

## Delivery Health Service Utilization and Barriers to Access in Lao People's Democratic Republic (PDR): An Analysis of MICS Data 2023

Lili Amaliah<sup>1\*</sup>, Supriatin<sup>1,2</sup>, Mohamad Sadli<sup>3</sup>, Maretalinia<sup>3,4</sup>

<sup>1</sup> Nursing Program, Sekolah Tinggi Ilmu Kesehatan Cirebon, Indonesia

<sup>2</sup> Faculty of Nursing, Lincoln University College, Kota Bharu, Kelantan, Malaysia

<sup>3</sup> Public Health Program, Sekolah Tinggi Ilmu Kesehatan Cirebon, Indonesia

<sup>4</sup> Ph.D. Program in Demography, Institute for Population and Social Research, Mahidol University, Thailand

Corresponding Author Email: [liliamalia9@yahoo.com](mailto:liliamalia9@yahoo.com)

Copyright: ©2025 The author(s). Media Publikasi Cendekia Indonesia publishes this article.

### ORIGINAL ARTICLES

Submitted: 27 March 2025

Accepted: 19 April 2025

#### Keywords:

Maternal, Health service utilization, Barriers to access, Lao People's Democratic Republic, Delivery of Health Services

OPEN ACCESS



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/)

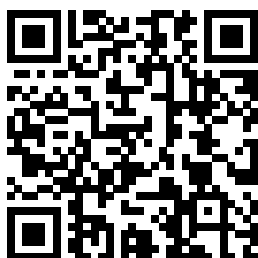
### ABSTRACT

There are barriers of delivery health services still existed, especially in low-middle income countries. This study aims to comprehensively analyze the utilization of maternal health services and the barriers that hinder access in the Lao People's Democratic Republic (PDR). This study analyzed 2023 MICS data from 3,754 women in the Lao People's Democratic Republic, examining maternal health service utilization. The dependent variable was categorized as utilization or non-utilization of delivery health services, while the independent variables included demographics, geography, decision-making power, and health system factors. Descriptive statistics, chi-square tests, and binary logistic regression were used for data analysis. This study found that of the 3,754 women, 78.05% of them reported ever used delivery health services. The Chi-square test showed that age, education, residence, region, decision making, insurance ownership, and wealth index were significantly associated with using maternal health services. Multivariate analysis showed that higher education was the strongest predictor of health service use (AOR = 20.90), with geographic factors, wealth inequality, and shared decision-making. Areas without road access and the poorest wealth groups were less likely to use services, while shared decision-making increased the likelihood by 45%. It is recommended that higher education be promoted, road access improved, and shared decision-making be encouraged to increase the utilization of maternal health services, especially among the poorest communities and those living in rural areas.

### Key Messages:

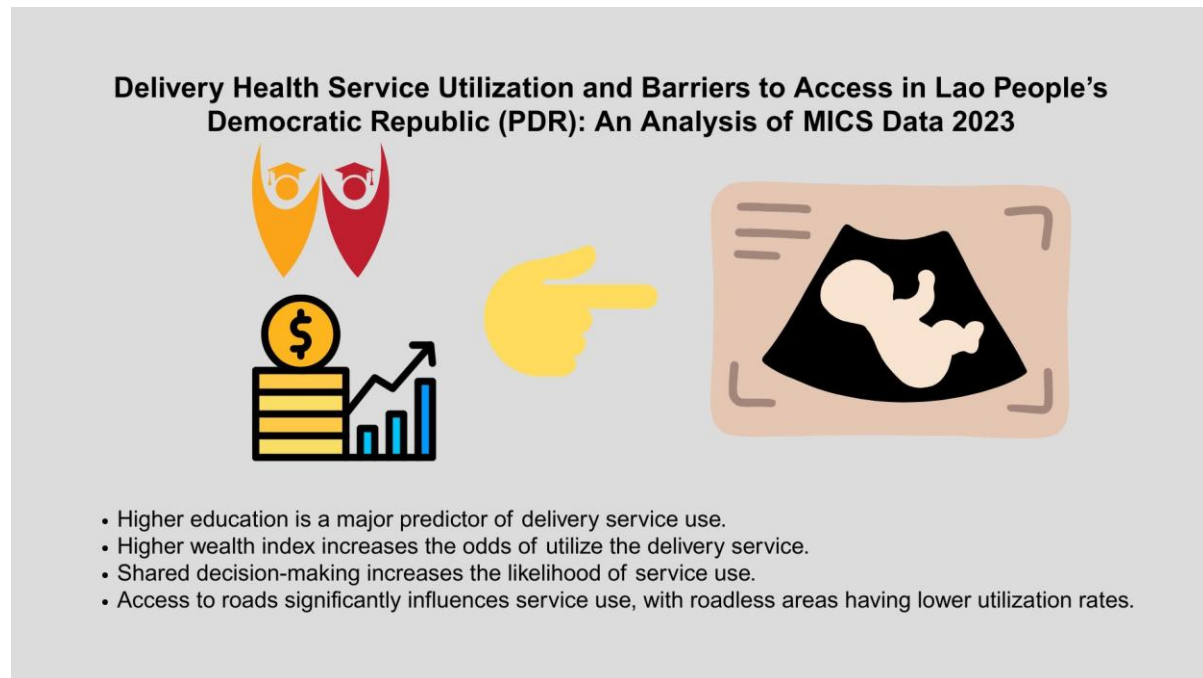
- Higher education is a major predictor of delivery service use.
- Higher wealth index increases the odds of utilize the delivery service.
- Shared decision-making increases the likelihood of service use.
- Access to roads significantly influences service use, with roadless areas having lower utilization rates.

Access this article online



Quick Response Code

## GRAPHICAL ABSTRACT



## INTRODUCTION

The adequate health services are a fundamental element in improving people's quality of life and well-being (1). In many developing countries, including Lao PDR (Laos), access to health services remains a major challenge influenced by various social, economic, and geographic factors (2,3). Despite efforts to improve health infrastructure, there are still significant disparities in the utilization of health services across different levels of society, especially for those living in remote or less developed areas (4).

In the Lao People's Democratic Republic, utilization of maternal health services remains a significant challenge, particularly in rural and remote areas (5). Although health care infrastructure has improved in recent years, many women still give birth at home rather than in health facilities (6). Factors such as limited access to health care facilities, particularly in areas without adequate road infrastructure, and socio-economic barriers, such as high costs and lack of financial resources, contribute to low utilization rates (7-9). In addition, cultural beliefs and low levels of education, particularly in rural communities, further hinder the use of skilled birth attendants and access to safe delivery services (10). These challenges are compounded by problems in health care management, including inadequate resources and poorly trained personnel, leading to a lack of trust in the health care system (11).

In addition to social and economic factors, poor health system management in some areas is also a major barrier for people to access quality health services (7). In some cases, lack of trust in the quality of health services in public facilities, often due to limited facilities, trained human resources, and lack of adequate care, causes many individuals, especially pregnant women, to prefer giving birth at home rather than using health facilities (12,13). This decision is often driven by the perception that home is safer or more affordable than a hospital or health center, despite the higher health risks associated with home births (14).

Education is a very important factor in influencing the decision to use health services, as higher levels of education are often associated with a better understanding of the importance of health care and access to information about available services (15). However, while education can increase the use of health services, inequality in education across regions, especially in rural areas, remains a major problem in Lao PDR (16). Geographic factors also play a significant role, as areas without adequate road access make it more difficult for people to reach health facilities, resulting in low levels of health service use (17). This problem is further exacerbated by the inability of hospitals and health centers to effectively reach remote areas, coupled with limited resources to staff these facilities (18).

The wealth index is also an important factor influencing access to and use of health services. The wealthy are more likely to access health services, while the poor are often limited by cost and lack of resources (19). This suggests that there are social inequalities that can influence individual decisions in seeking medical care. On the other hand, social factors such as joint decision-making within the family also play a major role. The decision to seek health services is not only influenced by the individual, but also by family dynamics, especially in the context of reproductive and birth health (8). Therefore, understanding the role of the family in health-related decision making is essential to improving the utilization of health services (7). This study aims to provide a comprehensive analysis of delivery health service utilization and barriers to access in Lao PDR. Additionally, this study will fill the gaps of studies examining the health services utilization, especially in Lao PDR where not many researches have been done.

## METHODS

This study utilized data from the Multiple Indicator Cluster Survey (MICS) conducted in Lao PDR. MICS is a nationally representative household survey providing key health and demographic indicators in 2023. The analysis included 3,754 women who reported their delivery health service utilization.

The dependent variable was delivery health service utilization, categorized as either utilization or non-utilization. Utilization of delivery health services includes delivery at government hospitals, government health centres, other public medical services, private hospitals, and private clinics. Not utilization delivery health services are including women who delivered at their home and other home. Independent variables included demographic factors such as women's age (15–19, 20–24, 25–29, 30–34, 35–39, 40–44, and 45–49 years), socioeconomic factors including education level (ranging from no education to higher education), marital status (currently or formerly married), and wealth index (categorized into five levels from poorest to richest). Geographic factors included place of residence (urban, rural with road, and rural without road) and region (North, Central, and South). In this study, the decision-making power was operationalized to understand the role of partner and family on how delivery services are chosen. Decision-making power regarding health service utilization was assessed based on whether the wife made the decision, the husband/partner, or jointly. Additionally, health system factors were examined, including health insurance ownership (with or without insurance).

Descriptive statistics were used to summarize the study population's characteristics, and chi-square tests were performed to assess the associations between delivery health service utilization and key independent variables. Binary logistic regression was conducted to estimate adjusted odds ratios (AORs) with 95% confidence intervals to determine the independent effects of each predictor. All statistical analyses were conducted using STATA version 18 (version X; StataCorp, College Station, TX, USA), with a significance level of  $p < 0.05$ . Since the study used publicly available MICS data, ethical approval was not required, as the data collection adhered to international ethical standards ensuring confidentiality and informed consent.

## CODE OF HEALTH ETHICS

The dataset used for this study is available through UNICEF's MICS portal: <https://mics.unicef.org/>. The ethical clearance for the original survey was obtained from UNICEF. Then, this current study does not require the ethical clearance since the respondents are anonymous and no possibility to be tracked.

## RESULTS

Table 1 illustrates the characteristics of the respondents in this study. A total of 78.05% of respondents used health services for childbirth, while 21.95% did not. The age distribution shows that the 20–24-year group has the highest percentage (29.81%). Most respondents have primary to secondary education, with 28.32% completing primary education and 27.54% junior secondary education. Almost all respondents (97.71%) are married or in a relationship. Most live in rural areas with road access (67.95%), while only 25.09% live in urban areas. Regarding the economy, 66.78% of respondents do not have health insurance, and the poorest group dominates with a percentage of 30.23%.

**Table 1. The general characteristics of women who participated in the study**

| <b>Variables (3,754)</b>          | <b>n</b> | <b>%</b> |
|-----------------------------------|----------|----------|
| <b>Delivery health service</b>    |          |          |
| No                                | 824      | 21.95    |
| Yes                               | 2930     | 78.05    |
| <b>Women's age</b>                |          |          |
| 15-19                             | 581      | 15.48    |
| 20-24                             | 1119     | 29.81    |
| 25-29                             | 1005     | 26.77    |
| 30-34                             | 687      | 18.30    |
| 35-39                             | 268      | 7.14     |
| 40-44                             | 77       | 2.05     |
| 45-49                             | 17       | 0.45     |
| <b>Education level</b>            |          |          |
| Non or ECE                        | 452      | 12.04    |
| Primary                           | 1063     | 28.32    |
| Lower secondary                   | 1034     | 27.54    |
| Upper secondary                   | 669      | 17.82    |
| Post secondary / Non tertiary     | 100      | 2.66     |
| Higher                            | 436      | 11.61    |
| <b>Marital status</b>             |          |          |
| Currently married/in union        | 3668     | 97.71    |
| Formerly married/in union         | 86       | 2.29     |
| <b>Place of residence</b>         |          |          |
| Urban                             | 942      | 25.09    |
| Rural with road                   | 2551     | 67.95    |
| Rural without road                | 261      | 6.95     |
| <b>Region</b>                     |          |          |
| North                             | 1515     | 40.36    |
| Central                           | 1459     | 38.87    |
| South                             | 780      | 20.78    |
| <b>Decision of health service</b> |          |          |
| Wife                              | 1524     | 40.60    |
| Husband/partner                   | 1352     | 36.01    |
| Joint decision                    | 878      | 23.39    |
| <b>Health insurance ownership</b> |          |          |
| With insurance                    | 1247     | 33.22    |
| Without insurance                 | 2507     | 66.78    |
| <b>Wealth index</b>               |          |          |
| Poorest                           | 1135     | 30.23    |
| Second                            | 930      | 24.77    |
| Middle                            | 704      | 18.75    |
| Fourth                            | 550      | 14.65    |
| Richest                           | 435      | 11.59    |

Table 2 analyzes the relationship between independent variables and the use of maternal health services. The results of the chi-square test show that age, education, residence, region, decision to use services, insurance ownership, and wealth index have significant relationships with the use of delivery health services ( $p < 0.05$ ). For example, respondents with higher education have the highest percentage of service use (99.31%), while areas without road access have the lowest percentage (50.96%). Joint decisions are also associated with increased service use (80.64%). On the other hand, marital status does

not show a significant relationship ( $p = 0.974$ ).

**Table 2.** Bivariate Analysis between Independent Variables and Maternal Health Services

| Variables (3,754)                 | Delivery of health services |         | Total | Chi-square | p-value |
|-----------------------------------|-----------------------------|---------|-------|------------|---------|
|                                   | No (%)                      | Yes (%) |       |            |         |
| <b>Woman's age (years old)</b>    |                             |         |       | 22.0201    | 0.001   |
| 15-19                             | 21.69                       | 78.31   | 581   |            |         |
| 20-24                             | 25.29                       | 74.71   | 1,119 |            |         |
| 25-29                             | 19.00                       | 81.00   | 1,005 |            |         |
| 30-34                             | 18.63                       | 81.37   | 687   |            |         |
| 35-39                             | 25.37                       | 74.63   | 268   |            |         |
| 40-44                             | 29.87                       | 70.13   | 77    |            |         |
| 45-49                             | 29.41                       | 70.59   | 17    |            |         |
| <b>Education level</b>            |                             |         |       | 428.5534   | <0.001  |
| Non or ECE                        | 45.80                       | 54.20   | 452   |            |         |
| Primary                           | 32.74                       | 67.26   | 1,063 |            |         |
| Lower Secondary                   | 19.73                       | 80.27   | 1,034 |            |         |
| Upper secondary                   | 8.82                        | 91.18   | 669   |            |         |
| Post-secondary / Non-tertiary     | 3.00                        | 97.00   | 100   |            |         |
| Higher                            | 0.69                        | 99.31   | 436   |            |         |
| <b>Marital status</b>             |                             |         |       | 0.0011     | 0.974   |
| Currently married/in union        | 21.95                       | 78.05   | 3,668 |            |         |
| Formerly married/in union         | 22.09                       | 77.91   | 86    |            |         |
| <b>Place of residence</b>         |                             |         |       | 271.8417   | <0.001  |
| Urban                             | 5.73                        | 94.27   | 942   |            |         |
| Rural with road                   | 25.17                       | 74.83   | 2,551 |            |         |
| Rural without roads               | 49.04                       | 50.96   | 261   |            |         |
| <b>Region</b>                     |                             |         |       | 104.6026   | <0.001  |
| North                             | 27.79                       | 72.21   | 1,515 |            |         |
| Central                           | 13.30                       | 86.70   | 1,459 |            |         |
| South                             | 26.79                       | 73.21   | 780   |            |         |
| <b>Decision of health service</b> |                             |         |       | 9.8008     | 0.007   |
| Wife                              | 21.06                       | 78.94   | 1,524 |            |         |
| Husband/partner                   | 24.63                       | 75.37   | 1,352 |            |         |
| Joint decision                    | 19.36                       | 80.64   | 878   |            |         |
| <b>Health insurance ownership</b> |                             |         |       | 42.3333    | <0.001  |
| With insurance                    | 15.72                       | 84.28   | 1,247 |            |         |
| Without insurance                 | 25.05                       | 74.95   | 2,507 |            |         |
| <b>Wealth index</b>               |                             |         |       | 608.1859   | <0.001  |
| Poorest                           | 44.93                       | 55.07   | 1,135 |            |         |
| Second                            | 22.47                       | 77.53   | 930   |            |         |
| Middle                            | 10.23                       | 89.77   | 704   |            |         |
| Fourth                            | 5.27                        | 94.73   | 550   |            |         |
| Richest                           | 0.92                        | 99.08   | 435   |            |         |

Table 3 presents the results of multivariate analysis using binary logistic regression. After controlling other variables, higher education remains the most dominant factor, with respondents with higher education 20.9 times more likely to use health services than those without education ( $OR = 20.90$ ;  $p < 0.001$ ). Geographical factors also significantly influence areas without road access, with a much lower likelihood of using services ( $OR = 0.29$ ;  $p < 0.001$ ). The wealth index shows striking inequality, with the richest group 19.66 times more likely to use services than the poorest group ( $p < 0.001$ ). In addition, a joint

decision increases the likelihood of using services by 45% (OR = 1.45;  $p = 0.002$ ). Meanwhile, older age (35-39 years) reduces the likelihood of using services (OR = 0.52;  $p = 0.001$ ).

**Table 3. The binary logistic regression of factors associated with the utilization of delivery health services utilization**

| Variables                         | AOR          | <i>p-value</i>   | [95% conf. | interval] |
|-----------------------------------|--------------|------------------|------------|-----------|
| <b>Women's age (years old)</b>    |              |                  |            |           |
| 15-19                             | ref          |                  |            |           |
| 20-24                             | 0.70         | 0.007            | 0.54       | 0.91      |
| 25-29                             | 0.73         | 0.035            | 0.55       | 0.98      |
| 30-34                             | 0.71         | 0.037            | 0.51       | 0.98      |
| 35-39                             | 0.52         | 0.001            | 0.34       | 0.77      |
| 40-44                             | 0.84         | 0.561            | 0.46       | 1.53      |
| 45-49                             | 0.79         | 0.689            | 0.24       | 2.56      |
| <b>Education level</b>            |              |                  |            |           |
| Non or ECE                        | ref          |                  |            |           |
| Primary                           | 1.29         | 0.050            | 1.00       | 1.65      |
| Lower secondary                   | 2.07         | <b>&lt;0.001</b> | 1.57       | 2.73      |
| Upper secondary                   | 3.79         | <b>&lt;0.001</b> | 2.63       | 5.48      |
| Post secondary / Non tertiary     | 5.26         | 0.007            | 1.58       | 17.50     |
| Higher                            | <b>20.90</b> | <b>&lt;0.001</b> | 6.42       | 68.02     |
| <b>Marital status</b>             |              |                  |            |           |
| Currently married/in union        | ref          |                  |            |           |
| Formerly married/in union         | 0.85         | 0.576            | 0.47       | 1.52      |
| <b>Place of residence</b>         |              |                  |            |           |
| Urban                             | ref          |                  |            |           |
| Rural with road                   | 0.48         | <b>&lt;0.001</b> | 0.35       | 0.66      |
| Rural without road                | 0.29         | <b>&lt;0.001</b> | 0.19       | 0.43      |
| <b>Region</b>                     |              |                  |            |           |
| North                             | ref          |                  |            |           |
| Central                           | <b>1.74</b>  | <b>&lt;0.001</b> | 1.39       | 2.16      |
| South                             | 0.89         | 0.339            | 0.71       | 1.12      |
| <b>Decision of health service</b> |              |                  |            |           |
| Wife                              | ref          |                  |            |           |
| Husband/partner                   | 0.94         | 0.538            | 0.77       | 1.15      |
| Joint decision                    | <b>1.45</b>  | <b>0.002</b>     | 1.15       | 1.84      |
| <b>Health insurance ownership</b> |              |                  |            |           |
| With insurance                    | ref          |                  |            |           |
| Without insurance                 | 0.66         | <b>&lt;0.001</b> | 0.54       | 0.81      |
| <b>Wealth index</b>               |              |                  |            |           |
| Poorest                           | ref          |                  |            |           |
| Second                            | 2.13         | <b>&lt;0.001</b> | 1.73       | 2.63      |
| Middle                            | 4.30         | <b>&lt;0.001</b> | 3.20       | 5.77      |
| Fourth                            | 6.13         | <b>&lt;0.001</b> | 4.02       | 9.35      |
| Richest                           | <b>19.66</b> | <b>&lt;0.001</b> | 7.08       | 54.54     |

## DISCUSSION

This study examined the determinants of health service utilization in the Lao PDR by identifying education, geographic accessibility, household wealth, and intra-household decision-making as critical factors. These findings reinforce the importance of structural and sociodemographic drivers in health-seeking behavior and provide valuable lessons that may apply to other Southeast Asian countries,

particularly Indonesia.

### **Sociodemographic and Structural Determinants in Laos**

Age was a significant factor in the utilization of health services. Women aged 20–24 and 35–39 years were less likely to utilize delivery services, potentially due to confidence from previous childbirth experiences or sociocultural preferences for home births. This mirrors findings from other low- and middle-income countries where maternal age influences the perceived need for institutional delivery. Moreover, education emerged as the most dominant factor. Women with higher education were over 20 times more likely to utilize delivery services than those with no education. This supports extensive literature (20–22) highlighting how education enhances health literacy, awareness, and access to information, thus promoting service utilization. However, wide confidence intervals indicate model limitations and the need for cautious interpretation. Geographic access—specifically the presence of roads—was a significant enabler of service use, with those lacking road access being substantially less likely to seek care (OR = 0.29). This reflects a broader infrastructure challenge in Lao PDR, where difficult terrain and dispersed populations hinder access to health facilities, particularly in rural areas (23,24). Wealth was another strong predictor. Women from wealthier households were almost 20 times more likely to use delivery services. This finding is consistent with literature showing that higher socioeconomic status improves access to both direct care and associated costs like transportation. Financial barriers remain a core challenge in equitable health access. Finally, shared decision-making within households significantly increased the likelihood of utilizing services, supporting prior research on the influence of familial dynamics (30). Health education and promotion strategies that engage women, their partners, and family members may enhance health-seeking behavior.

### **Comparative Perspective: Laos and Indonesia**

While the findings are grounded in the Lao PDR context, parallels and contrasts with Indonesia are highly instructive. Both countries face similar challenges regarding geographical barriers, health equity, and cultural norms surrounding childbirth. In Indonesia, maternal health service utilization remains uneven, particularly across provinces and urban and rural areas. According to the Indonesian Demographic and Health Survey (SDKI/*Survei Dasar Kesehatan Indonesia*), institutional delivery rates remain lower in eastern provinces with weaker health infrastructure. The similarities between Lao PDR and Indonesia include the importance of maternal education in predicting delivery care utilization. Additionally, the impact of geographic access on maternal health service use, especially in rural or remote areas. Moreover, economic inequality is a barrier to accessing quality services. However, Lao PDR and Indonesia are facing different challenges. Indonesia has implemented national-scale programs such as Jampersal (*Jaminan Persalinan*/ Delivery Guarantee Program) and JKN (National Health Insurance), which have improved access, particularly among the poor. Such programs are more limited in Laos. In Indonesia, community health initiatives like Posyandu and Puskesmas are more established and may be more active in bridging rural-urban disparities. Cultural norms in Indonesia, especially among indigenous or remote communities, continue to influence delivery practices and perceptions of modern healthcare, similar to Laos but shaped by a more decentralized health system.

### **Policy Implications for Indonesia**

The Lao experience provides several lessons for Indonesia. Investing in women's education remains critical to improving maternal health outcomes. Strengthening community-based educational interventions can improve knowledge and service uptake. Improving rural infrastructure, particularly road access, should remain a priority in remote Indonesian provinces. Engaging families in maternal health decision-making could further improve service utilization. Interventions that promote shared decision-making, such as male involvement programs, should be scaled up. Targeting wealth disparities through the continued expansion of financial protection schemes like JKN is vital. While Indonesia has made greater progress in service provision, especially through its universal health coverage efforts, challenges in service quality, geographic equity, and sociocultural acceptance persist—many of which are mirrored in Laos.

Therefore, improving physical accessibility through the development of better road infrastructure is a crucial step in addressing inequalities in access to health services (15).

The finding that wealthier individuals are more likely to use health services, with an odds ratio of 19.66 times higher than that of poorer individuals, is consistent with findings from previous studies showing a strong relationship between economic status and access to health services. Economic inequality plays a significant role in access to health services, with the wealthier group having easier access to better health services, while the poor are often hampered by costs and resource constraints (25). In addition, the inability to pay for health services is one of the main barriers for poor families in accessing the health care they need (26). The theory of access to health services states that factors such as cost, ability to pay, and availability of services affect an individual's ability to obtain the health services they need (27). Other studies utilizing MICS Philippines and Malawi found similar results that higher education level and wealthier women were more likely to utilize the delivery care services (28,29). In this context, cost is an important dimension that exacerbates inequalities in access to health services, as those in lower socioeconomic classes often have difficulty paying for medical services or transportation costs to health facilities.

The finding that shared decision-making within the family members increased the likelihood of health care use by 45% is in line with previous research findings that show that family dynamics have a significant influence on health care use decisions. For example, health care decisions are often influenced by interactions and discussions within the family, where other family members, especially husbands or partners, can influence the choice to seek medical care (30). The theory of shared decision-making in the context of health also supports these findings, where shared decisions can increase understanding and commitment to treatment options, as well as strengthen the social support needed for access to health care (31). Therefore, health programs that emphasize the importance of the family's role in the decision-making process may be an effective strategy to increase health care use, as suggested by previous theory and empirical evidence.

The limitations of this study include the use of secondary data from the Multiple Indicator Cluster Survey (MICS), which has limitations in terms of available variables, so that several factors that may influence the use of health services, such as the quality of health services or deeper cultural factors, cannot be analyzed directly. In addition, although this study includes a fairly large sample, the data used are cross-sectional, so it cannot show a definite causal relationship between factors that influence the use of health services. This study also did not consider other factors that may play a role, such as the influence of government policies or social changes that may affect access to and use of health services in the long term. Finally, although data were obtained from various regions in Lao PDR, limitations in the representation of unreached areas or the lack of recent data may affect the accuracy of the results that reflect current conditions. The findings from Lao PDR in this study provide lessons for other developing countries, including investing in women's education, improving rural infrastructure, engaging families in maternal health making, and targeting wealth disparities.

## CONCLUSION

Overall, this study revealed that education, economic status, and geographic access were the main maternal health service utilization predictors. These findings highlight the importance of policy interventions that focus on increasing access to education, improving rural infrastructure, and expanding health insurance coverage to reduce disparities in health service utilization. In addition, promoting husband or partner participation in decision-making may also be an effective strategy to increase maternal health service utilization.

Future research could add more expected predictors of delivery care with a mix of quantitative and qualitative methods by exploring the sociocultural and service quality. This study contributes to the growing body of evidence on maternal health in Southeast Asia by highlighting the structural and socio-cultural drivers of service utilization in a lower-middle-income country. Incorporating a comparative lens with Indonesia adds a regional perspective, offering insights relevant to policymakers, particularly those addressing maternal and child health disparities in multi-ethnic, geographically diverse contexts.



## FUNDING

This research received no external funding.

## ACKNOWLEDGMENTS

We would like to express our sincere gratitude for the administrative and technical support provided by Stikes Cirebon. Their invaluable assistance has greatly contributed to the success of this study.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest.

## REFERENCES

1. World Health Organization. WHO guideline on self-care interventions for health and well-being, 2022 revision [Internet]. World Health Organization; 2022 [cited 2025 Mar 27]. Available from: <https://iris.who.int/bitstream/handle/10665/357828/9789240052192-eng.pdf?sequence=1>
2. Ahissou NCA, Nonaka D, Takeuchi R, de los Reyes C, Uehara M, Khampheng P, et al. Trend of sociodemographic and economic inequalities in the use of maternal health services in Lao People's Democratic Republic from 2006 to 2017: MICS data analysis. *Trop Med Health*. 2023 Oct 19;51(1):56.
3. Liverani M, Phongluxa K, Phommasone K, Chew R, Chandna A, Pongvongsa T, et al. Prospects for the development of community-based care in remote rural areas: a stakeholder analysis in Laos. *BMC Health Serv Res*. 2024 Jan 11;24(1):55.
4. World Health Organization. WHO guideline on health workforce development, attraction, recruitment and retention in rural and remote areas [Internet]. World Health Organization; 2021 [cited 2025 Mar 27]. Available from: <https://iris.who.int/bitstream/handle/10665/341130/9789240025318-eng.pdf>
5. Kapheak K, Theerawasttanasiri N, Khumphoo P, Sriwongphan R, Ritthimon W, Chayaseng C, et al. A Qualitative Study of Women's Perspectives of Antenatal Care in Rural Areas of the Lao PDR. *Journal of Population and Social Studies*. 2025 Jan 3;33:803–21.
6. Kapheak K, Theerawasttanasiri N, Khumphoo P, Sriwongphan R, Ritthimon W, Chayaseng C, et al. Perspectives of Healthcare Providers in Maternal and Child Health Services in Bokeo Province, Lao People's Democratic Republic: A Qualitative Study. *Journal of Population and Social Studies*. 2023 Dec 27;32:329–45.
7. Aryal A, Clarke-Deelder E, Afriyie DO, Phommalangsy S, Fink G. Factors influencing healthcare facility selection in an urban setting in Lao PDR: Findings from a qualitative study. *SSM - Health Systems*. 2025 Jun;4:100062.
8. Kawaguchi Y, Sayed AM, Shafi A, Kounnavong S, Pongvongsa T, Lasaphonh A, et al. Factors affecting the choice of delivery place in a rural area in Laos: A qualitative analysis. *PLoS One*. 2021 Aug 2;16(8):e0255193.
9. Phongluxa K, Langeslag G, Jat TR, Kounnavong S, Khan MA, Essink DR. Factors influencing sexual and reproductive health among adolescents in Lao PDR. *Glob Health Action*. 2020 Jul 30;13(sup2):1791426.
10. Wungrath J, Sriwongphan R, Kapheak K, Ritthimon W. Home Births Among Ethnic Minority Communities in Bokeo Province, Lao People's Democratic Republic. *Kesmas*. 2024;19(4):264–71.
11. Hose I, Durham J, Phengsavanh A, Sychareun V, Vongxay V, Xaysomphou D, et al. Perceptions and management of postpartum haemorrhage among remote communities in Lao PDR. *Rural Remote Health*. 2020 Jan 10;
12. Haenssge MJ, Elliott EM, Phommachanh S, Phomkong S, Kounnavong S, Kubota S. Trust in healthcare: methodological and conceptual insights from mixed-method research in Lao People's Democratic Republic. *BMJ Glob Health*. 2024 May;9(5):e014640.

13. Phommachanh S, Essink DR, Jansen M, Broerse JEW, Wright P, Mayxay M. Improvement of Quality of Antenatal Care (ANC) Service Provision at the Public Health Facilities in Lao PDR: Perspective and Experiences of Supply and Demand Sides. *BMC Pregnancy Childbirth*. 2019 Dec 22;19(1):255.
14. Win PP, Hlaing T, Win HH. Factors influencing maternal death in Cambodia, Laos, Myanmar, and Vietnam countries: A systematic review. *PLoS One*. 2024 May 17;19(5):e0293197.
15. Dawkins B, Renwick C, Ensor T, Shinkins B, Jayne D, Meads D. What factors affect patients' ability to access healthcare? An overview of systematic reviews. *Tropical Medicine & International Health*. 2021 Oct 21;26(10):1177–88.
16. Vongsaly C. Basic Education in Lao People's Democratic Republic. In 2024. p. 459–85.
17. Thongmixay S, Essink DR, Greeuw T de, Vongxay V, Sychareun V, Broerse JEW. Perceived barriers in accessing sexual and reproductive health services for youth in Lao People's Democratic Republic. *PLoS One*. 2019 Oct 29;14(10):e0218296.
18. Sato C, Phongluxa K, Toyama N, Gregorio ER, Miyoshi C, Nishimoto F, et al. Factors influencing the choice of facility-based delivery in the ethnic minority villages of Lao PDR: a qualitative case study. *Trop Med Health*. 2019 Dec 5;47(1):50.
19. Nagpal S, Masaki E, Pambudi ES, Jacobs B. Financial protection and equity of access to health services with the free maternal and child health initiative in Lao PDR. *Health Policy Plan*. 2019 Oct 1;34(Supplement\_1):i14–25.
20. Enticott J, Johnson A, Teede H. Learning health systems using data to drive healthcare improvement and impact: a systematic review. *BMC Health Serv Res*. 2021 Dec 5;21(1):200.
21. Khatri RB, Assefa Y. Access to health services among culturally and linguistically diverse populations in the Australian universal health care system: issues and challenges. *BMC Public Health*. 2022 Dec 3;22(1):880.
22. Raghupathi V, Raghupathi W. The influence of education on health: an empirical assessment of OECD countries for the period 1995–2015. *Archives of Public Health*. 2020 Dec 6;78(1):20.
23. Mohd Rosnu NS, Singh DKA, Mat Ludin AF, Ishak WS, Abd Rahman MH, Shahar S. Enablers and Barriers of Accessing Health Care Services among Older Adults in South-East Asia: A Scoping Review. *Int J Environ Res Public Health*. 2022 Jun 15;19(12):7351.
24. Verma VR, Dash U. Geographical accessibility and spatial coverage modelling of public health care network in rural and remote India. *PLoS One*. 2020 Oct 21;15(10):e0239326.
25. Gordon T, Booyesen F, Mbonigaba J. Socio-economic inequalities in the multiple dimensions of access to healthcare: the case of South Africa. *BMC Public Health*. 2020 Dec 4;20(1):289.
26. Hashemi G, Wickenden M, Bright T, Kuper H. Barriers to accessing primary healthcare services for people with disabilities in low and middle-income countries, a Meta-synthesis of qualitative studies. *Disabil Rehabil*. 2022 Apr 10;44(8):1207–20.
27. Folland S, Goodman AC, Stano M, Danagoulain S. *The Economics of Health and Health Care*. New York: Routledge; 2023.
28. Hodge A, Firth S, Bermejo R, Zeck W, Jimenez-Soto E. Utilisation of health services and the poor: deconstructing wealth-based differences in facility-based delivery in the Philippines. *BMC Public Health*. 2016 Dec 6;16(1):523.
29. Yaya S, Bishwajit G, Shah V. Wealth, education and urban–rural inequality and maternal healthcare service usage in Malawi. *BMJ Glob Health*. 2016 Aug 16;1(2):e000085.
30. Zakayo SM, Njeru RW, Sanga G, Kimani MN, Charo A, Muraya K, et al. Vulnerability and agency across treatment-seeking journeys for acutely ill children: how family members navigate complex healthcare before, during and after hospitalisation in a rural Kenyan setting. *Int J Equity Health*. 2020 Dec 10;19(1):136.
31. Resnicow K, Catley D, Goggin K, Hawley S, Williams GC. Shared Decision Making in Health Care: Theoretical Perspectives for Why It Works and For Whom. *Medical Decision Making*. 2022 Aug 16;42(6):755–64.