facility emerged as a significant determinant of satisfaction. In the mountainous terrain of Northern Laos, geographic distance is heavily compounded by underdeveloped road networks. Douangvichit et al. previously identified travel difficulty as a primary barrier to accessing care in Laos [7]. The quantitative significance of this "distance penalty" is directly mirrored in the community's qualitative appeals for mobile clinics, increased ambulance availability, and organized patient transport mechanisms. Patients who expend significant time and indirect travel costs to reach a hospital arrive with higher expectations, and their satisfaction drops precipitously when met with administrative delays [14].

4.3. The demand for cultural competency and communication

Perhaps the most striking finding is the disparity between clinical provision and interpersonal communication. Nearly 11% of the community's comments specifically requested clearer explanations of diagnoses and improved post-treatment guidance. Furthermore, over 10% of the feedback explicitly advocated for the hiring of ethnic minority staff. Qian et al. observed that health workforce planning in Lao PDR historically struggles with equitable distribution and cultural matching in remote areas [15]. The community's explicit request for ethnic representation highlights that culturally competent care and respectful communication are valued just as highly as technical medical intervention, a trend increasingly recognized in patient-centered care models across the Asia-Pacific [12].

4.4. Bridging the infrastructure deficit

Despite the overarching goals of the Ministry of Health's 5 Goods 1 Satisfaction (5G1S) policy [16], the community voiced deep concerns regarding foundational physical infrastructure. Over 20% of the qualitative comments demanded immediate upgrades to patient rooms, bathrooms, and essential utilities. This local grievance is indicative of a broader national challenge; as highlighted by UNICEF and the World Health Organization, many rural facilities still lack climate-resilient water, sanitation, and hygiene (WASH) infrastructure [17,18]. These grassroots demand for systemic modernization strongly aligns with recent mixed-methods research published within the ASEAN context. For instance, Mon et al. demonstrated that comprehensive health systems strengthening specifically improving the local health workforce ratio and upgrading rural facility infrastructure was the primary catalyst for expanding healthcare access and utilization in remote, cross-border townships [19]. Thus, to achieve genuine UHC, infrastructure investments in rural Laos must focus as much on the patient environment and workforce capacity as they do on clinical supplies.

This study has some limitations that should be acknowledged. This study was conducted within a single district, the findings may not be entirely generalizable to all rural areas in Lao PDR, although they provide a highly relevant foundational framework for assessing similar multi-ethnic border regions.

5. Conclusions and recommendations

This mixed-methods study concludes that patient satisfaction with public health services in Phonthong District is not determined solely by clinical outcomes but is profoundly shaped by underlying socio-economic and geographic vulnerabilities. The predictive modeling revealed that a patient's income, primary occupation, distance to the facility, and health insurance status are significant determinants of their healthcare experience. While national financial protection schemes have successfully mitigated some economic barriers for agricultural families, actively listening to the community reveals that rural populations evaluate healthcare quality through a deeply human and practical lens.

Based on these findings, it is recommended that future health sector reforms and local public health practices move beyond simply expanding access. Policymakers must actively invest in modernizing basic facility utilities and equipping rural clinics with reliable diagnostic tools. Moreover, local health administrators should prioritize cultivating a culturally responsive, communicative healthcare workforce including the hiring of ethnic minority staff to bridge communication gaps and ensure respectful care that meets the specific dignity and needs of multi-ethnic rural communities.

Compliance with ethical standards

Statement of ethical approval

The research protocol and data collection methods were reviewed and approved by the Ethics Committee of Souphanouvong University and the Phonthong District Public Health Office prior to the commencement of the study.

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Disclosure of conflict of interest

The authors declare no conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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