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**The trends of maternal and infant mortality and
Health care facility status in Lao PDR**

Phaythoun Kenvongphachanh

**The Graduate School
Yonsei University
Department of Medicine**

The trends of maternal and infant mortality and Health care facility status in Lao PDR

A Master's Thesis

**Submitted to the Department of Medicine,
and the Graduate School of Yonsei University
In partial fulfillment of the Master of Medicine**

Phaythoun Kenvongphachanh

June 2024

**This certifies that the Master's Thesis
of Phaythoun Kenvongphachanh is approved.**

Thesis Supervisor	Jong-Koo Kim
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Thesis Committee Member	Jae Hung Jung
-------------------------	---------------

Thesis Committee Member	Jin-Won Noh
-------------------------	-------------

**The Graduate School
Yonsei University
June 2024**

ACKNOWLEDGEMENT

I would like to express my heartfelt gratitude to my wife and two daughters, Tamin and Marin, as well as the Kenvongphachanch family and two esteemed mentors, whose unwavering support and encouragement have been fundamental to my journey throughout this period of study. I am also extremely grateful to the Ministry of Health of Lao PDR, the Korea Foundation for International Health, including Dr. Lee Jong-Wook and the KOFIH program, and my family for their generous support in providing the scholarship.

I extend my sincere thanks to Yonsei University, particularly the Department of Medicine, Graduate School, and the Medical College of Wonju, along with its dedicated staff, for making this training possible.

I would like to extend my heartfelt thanks to my supervisor, Jong Koo Kim, and my coordinator, Ms. Huijin, who agreed to oversee this study despite their numerous commitments. Lastly, I am grateful to all my colleagues in the KOFIH program and my fellow students. Their support, along with the opportunities for learning and teaching, has greatly enhanced my capabilities.

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ABSTRACT

THE TRENDS OF MATERNAL AND INFANT MORTALITY AND HEALTH CARE FACILITY STATUS IN LAO PDR

Background: Maternal and child health (MCH) in the Lao People's Democratic Republic (Lao PDR) is crucial for improving health outcomes and achieving Sustainable Development Goals. Despite progress, challenges such as high maternal and infant mortality rates persist, particularly in rural areas compared to urban areas

Methods: This study utilizes data from the Lao Social Indicator Survey II (LSIS II) and DHIS2 health facility records to analyze trends contributing to health worker coverage, healthcare facility hospital levels, and bed availability, as well as mortality rates among mothers and infants. A comparative approach is employed to evaluate health services in urban and rural settings, focusing on healthcare utilization and quality of care.

Results: The findings reveal significant disparities in maternal and infant health outcomes between urban and rural areas. Specifically, Vientiane (the capital) exhibited better healthcare service utilization and lower mortality rates than Houaphan Province. Key determinants of these disparities included economic status, education levels, access to skilled birth attendants, and the availability of essential medical resources. In Vientiane, a city with a population of 989,000 residents and an equal distribution of men and women, notable advancements in healthcare service delivery have been achieved. This progress is supported by 47 facilities, including 5 provincial hospitals and 42 health centers, and is particularly evident in improvements to telecommunications infrastructure and accessibility. Conversely, in Houaphan Province, despite having a diverse population of around 315,000 individuals and 85 health facilities—including 1 provincial hospital and 84 health centers—challenges remained. This is reflected by higher maternal mortality rates and neonatal morbidity compared to Vientiane.

Conclusion: Improving maternal and infant health outcomes in Lao PDR, especially in rural areas, is crucial. This involves enhancing healthcare infrastructure and increasing the availability of trained healthcare professionals. These measures will help in identifying trends that contribute to health worker coverage, the number of health facility beds, hospital-level services, and maternal and infant mortality rates. Policy recommendations include implementing targeted interventions for rural communities and ensuring continued support from international health organizations.

Keywords: Maternal mortality, infant mortality, healthcare status, urban-rural disparities, health policy, health facility

1. Introduction

1.1. Background

Trends in maternal and infant mortality, as well as healthcare facilities worldwide, are of crucial importance for ensuring the well-being and survival of mothers and children. Enhancing the quality of these services involves various strategies and interventions aimed at providing safe, effective, and patient-centered care (Scopaz, Eckermann, & Clarke, 2013; Shimocomaqui, Masuda, de Souza, de Sousa Gadelha, & Eshriqui, 2023). A key aspect of improving quality is ensuring access to skilled healthcare professionals who are trained in comprehensive maternal and child healthcare. This includes obstetricians, midwives, pediatricians, and other specialized healthcare providers. Adequate staffing levels, ongoing training, and professional development opportunities are essential to maintain a high standard of care. Another critical factor is the availability of essential medical equipment, supplies, and medications. Access to well-equipped facilities, including hospitals and clinics, is crucial for safe deliveries, emergency obstetric care, and pediatric services. Regular maintenance and quality assurance protocols help ensure the functionality and reliability of these resources. (Reynolds, Wong, & Tucker, 2006).

Maternal and child health (MCH) has seen global improvements over the past 25 years, largely due to efforts aimed at achieving Millennium Development Goals (MDG) 4 (reduce child mortality) and 5 (improve maternal health). As a result, countries are now focusing on the Sustainable Development Goals (SDGs) for the period 2016-2030 (Sysavanh Phommachanh, Essink, Wright, Broerse, & Mayxay, 2021; Shimocomaqui et al., 2023). Maternal mortality remains a critical health indicator, highlighting the vast disparities between affluent and impoverished nations. Developed countries report approximately nine maternal deaths per 100,000 live births, whereas developing countries experience around 450 maternal deaths per 100,000 live births. The Western Pacific Region alone records about 13,000 maternal deaths annually, with significant disparities observed within developing countries, particularly between urban and rural areas, and between the wealthy and the poor. Regionally, the highest maternal mortality rate (MMR) is found in Africa (830), followed by some countries in the Western Pacific Region and the Middle East, then Asia (330), Oceania (240), Latin America and the Caribbean (190), with the lowest rates in developed countries. In the Lao People's Democratic Republic, the MMR is estimated to range from 400 to 600 per 100,000 live births, marking the poorest maternal health indicators in the Southeast Asia region when compared to neighboring countries. (Jacobs, Lindelow, Xayyavong, & Sackett, 2012) The Lao People's Democratic Republic (Lao PDR), a landlocked lower-middle-income country in Southeast Asia, has a population of 7,282,000, comprising 3,349,000 females and 3,513,000 males. The ethnic composition includes 55% Lao Loom and 45% other ethnic groups, spread across 18 provinces. An estimated 67.1% of the population resides in rural mountainous areas, and 7.9% live in regions without road access. In response, the government of Lao PDR has launched several primary healthcare strategies in collaboration with international partners.

The Ministry of Health established a Maternal and Child Health-Expanded Program for Immunization Technical Working Group and developed the Strategy for the Integrated Package of Maternal, Neonatal, and Child Health Services. In Southeast Asia, the child mortality rate in Vietnam is 170 per 100,000 live births, compared to 124 per 100,000 in Thailand. According to the 2019 Lao Social Indicator Survey (LSISII), the child mortality rate in Laos is 46 per 1,000 live births. Additionally, the maternal mortality rate in Laos is reported to be 405 per 100,000 live births.

Child mortality and morbidity in Laos are largely attributed to the quality of healthcare services. The primary factors influencing maternal and newborn health are economic and social determinants. In Laos, maternal and newborn health services are impacted by these two categories of factors: economic and social. Economic factors, including poverty and limited healthcare access, contribute to inadequate prenatal care, malnutrition, and a scarcity of skilled birth attendants. These issues heighten the risk of complications during pregnancy and childbirth. On the social side, factors such as cultural norms, gender inequality, and educational deficits also significantly affect maternal and newborn health. For instance, traditional beliefs may prevent women from seeking timely medical care or adopting healthy behaviors during pregnancy. Furthermore, gender inequality can restrict women's decision-making power and access to resources, thereby impacting their ability to prioritize their own health and that of their newborns. To tackle these challenges, it is crucial to implement comprehensive strategies aimed at enhancing healthcare infrastructure, promoting education and awareness about maternal and newborn health, empowering women, and addressing both poverty and social inequalities. Addressing these economic and social factors is essential for improving health outcomes in Laos (Y. Kamiya, 2011)

The government, along with various organizations and international partners, is actively working to enhance the healthcare system and improve access to quality healthcare for mothers and children. In Laos, maternal healthcare services strive to offer comprehensive care to pregnant women, encompassing prenatal care, skilled attendance during childbirth, and postnatal care. Efforts are underway to increase the number of skilled healthcare professionals, including midwives and nurses, in both urban and rural settings. Additionally, initiatives have been launched to promote safe delivery practices and provide essential obstetric care. Despite challenges related to geography and infrastructure, Laos has experienced significant advancements in its telecommunications sector, coupled with increased affordability of mobile devices. To gain a better understanding of mobile phone usage trends, organizations such as UNICEF have conducted studies like the Lao Social Indicator Survey (LSIS II) to collect extensive data on technology access. This research analyzes mobile phone usage among women and men aged 15-49 in Laos, utilizing data from LSIS II collected by UNICEF. By exploring technology adoption patterns, the study seeks to enhance understanding of the role of mobile telecommunications in shaping society and promoting connectivity in Laos. Through an empirical analysis of LSIS II data, the study aims to inform evidence-based policymaking and interventions that promote digital inclusion and socioeconomic development in the country (Som et al., 2023). Maternal health remains a significant concern in Laos, where challenges such as limited access to healthcare facilities and socioeconomic disparities contribute to poor maternal health outcomes. To effectively address these challenges and develop evidence-based interventions, it is crucial to understand the trends and factors influencing maternal health **facility** services in the country.

For children, healthcare services prioritize proper immunization coverage, nutrition, and early childhood development. Immunization programs have expanded to protect more children against vaccine-preventable diseases. Nutrition interventions, including breastfeeding support and supplementary feeding programs, are designed to combat malnutrition and foster healthy growth and development (Lee, 2014). The top priority of maternal and newborn health is the provision and improvement of management systems and the support of government policies. Despite efforts by the Lao government, challenges remain in providing equitable access to healthcare services throughout the country, particularly in Vientiane and rural areas like Houaphan Province. Vientiane has a population of 989,000, with an almost equal distribution of male and female residents. The majority (82%) are of the Lao ethnic group, and Buddhism is the predominant religion, practiced by 91% of the population. The GDP per capita is \$2,448. The city comprises 481 villages with a total of 181,083 households. Geographically, Vientiane is situated at approximately 17.9757° N latitude and 102.6331° E longitude and has a population density of about 1,320 people per square kilometer. The elevation ranges from 170 meters to 200 meters above sea level, and the city experiences a tropical monsoon climate with distinct wet and dry seasons. In Vientiane, there are 47 health facilities. Among these, 5 are Center and Provincial Hospitals, which represent 10.64% of the total. Health Centers make up the majority, with 42 facilities accounting for 70.21% of all health facilities in the area.

Houaphan Province is located in the northeastern part of Lao PDR and shares a 250 km border with Son La Province of Vietnam, situated 128 km south of Nghe An Province. The province spans an area of 16,500 km² and comprises 10 districts, with a total population of 315,000 people. It is home to a diverse mix of ethnic groups, including Lao (56.71%), Khmu (19.3%), Hmong (29.83%), and a small percentage of foreigners (0.18%) (Reynolds, Wong, & Tucker, 2006).

People from all ethnic groups possess distinct identities, cultures, and languages, yet there is a fundamental unity and love among them. In terms of healthcare infrastructure, the region boasts one provincial hospital, nine district hospitals, and 60 health centers. The maternal mortality rate stands at 489 per 100,000 live births, and the average life expectancy is 62 years, with women living slightly longer at 63 years compared to men at 60 years. In Houaphan Provinces, the target neonatal healthcare service coverage reached 81%. However, the number of newborn deaths remains high, (Nagpal, Masaki, Pambudi, & Jacobs, 2019). In Houaphan Province, there are a total of 85 health facilities. Of these, only one serves as both a Center and Provincial Hospital, making up 4.71% of the total. There are three District Hospitals, which account for 10.59% of the total. The majority of health facilities are Health Centers, with 81 facilities comprising 84.71% of the total in Houaphan Province.

The objective of this study is to improve health worker coverage, health facility beds, and maternal and infant mortality of mothers and infants in Houaphan Province, comparing them with those in Vientiane in Lao PDR. This involves assessing maternal mortality ratio and neonatal morbidity rates during pregnancy, childbirth, and the postnatal period, with a specific focus on meeting the healthcare needs of the Hmong ethnic community residing in rural mountain areas (Sychareun et al., 2013)

1.2. Objective

The aim of this study is to identify trends in maternal and infant mortality and healthcare facility utilization in Vientiane (an urban area, the capital of the country) and Houaphan Province in Lao PDR. Ultimately, the study's goals are (1) to improve gaps in healthcare system services between urban and rural areas and (2) to provide insights into trends contributing to health worker coverage, health facility beds, and maternal and infant mortality of mothers and infants.

1.3. Research Question

The research explores disparities in health worker coverage, health facility beds, and maternal and infant mortality rates between urban and rural areas in Laos. It focuses on standards of healthcare management, the quality of healthcare services, and trends in maternal and newborn health facilities, including district A and district B hospitals and health centers in districts. The study aims to identify significant differences in these areas between urban and rural areas

1.4. Significance of the Study

This study aims to identify trends influencing maternal and infant mortality and morbidity in urban Vientiane and rural Houaphan Province in Lao PDR. By examining these areas, the study seeks to improve the quality of healthcare facilities and inform health policy recommendations for the Ministry of Health. It focuses on factors affecting healthcare quality, such as workforce dynamics and healthcare service availability, and emphasizes improvements in health facilities, including hospitals, centers, and health centers in both urban and rural settings. The findings will provide valuable insights to address regional disparities and improve maternal and child health outcomes across Lao PDR.

1.5. Benefits

The specific details regarding healthcare services for maternal and child health in Laos may have evolved, with a particular emphasis on services for ethnic groups of mothers and children living in rural areas.

Improved Outcomes: Strengthening community health systems enhances health outcomes for both mothers and newborns by reducing maternal and infant mortality rates.

Expanded Healthcare Access and Utilization: By concentrating efforts on rural regions and strengthening community health infrastructure, healthcare services for expectant mothers and newborns have become more accessible, ensuring that essential medical care is readily available and easily accessible.

Building Capacity: Strengthening community health systems requires capacity building, which involves empowering local healthcare providers with the skills and knowledge necessary to meet the unique healthcare needs of mothers and children in facilities such as hospitals and health centers in districts A and B.

Raising Awareness and Behavioral Change: Community-based initiatives are crucial in increasing awareness of maternal and child health issues. Engaging directly with communities offers an opportunity to encourage behavioral changes that align with the original culture and traditions of the area, positively influencing healthcare-seeking behaviors and overall health practices.

2. LITERATURE REVIEW

2.1. The World Health Organization's Role in Advancing Healthcare in Lao PDR: Overview of Maternal Healthcare and Newborn Services

The World Health Organization (WHO) has played a crucial role in advancing healthcare in the Lao PDR, particularly in the areas of reproductive, maternal, and newborn health. By collaborating with health authorities and development partners, WHO has significantly influenced the development and implementation of the National Strategy and Action Plan on Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCAH) for the period 2021-2025.(Organization, 2005).

WHO's Contribution: The WHO has played a crucial role in advancing healthcare in Laos, especially in the areas of reproductive, maternal, and newborn health. The collaboration between the WHO, local health authorities, and development partners has been instrumental in developing and executing national strategies and action plans to enhance maternal and newborn health. The WHO's support includes improving healthcare infrastructure, training healthcare workers, and implementing evidence-based interventions to tackle challenges in maternal and newborn health (Lee, 2014).

ODA Support: Official development assistance (ODA) is instrumental in providing financial support for maternal and newborn healthcare services in Laos. ODA funding supports various interventions, such as prenatal care, skilled birth attendance, postnatal care, emergency obstetric services, and newborn care programs. Beyond direct healthcare services, ODA also aids in strengthening health systems through infrastructure development, procurement of medical equipment and supplies, and capacity building for healthcare personnel (Organization, 2005).

Key Achievements: WHO-supported initiatives have significantly enhanced antenatal care coverage and increased the number of facility-based deliveries attended by skilled professionals. Programs such as Early Essential Newborn Care (EENC) and Kangaroo Mother Care (KMC) have played a crucial role in lowering neonatal mortality rates by advocating for essential newborn care practices and encouraging skin-to-skin contact between mothers and their infants.

Quality assessment and improvement mechanisms implemented in hospitals have improved the quality of maternal and newborn healthcare services, leading to improved health outcomes. The CONNECT Initiative, which focuses on strengthening primary healthcare, has increased facility deliveries, improved birth registration rates, and expanded access to essential services.

Challenges: Despite significant progress, several issues continue to impact maternal and newborn health outcomes, including geographical disparities, inadequate healthcare infrastructure in rural areas, cultural barriers, and socioeconomic factors. Geographical remoteness frequently leads to diminished access to healthcare services, which in turn contributes to health outcome disparities between urban and rural populations.

Cultural beliefs and practices can influence healthcare-seeking behaviors and perceptions of maternal and newborn care, which may pose challenges to the adoption of modern healthcare practices.

Similarly, bioeconomic factors such as poverty and education levels can affect access to healthcare services and contribute to disparities in health outcomes among different population groups.

Ongoing Efforts: The Lao government, NGOs, and international organizations are actively working to tackle these challenges through research, policy development, and targeted interventions. Current initiatives focus on enhancing healthcare infrastructure, improving access to services in remote areas, promoting community-based healthcare programs, and overcoming socio-cultural barriers to healthcare utilization. Ongoing investment in maternal and newborn healthcare, coupled with continuous collaboration among stakeholders, is crucial for advancing health outcomes for mothers and infants in Laos (Organization, 2010).

The maternal healthcare and newborn services in Laos highlight both significant achievements and ongoing challenges in this vital area of public health. The Ministry of Health (MOH) shows a steadfast commitment to improving these services by prioritizing the development of strategies and the delivery of high-quality care, which are crucial for protecting the health of mothers and infants. By ensuring access to essential services, maintaining rigorous quality standards, enhancing healthcare infrastructure, and building partnerships, the MOH plays a critical role in advancing national health goals and ensuring the right to health for all citizens (Norng, Phon, Hok, & Sam).

2.2. Healthcare Delivery for Maternal and Child Health in Lao PDR: An Overview of Health Center Services

The healthcare delivery system for maternal and child health in the Lao PDR primarily consists of a network of health facilities that emphasize primary healthcare services at the community level. Below is an overview of the healthcare delivery services for maternal and child health in health centers across Laos:

Table 1. Overview of Health Center Services for Maternal and Child Health in Lao PDR

Health Center Structure	
Primary Healthcare Facilities	Health centers in Lao PDR serve as primary healthcare facilities, often at the community level.
Maternal and Child Health Units	Specialized units within health centers dedicated to maternal and child health services.

Maternal Health Services	
Antenatal Care (ANC)	The quality of ANC services suffers due to inadequate facilities, a shortage of skilled providers, poor communication, minimal privacy during consultations (only 4% considered privacy in one study), ineffective use of educational materials (fewer than 10% used them effectively), and healthcare providers' limited training and motivation, leading to short and ineffective ANC sessions
Skilled Birth Attendance	Focus on encouraging deliveries attended by skilled birth attendants, with health center staff, including midwives, playing a crucial role.
Postnatal Care (PNC)	Health centers offer PNC for mothers and newborns, addressing postpartum complications and ensuring well-being.
Child Health Services	
Immunization Programs	Health Centers administer childhood vaccinations as part of national immunization programs.
Growth Monitoring and Nutrition Services	Routine monitoring of children's growth and nutrition. Health workers assess nutritional status and provide interventions for malnutrition.
Management of Childhood Illnesses	Health center staff diagnose and treat common childhood illnesses such as diarrhea, respiratory infections, and preventable diseases.
Family Planning Services	
Family Planning Services	Health centers may offer family planning services to support reproductive health and allow families to plan the timing and spacing of pregnancies.
Health Education	
Health Education	Community health workers and health center staff conduct health education sessions on maternal and child health topics. This includes educating communities about the importance of prenatal care, proper nutrition, and early childhood development.

Community Engagement	
Community Engagement	Health centers engage with the community to raise awareness about maternal and child health issues through community meetings, outreach programs, and collaboration with local leaders.
Referral System	
Referral System	Health centers are part of a referral system, playing a role in identifying high-risk pregnancies or complicated cases that may require referral to higher-level facilities such as district hospitals.
Data Collection and Reporting	
Data Collection and Reporting	Health centers contribute to health information systems through data collection and reporting. Monitoring and evaluation of maternal and child health indicators help assess the effectiveness of interventions.
Capacity Building and Training	
Capacity Building and Training	Ongoing training programs are conducted for health center staff, including midwives and nurses, to improve their skills in maternal and child healthcare.
Collaboration with NGOs and International Organizations	
Collaboration with NGOs and International Organizations	Health centers often collaborate with non-governmental organizations (NGOs) and international organizations to expand resources, expertise, and funding for maternal and child health initiatives.
Challenges	
Challenges	Challenges may include limited resources, geographical disparities, and the need for sustained community engagement.
Future Directions	
Future Directions	Ongoing efforts focus on strengthening health systems, expanding services, and addressing challenges to improve maternal and child health outcomes.

2.3. Health Policy Development

The Ministry of Health (MOH) in Laos prioritizes policy initiatives that focus on the healthcare needs of mothers and children. These initiatives encompass providing essential services, promoting family planning, conducting educational campaigns, and enhancing the capacity of healthcare providers. Policy formulation and program assessment are key components of the MOH's efforts. Collaboration with governmental bodies, development partners, NGOs, and local communities is essential for improving maternal and child health outcomes in Laos.

Policies are meticulously crafted to address specific challenges, including the reduction of maternal mortality, enhanced access to prenatal and postnatal care, promotion of breastfeeding, and prevention of childhood illnesses. After policy formulation, meticulous planning for implementation takes place, which involves delineating strategies, allocating resources, and establishing monitoring and evaluation frameworks. Equipping healthcare providers with the necessary skills and knowledge through capacity-building efforts is paramount.

Monitoring and evaluation are crucial, allowing policymakers to assess progress, pinpoint areas for improvement, and adjust policies and programs as needed. There is a strong focus on continuous refinement to ensure that policies are responsive to the changing needs of mothers and children in Laos, particularly in rural regions and healthcare center environments.

Health policy development focusing on maternal and child health is a top priority for the MOH in Laos. This is highlighted by collaborative efforts to improve health outcomes and promote the well-being of mothers and children, especially in rural areas and healthcare centers (Scopaz, Eckermann, & Clarke, 2013).

Table 2. Maternal Health Care Insurance: Strategies for Ensuring Accessible and Quality Healthcare in Lao PDR

Maternity Care	Prenatal care: Check-ups and screenings during pregnancy. Delivery: Coverage for hospital costs and professional medical fees during childbirth.
Postpartum Care	Coverage for medical attention and support after childbirth.
Diagnostic Services	Coverage for diagnostic procedures related to pregnancy (e.g., ultrasound scans, prenatal tests).
Prescription Medications	Inclusion of necessary prescription medications for maternity care.

Wellness and Preventive Services	Optional services promoting overall health for expectant mothers.
Network of Providers	Encouragement to seek services from within the insurance provider's network.
Affordability	Consideration of costs to ensure accessibility; various insurance options may be available.
Review Policy Details	Critical examination of policy details, including coverage limits, copayments, and exclusions.

These strategies collectively aim to create a healthcare system that addresses the diverse needs of the population, ensuring quality, accessibility, and cultural sensitivity. Emphasizing local adaptation and continuous evaluation is crucial for the success of healthcare strategies in Laos or any other region (A. M. Khan, Lassi, & Bhutta, 2018; Organization, 2005).

2.4. Routine Quality Assessment in Healthcare Facilities: Enhancing Maternal and Newborn Healthcare in Laos

Routine quality assessments in healthcare facilities involve regular monitoring and evaluation to ensure the delivery of high-quality services. These assessments are essential for maintaining and improving healthcare standards, focusing on infrastructure, processes, and outcomes. Specific indicators and benchmarks are used to measure healthcare quality.

In Laos, hospitals and health centers have adopted routine quality assessments into their daily operations. Healthcare personnel, supported by training programs, play a crucial role in these assessments, which are conducted at regular intervals with established reporting mechanisms.

In maternal and newborn healthcare, these assessments identify challenges and areas needing improvement. Strategies are then developed to address these challenges, leading to overall enhancement of healthcare services. A summary of findings provides insights into the current state of maternal and newborn healthcare in Laos and highlights areas for improvement. Recommendations emphasize the importance of routine quality assessments in achieving better healthcare outcomes for mothers and newborns, integrating these findings into the broader narrative of healthcare improvement in Laos.

2.5. Comprehensive Reproductive Health Promotion in Laos: A Collaborative Approach Involving Diverse Stakeholders

The Ministry of Health (MOH) collaborates with a diverse range of organizations to enhance reproductive health in Laos. These partnerships broaden the scope of reproductive health services and education by utilizing the technical expertise and resources of international agencies such as WHO, UNFPA, KOICA, KOFIH, JAICA, and UNICEF. By integrating into broader multilateral programs, these efforts ensure that reproductive health promotion is aligned with objectives related to maternal and child health and sustainable development. Additionally, partnerships with civil society organizations enable communities to advocate for reproductive health rights and access necessary services. Collaborations with academic and research institutions support the development and implementation of evidence-based policies and programs, reinforcing MOH's commitment to providing accessible, equitable, and rights-based reproductive health services to all individuals in the country (Hirokawa, 2013).

Promoting reproductive health requires a comprehensive approach to ensure that individuals have access to the necessary knowledge, resources, and services to maintain and improve their reproductive well-being. This includes a range of aspects such as family planning, maternal health, sexual education, and the prevention and management of reproductive tract infections. They provides access to a range of contraceptive methods to enable individuals and couples to make informed choices about the number and spacing of their children. Maternal health is another crucial aspect, ensuring access to quality maternal healthcare services during pregnancy, childbirth, and the postpartum period to reduce maternal mortality and improve maternal well-being. Sexual education plays a vital role by providing accurate and age-appropriate information about sexuality, reproductive anatomy, and safe sexual practices to promote responsible and informed decision-making. Additionally, measures to prevent and control reproductive tract infections (RTIs) and sexually transmitted infections (STIs) are essential, including promoting safe sex practices. Addressing social and cultural factors to promote gender equality and empowerment is also necessary, enabling all individuals to make informed reproductive choices. Ensuring access to affordable and quality reproductive healthcare services, including antenatal care, safe childbirth, and postnatal care, is critical. Advocacy and awareness efforts are needed to raise awareness about reproductive health issues, advocate for supportive policies, and reduce the stigma associated with reproductive issues. Community engagement is also important to ensure that reproductive health initiatives are culturally sensitive and address local needs. Promoting reproductive health is essential for individual well-being and contributes to broader public health goals, including reducing maternal and child mortality, preventing the spread of infections, and promoting sustainable population growth. It requires collaboration between healthcare providers, policymakers, community leaders, and individuals to create an environment that supports reproductive health and rights.

2.6. Primary Healthcare

The Lao Ministry of Health has been instrumental in developing a comprehensive network of health services, ranging from community-level facilities to tertiary referral hospitals, aimed at advancing universal health coverage. This case study employs demographic data, health service information, and policy documents to identify key facilitators, pathways, and potential strategies for improving primary healthcare in Laos (AGONGO, Dovlo, Anaseba, ADONGO, FIANKO, & Awekeya, 2023).

Primary healthcare in Laos focuses on delivering basic health services to the population. These services encompass preventive care, health education, maternal and child health services, immunizations, and the treatment of common illnesses. A range of organizations, such as government agencies, non-governmental organizations (NGOs), and international bodies, play roles in supporting these primary healthcare initiatives in Laos (Mayxay et al., 2013).

The Lao government, under the leadership of the Ministry of Health, places a high priority on healthcare services, emphasizing primary healthcare. This focus is crucial, particularly in rural areas where access to healthcare is often limited.

International Collaboration: International organizations, including the Asian Development Bank (ADB) and the WHO, work in partnership with the Lao government to enhance primary healthcare initiatives. These collaborations focus on strengthening healthcare systems and improving overall health outcomes (Organization, 2005).

NGO Participation: Non-governmental organizations, both local and international, play a significant role in primary healthcare projects. These initiatives often focus on specific health issues such as infectious diseases, maternal and child health, or community health education.

Community Health Workers: In remote areas, community health workers are crucial in providing basic healthcare services. Their duties encompass educating the community, administering vaccinations, and meeting basic healthcare needs (Nonaka et al., 2022).

2.7. Exploring the interconnected Influences on Maternal and Child Health in Laos

The social and economic impacts on maternal and child health in Laos are significant and multifaceted. Numerous factors influence the overall well-being of mothers and children, affecting both social and economic dimensions (Yusuke Kamiya, 2011).

The social and economic impact of cultural behavior in the community in Laos is both multifaceted and significant. Cultural norms and traditions shape various aspects of life, including social interactions, economic activities, and community development. These behaviors influence social cohesion, identity, and values, and also affect economic practices such as agriculture, trade, and handicrafts. Additionally, cultural events and festivals are crucial in promoting tourism and generating income for local communities. However, these cultural norms can also present challenges, such as gender inequality, limited access to education, and barriers to modernization. It is essential to

understand and address these cultural dynamics to foster sustainable development and inclusive growth in Laos.

The Social Impact of Maternal and Child Health in Laos: The social impact of maternal and child health encompasses various aspects that influence the well-being of mothers and children, contributing to the overall fabric of society. Here is a summarized overview: Improved maternal and child health leads to healthier families and communities. Reduced maternal and child mortality rates contribute to social stability. Access to maternal healthcare empowers women, fostering gender equality. Improved maternal health positively influences the overall status of women in society. Furthermore, healthy mothers and children are more likely to participate in education. Maternal and child health programs can contribute to increased school attendance. Additionally, healthy mothers and children contribute to the overall well-being of communities, and a reduced disease burden improves the quality of life in localities. These social impacts highlight the interconnectedness of maternal and child health with broader societal factors, emphasizing the importance of healthcare interventions, education, and community engagement to promote positive outcomes.(Suzuki & Ota, 2023)

The economic impact of maternal and child health in Laos is significant, influencing various aspects of the economy. Healthy mothers can participate more actively in the workforce, thereby enhancing economic productivity, while reduced child mortality allows families to allocate resources more efficiently. Investments in maternal and child health lead to long-term cost savings by preventing expensive medical interventions, reducing health complications, and lessening the financial burden on families and healthcare systems. Healthy children are more likely to grow into productive adults, contributing to the labor force, and improved maternal health positively affects the health of future generations. Addressing maternal and child health issues is crucial for breaking the cycle of poverty, as healthy mothers are better positioned to engage in income-generating activities. A healthy population is a key driver of economic development, and investments in maternal and child health contribute to building human capital, a critical component of economic growth. Therefore, the economic impact of maternal and child health in Laos highlights contributions to workforce productivity, healthcare cost savings, inter-generational well-being, poverty alleviation, and overall economic development (Suzuki & Ota, 2023).

2.8. Routine Immunization Services (EPI) in Laos: Delivery System, Challenges, and Ensuring Effective Coverage and Accessibility

The immunization services are managed by the Ministry of Health and the Expanded Program on Immunization (EPI), in collaboration with the World Health Organization (WHO). These services are structured across various healthcare facility levels. This summary provides an overview of the immunization service delivery system, which includes central and provincial hospitals, district hospitals, health centers, outreach sites, and mobile sites. Fixed sites primarily serve children who live nearby, offering immunization services daily at central and provincial hospitals, weekly at district hospitals, and twice weekly at health centers (Kenvongphachach, Lee, Jung, & Kang, 2022).

Immunization services are offered by the Ministry of Health and EPI, in collaboration with WHO,

at various levels including central and provincial hospitals, district hospitals, health centers, outreach sites, and mobile sites. Fixed sites primarily serve children residing near these facilities, offering immunization services daily at central and provincial hospitals, weekly at district hospitals, and twice weekly at health centers (De Lapeyre, Tixier, & Risède, 2017).

In the existing immunization service delivery system, health facilities deploy nurses to provide outreach services in villages several kilometers away, with visits scheduled every three months. Often, nurses may need to stay overnight to achieve adequate coverage. However, this method has not been effective in reaching all children due to a lack of prioritization based on population density, low coverage rates, and high drop-out rates. Additionally, peripheral health workers at both district and health center levels face the challenge of managing multiple responsibilities across various programs, which leads to inefficient use of their time. There is a clear need for improved integration of immunization services with other maternal and child health programs. Furthermore, delivering immunization services in urban and peri-urban areas, especially those with high populations of migrant families, presents substantial challenges. This situation underscores the critical need for enhanced coordination between the immunization program and urban authorities (A. I. Khan et al., 2019).

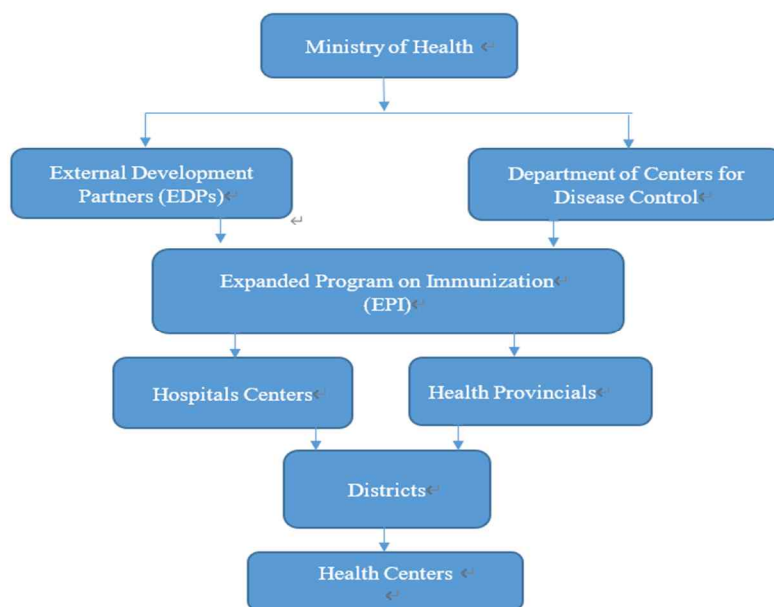


Figure 1. Immunization system services

2.9. Expanding Healthcare Insurance Coverage for Mothers and Children in Laos: Options, Initiatives, and Implications for Maternal and Child Health Outcomes

Healthcare insurance coverage for mothers and children in Laos is accessible through government-sponsored programs, private health insurance, and initiatives by international organizations and NGOs. Private health insurance plans offer a range of maternal healthcare services, allowing individuals to select plans that best meet their needs. Organizations such as the WHO and UNFPA work in collaboration with governments and local healthcare providers to enhance maternal healthcare services worldwide. In Laos, private insurers provide coverage for prenatal, childbirth, and postnatal care. It is recommended to contact these companies directly to understand specific coverage options. Furthermore, international efforts help to improve the accessibility of healthcare services, including maternal care. Efforts are underway to strengthen community health services, thereby enhancing healthcare access in rural areas and supporting hospital services. It is crucial to carefully review the details, costs, and coverage limits of an insurance plan before making a selection. Public maternal health centers may offer free or subsidized services to ensure that essential maternal healthcare is available, especially in rural areas (S Phommachanh, Essink, Wright, Broerse, & Mayxay).

Healthcare insurance coverage for mothers and children in health center areas is essential for ensuring access to vital healthcare services and improving maternal and child health outcomes. Providing insurance, especially in rural and underserved areas where health centers often serve as the primary healthcare providers, enables mothers and children to access preventive services, prenatal care, skilled birth attendance, postnatal care, and immunizations. This coverage alleviates financial barriers to healthcare, reduces families' out-of-pocket expenses, and promotes timely use of health services. Furthermore, insurance coverage supports improved health outcomes by enabling early detection and management of health conditions, fostering continuity of care, and facilitating comprehensive healthcare interventions tailored to the specific needs of mothers and children. Ultimately, securing healthcare insurance coverage for mothers and children in health center areas is crucial for advancing maternal and child health and achieving universal health coverage goals in Laos (Nagpal et al., 2019).

2.10. Healthcare Financing for Maternal and Child Health in Laos: Official Development Assistance and Government Initiatives

Healthcare financing related to official development assistance (ODA) involves the allocation and utilization of funds provided by foreign governments, international organizations, and other entities to support healthcare initiatives in recipient countries such as Laos. ODA plays a crucial role in financing various aspects of healthcare, including infrastructure development, healthcare service delivery, capacity building, and the procurement of medical supplies and equipment.

In Laos, ODA plays a crucial role in healthcare financing, especially in critical areas such as maternal and child health, infectious disease control, healthcare infrastructure development, and health system strengthening. ODA funds are typically distributed through bilateral and multilateral partnerships, as well as international organizations including the WHO, the United Nations Population Fund (UNFPA), the World Bank, and other development partners (De Lapeyre, Tixier, & Risède, 2017).

The Annual Work Plan (AWP) in Laos outlines the health financing strategies implemented by the Ministry of Health (MOH). These strategies focus on budget allocation and resource mobilization to support various healthcare programs and initiatives aimed at improving health outcomes nationwide. The AWP specifies the distribution of funds across different health sectors, including maternal and child health, infectious disease control, healthcare infrastructure development, and health promotion activities. It also may include plans for leveraging external funding sources, such as ODA or grants from international organizations, to enhance domestic resources. The primary goal of health financing within the AWP is to ensure that all citizens of Laos have equitable access to quality healthcare services, while also maximizing the efficiency and effectiveness of healthcare spending.

In Lao PDR, healthcare financing for maternal health encompasses a variety of components, such as government initiatives, donor support, and health insurance schemes. Below are some details regarding healthcare financing for maternal health:

Government Initiatives: The government of Lao PDR is committed to improving maternal health outcomes and has made financial commitments to support maternal health services. Programs like the Free Maternal and Child Health (MCH) program and the National Health Insurance (NHI) scheme have been implemented to improve access to maternal healthcare services.

National Health Insurance (NHI) Scheme: The NHI scheme is a key part of the health financing reforms in Lao PDR. Its goal is to provide financial protection and broaden access to healthcare services, including those for maternal health. The NHI scheme typically requires contributions from individuals, employers, and the government to fund health services. (Nagpal et al., 2019)

Table 3. Financial Management System for Maternal Health in Laos: Government Initiatives, National Health Insurance Scheme, Donor Support, and Out-of-Pocket Expenses

Government Initiatives	- Introduction of the National Health Insurance (NHI) scheme to expand access to maternal healthcare.
	- Financial support through the Free Maternal and Child Health (MCH) program.
	- Introduction of the National Health Insurance (NHI) scheme to expand access to maternal healthcare.
National Health Insurance (NHI) Scheme	- Integral part of broader health financing reforms.
	- Aims to provide financial protection and increase access to healthcare services, including maternal health.
	- Involves contributions from individuals, employers, and the government to fund health services
Donor Support	- Support from international organizations, NGOs, and donor agencies for healthcare, specifically maternal health programs.
	- Contributions often focus on infrastructure development, healthcare professional training, and improving the quality of maternal health services.
Out-of-Pocket Expenses	- Despite efforts to improve healthcare financing, individuals may still incur out-of-pocket expenses for maternal health services.
	- Particularly significant for households with limited financial resources, requiring ongoing attention to minimize financial barriers.

2.11. Strategies for Improving Healthcare Workforce Supply for Maternal and Child Health at Health Centers in Laos

In Laos, as in many other countries, it is crucial to have an adequate healthcare workforce to ensure quality care, particularly in maternal and child health, and to reduce maternal and child mortality rates. However, Laos encounters several challenges in this area, including a shortage of trained healthcare professionals, particularly in rural and remote areas, and disparities in access to healthcare services between urban and rural populations (Group, 2016).

To address these challenges and expand the healthcare workforce supply for maternal and child health in Laos, several strategies can be considered. Ensuring an adequate supply of healthcare workers at health centers is crucial for providing quality care to women and children throughout the country (Tandon, Yap, & Chanthala, 2016).

Healthcare workforce supply in health centers, especially in rural areas, leading to disparities in healthcare access	
Issues Identified	Healthcare professionals, especially in rural areas, leading to disparities in healthcare access.
Strategies to Address Challenges	Enhancing training and retention programs, improving infrastructure and resources, engaging communities in healthcare planning, utilizing technology like telemedicine.
Responsibilities of Health Centers	Disease prevention, health promotion, data collection on maternal and child health.
Importance of a Comprehensive Approach	Essential to improve workforce supply and ensure quality care.

Table 4. Strategies for Improving Healthcare Workforce Supply for Maternal and Child Health at Health Centers in Laos

Strategy	Description
Training and Capacity Building	Implement training programs to equip healthcare workers with skills in maternal and child health care, including doctors, nurses, midwives, and other professionals.
Recruitment and Retention	Develop strategies to attract and retain healthcare workers in rural areas by offering incentives, career advancement opportunities, and improving working conditions.
Task Shifting	Delegate certain healthcare tasks to lower-level workers, such as community health workers, to ease the workload of skilled professionals and improve access to services.
Infrastructure and Resources	Invest in health center infrastructure, including facilities, equipment, and supplies, to ensure the effective provision of maternal and child health services.
Supportive Supervision and Mentorship	Provide ongoing supervision and mentorship to improve clinical skills and quality of care among healthcare workers.
Community Engagement	Engage with local communities to raise awareness, promote health services, and foster community participation in health center activities, strengthening community-health center linkages (Ministry of Health, Lao PDR website).

2.12. International Cooperation in Improving Maternal and Child Health Outcomes in Laos

International cooperation, often facilitated by DPs, plays a crucial role in supporting the Ministry of Health (MOH) in Laos to enhance maternal and child health outcomes.

Maternal and child health is a critical aspect of development, and international cooperation, facilitated through DPs, plays a crucial role in supporting efforts to improve maternal and child health outcomes in countries such as Laos. DPs comprise a diverse array of entities, including bilateral donors (such as individual countries like Japan, Australia, or the United States), multilateral donors (such as the World Bank or the Asian Development Bank), international organizations (including United Nations agencies like UNICEF or WHO), non-governmental organizations (NGOs), and development finance institutions (such as the WHO or the Global Fund).

Below are some key aspects of international cooperation between the MOH and development partners (DPs) in maternal and child health in Laos:

- Technical Assistance: Technical assistance from development partners offers crucial expertise and support to the MOH in several key areas of maternal and child health. This includes building capacity among healthcare providers, implementing evidence-based interventions, and enhancing the strength of health systems.
- Financial Support: DPs provide financial resources to support maternal and child health programs and initiatives in Laos. These funds may be allocated for infrastructure development, procurement of essential supplies and equipment, training programs, and other priority areas identified by the MOH.
- Policy and Strategy Development: Development partners work alongside the MOH to formulate policies, strategies, and guidelines designed to enhance maternal and child health outcomes. This collaboration may include conducting research, exchanging best practices from other nations, and facilitating dialogues among multiple stakeholders to guide the policy-making process.
- Program Implementation: DPs frequently assist in the implementation of targeted maternal and child health programs and projects, working in collaboration with the MOH and other stakeholders. These initiatives may concentrate on key areas such as maternal and newborn care, child immunization, nutrition, family planning, and adolescent health.
- Monitoring and Evaluation: Development partners collaborate with the MOH to monitor and evaluate the impact of interventions aimed at improving maternal and child health. This process includes data collection, assessment conduction, and the utilization of evidence to guide decision-making and enhance the effectiveness of programs.
- Advocacy and Partnerships: DPs advocate for increased attention and investment in maternal and child health at both national and international levels. They also facilitate partnerships among the MOH, civil society organizations, private sector entities, and other stakeholders to mobilize resources and coordinate efforts toward common goals.

Overall, international cooperation between the MOH and development partners is essential for improving maternal and child health outcomes in Laos. By leveraging technical expertise, financial

resources, and collaborative partnerships, these efforts help strengthen health systems, expand access to quality healthcare services, and ultimately save lives (WHO report).

Table 5. Funding Sources for Maternal and Child Health Initiatives in Laos of AWP 2023

Funding Source	Amount Allocated (USD)	Purpose
World Health Organization (WHO)	\$1,500,000	maternal and child health (MCH), immunization programs, reproductive health and family planning, quality improvement on MCH promotion, maternal health promotion, nutrition and infant and young child feeding, under-5-year-old child health promotion, health communication and education, training healthcare workers, providing medical supplies, primary healthcare, strengthening and policy.
United Nations Children's Fund (UNICEF)	\$700,000	Immunization programs, nutritional support
United States Agency for International Development (USAID)	\$1,200,000	Maternal health clinics, prenatal care initiatives
Asian Development Bank (ADB)	\$800,000	Infrastructure development for healthcare facilities
Total	\$ 4,200,000	

3. METHODS

3.1. Study Design

The study design is focused on evaluating the improvement of healthcare facilities for maternal and newborn care in Vientiane and Houaphan Province, Laos. It specifically aims to assess the quality of MCH care, encompassing healthcare provision, the quality of equipment services, and healthcare management practices. By utilizing DHIS2 tools provided by the Ministry of Health in Lao PDR, the study intends to efficiently collect, manage, analyze, and disseminate health data.

Data were collected from a representative sample of the community in Houaphan Province at a single point in time. The primary objective is to assess the quality of health services provided for maternal and newborn care at health centers, focusing on healthcare provision, the adequacy of health facility standards, and healthcare management practices.

By focusing on these aspects, the study seeks to gain a comprehensive understanding of the challenges and opportunities for improving MCH services. It aims to generate insights that can inform policy and practice to improve the quality of health facilities and services dedicated to maternal and child healthcare in Houaphan Province, Laos.

3.2. Study Site

The purpose of this study is to examine the relationship between the provision of health care services and maternal and infant health in both urban Vientiane and rural Houaphan Province in Lao PDR. It included health facilities from both areas, representing urban and rural settings, to provide a comprehensive view of maternal and infant healthcare across different regions of the country. In Houaphan Province, a significant portion of the population lives in rural areas, where health facilities deliver healthcare services. Additionally, an evaluation outreach team is active in these areas. The estimated maternal mortality rate in 2023 was 166 per 100,000 live births. In Vientiane, although it is classified as urban, a substantial part of the population lives in rural areas. In Houaphan district, health facilities provide healthcare services, supported by evaluation and outreach teams. The estimated maternal mortality rate in 2023 was 202 per 100,000 live births (Scopaz, Eckermann, & Clarke, 2013).

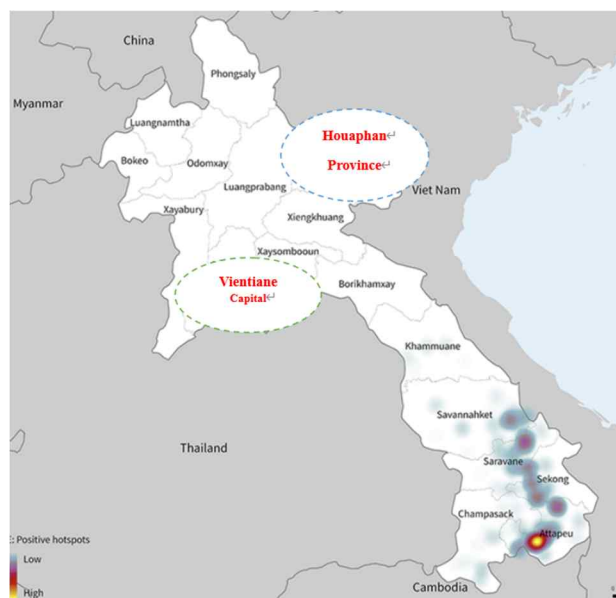


Figure 2. Geography of study location

3.3. Data Source

The data were derived from secondary sources maintained by the Ministry of Health in Laos, specifically from the DHIS2 and LAOSIS systems. These systems constitute a comprehensive health information system utilized for data collection, management, and analysis by various health organizations. Access to DHIS2 is limited to authorized personnel and is facilitated through formal channels established by the ministry. The database encompasses a wide range of health-related data, including maternal and infant mortality rates, health services, demographics, and interventions, which are routinely collected from health facilities across Laos. The DHIS2 data were used to evaluate health worker coverage, the availability of beds in health facilities, and the maternal and infant mortality rates of mothers and infants, extracting specific indicators for statistical analysis. This process involved accessing, querying, and analyzing the data to identify patterns and associations, thereby contributing to the study's objectives.

3.4. Study Population

The study population consists of various groups and entities in urban Vientiane and Houaphan Province in Lao PDR. This includes pregnant women, mothers, infants, healthcare providers, and community members in these regions. The focus is on understanding the utilization patterns of maternal and infant health services and assessing health worker coverage, health facility beds, and maternal and infant mortality rates. Pregnant women and mothers in these regions are essential to

the study as their experiences provide insights into prenatal, delivery, and postnatal care services. Infants, specifically newborns and those up to one year old, are included to evaluate infant health outcomes and mortality rates. Healthcare providers, including doctors, nurses, midwives, and other health workers, are studied to assess their distribution, coverage, and capacity to deliver healthcare services. Health facilities such as hospitals, clinics, and health centers are evaluated based on their bed availability and overall capacity to manage maternal and infant health cases. Additionally, community members in both urban and rural settings provide a broader perspective on the accessibility and effectiveness of healthcare services. By comparing these factors between urban Vientiane and rural Houaphan Province in Lao PDR, the study aims to identify disparities and areas for improvement in maternal and infant health services Lao PDR.

3.5. Statistical Analysis

The statistical analysis in this study utilized data from the DHIS2 and LSIS LAO databases, concentrating on comparing trends and factors influencing maternal and infant mortality within healthcare facilities across Vientiane and Houaphan Province. This analysis employs rigorous descriptive statistical methods, ensuring data quality through comprehensive cleaning and preparation. It focuses on key indicators such as mortality rates and accessibility to healthcare services. These analytical methods aim to provide a robust understanding of the trends in maternal and child health outcomes in the study areas, thereby informing strategic interventions and policy recommendations to enhance healthcare delivery and improve overall outcomes at healthcare facilities.

4. RESULTS

4.1. Sociodemographic Characteristics of the Study Sites

The study aims to improve maternal and newborn healthcare services in Houaphan Province, with a particular focus on reducing maternal mortality and neonatal morbidity rates, especially among the Hmong ethnic group in rural mountainous areas. Specific objectives include identifying sociodemographic factors that influence healthcare utilization for mothers and infants in both urban Vientiane and rural Houaphan Province, improving healthcare system services between these regions, and understanding the factors that contribute to mortality rates among mothers and infants.

Secondary data analysis, which utilizes existing datasets such as the DHIS2 and the LAOSIS database from the Ministry of Health in Laos spanning 2019 to 2023, is used to examine trends and factors influencing maternal and infant mortality in health facilities. This approach provides access to extensive datasets, offering significant advantages. However, it is crucial for researchers to assess the quality, completeness, representativeness, and potential biases of the dataset. It is also important to consider the differences between primary and secondary data collection methods, including aspects such as data collection processes, quality assurance, and validity. The choice between using secondary and primary data depends on the research objectives, context, and available resources. Employing a combined approach allows a comparison of results over the years, facilitating a more comprehensive understanding.

Vientiane, as the capital and largest city of Laos, is distinguished by its urban environment and cosmopolitan ambiance. The city's population is a diverse blend of ethnicities, cultures, and socioeconomic backgrounds. Although predominantly urban, Vientiane also encompasses rural areas. Insights into aspects such as population density, household composition, education levels, income distribution, and employment status in Vientiane are gleaned from demographic data sourced from census reports and other studies.

Houaphan Province is predominantly rural, with villagers primarily engaged in agriculture and facing limited access to healthcare. Sociodemographic factors, including population distribution, household size, low education levels, and disparities in healthcare access, significantly impact maternal and infant health. High mortality and morbidity rates, particularly among ethnic groups such as the Hmong in remote areas, underscore the urgent need for intervention. Analyzing population demographics, income, and geographic disparities enables healthcare facilities to tailor services to meet the diverse needs of both urban and rural communities.

Sociodemographic characteristics significantly influence the utilization of health facility services for maternal and infant care in both urban Vientiane capital and rural Houaphan Province in Laos. Key indicators affecting this utilization include maternal deaths, infant mortality, the availability of healthcare staff, hospital bed capacity, and the provision of outpatient and inpatient healthcare services.

4.2. Population Distribution and Socioeconomic Contrasts: Comparative Analysis of Vientiane (Capital) and Houaphan Province Characteristics of the Study Sites

Vientiane exhibits a more balanced gender distribution, with a slight predominance of females over males. In contrast, Houaphan Province has a higher proportion of males. The majority of the population in both regions is of the Lao ethnic group, although Vientiane has a higher percentage of this group compared to Houaphan Province.

The summary below delineates the distinctions between Vientiane and Houaphan Province regarding population size, gender distribution, ethnic makeup, religious affiliations, economic status, and community organization. Vientiane boasts a larger population, a greater percentage of females, a predominance of the Lao ethnic group, a larger Buddhist community, a higher GDP per capita, and fewer villages and households than Houaphan Province. These variations highlight the diverse socioeconomic and cultural landscapes across Laos.

Table 6. General Characteristics of Vientiane (Capital) and Houaphan Province in 2023

Characteristics	Vientiane(Capital)	Houaphan Province
Populations	989,000	315,000
Sex		
Male	49.44%	62.86%
Female	50.56%	37.14%
Ethnicity		
Lao group	82%	65%
Other ethnic groups	18%	35%
Religion		
Religion (Buddhism)	91%	80%
Religion (ethnic)	9%	20%
GDP		
Per Person	\$2,448	\$1,213
No. of Villages		
Total	481	724
No. of Households		
Total	181,083	54,369

4.3. Maternal Mortality Ratio and Comparison between Vientiane (Capital) and Houaphan Province 2019-2023 in Lao PDR

The fluctuations in maternal death rates in both Houaphan Province and Vientiane from 2019 to 2023 in Laos highlight the differing contributions to the total maternal deaths and the challenges encountered in delivering maternal health services.

In Vientiane, the number of maternal deaths has fluctuated over the years, with two deaths reported in 2019, three in 2020, four in 2021, and two each in 2022 and 2023.

In Houaphan Province, data indicate fluctuations in maternal mortality rates, with two deaths reported in 2019. This number increased significantly to nine deaths in 2020, then slightly decreased to eight deaths in 2021. It further decreased to six deaths in 2022, before rising again to eight deaths in 2023.

In summary, the comparison shows that Vientiane maintained relatively stable and lower maternal mortality rates compared to Houaphan Province, which experienced significant fluctuations and higher mortality rates. This indicates that Vientiane probably has superior healthcare facilities and management, whereas Houaphan Province struggles with issues concerning healthcare accessibility, quality, and infrastructure that need to be addressed.

Table 7. Maternal Mortality Ratio ¹in Laos from 2019 to 2023: A Comparison Between Vientiane (Capital) and Houaphan Province

Name of Provinces	2019	2020	2021	2022	2023
Vientiane (Capital)	2.	3.	4.	2.	2.
Phongsali	5.	1.	7.	3.	2.
Louangnamtha	4.	5.	1.	9.	2.
Oudomxai	3.	13.	8.	6.	3.
Bokeo	6.	2.	6.	6.	2.
Louangphabang	11.	4.	5.	7.	4.
Houaphan	2.	9.	8.	6	8.
Xainyabouli	6.	6.	2.	3.	3.
Xiangkhouang	4.	10.	7.	4.	6.
Vientiane	10.	7.	3.	6.	7.
Bolikhamxai	2.	9.	5.	3.	3.
Khammouan	10.	9.	7.	8.	6.
Savannakhet	20.	12.	9.	16.	4.
Salavan	10.	11.	6.	11.	4.
Xekong	2.	6.	2.	4.	3
Champasak	6.	8.	10.	6.	6.
Attapu	6.	4.	8.	3.	1.
Xaisomboun	3.	2.	3.	2.	1.
Total	112.	121.	98.	103.	67.

¹ The Maternal Mortality Ratio (MMR) is defined as the number of maternal deaths per 100,000 live births. It is a critical indicator of the quality of a healthcare system and reflects the ability to provide effective care during pregnancy and childbirth.

4.4. Infant Mortality Rate in Vientiane (Capital) and Houaphan Province in Laos from 2019 to 2023

The infant mortality rate in Vientiane and Houaphan Province in Laos exhibited varying trends from 2019 to 2023. In Vientiane, the number of infant deaths fluctuated, peaking at 114 in 2019, then decreasing to 89 in 2020, and dropping further to 62 in 2021. Subsequently, the number rose to 81 deaths in both 2022 and 2023. In contrast, Houaphan Province also experienced fluctuations in infant mortality rates, beginning with 126 deaths in 2019, decreasing to 109 in 2020, and then to 105 in 2021. The rate slightly increased to 112 in 2022, before falling to 77 deaths in 2023. These trends underscore the variability in infant mortality rates between the two provinces over this 5-year period, highlighting the complex nature of these trends and emphasizing the need for targeted interventions to address regional disparities in child health outcomes.

Table 8. Trends in the Infant Mortality Rate ²(2019-2023): A Comparison Between Vientiane (Capital) and Houaphan province

Name of Provinces	2019	2020	2021	2022	2023
Vientiane (Capital)	114.	89.	62.	81.	81.
Phongsali	67.	34.	36.	32.	27.
Louangnamtha	95.	82.	63.	93.	77.
Oudomxai	166.	126.	100.	115.	116.
Bokeo	105.	56.	97.	99.	83.
Louangphabang	124.	113.	114.	132.	105.
Houaphan	126.	109.	105.	112.	77.
Xainyabouli	53.	42.	69.	65.	55.
Xiangkhouang	150.	149.	138.	132.	87.
Vientchanh	70.	72.	83.	108.	99.
Bolikhamxai	116.	106.	103.	97.	99.
Khammouan	303.	230.	236.	254.	197.
Savannakhet	305.	243.	252.	231.	189.
Salavan	224.	177.	226.	210.	228.
Xekong	85.	49.	79.	85.	87.
Champasak	161.	170.	186.	132.	151.
Attapu	48.	81.	72.	68.	51.
Xaisomboun	24.	20.	19.	17.	9.
Total	2336.	1948.	2040.	2063.	1818.

² The Infant Mortality Rate (IMR) is defined as the number of infant deaths (children under one year of age) per 1,000 live births. It is a critical indicator of the overall health of a population, reflecting the quality of maternal and infant care services.

4.5. Healthcare Worker Coverage: A Comparison Between Vientiane (Capital) and Houaphan Province

These calculations determined the percentages of doctor, nurses and midwife relative to the total population in each province. This comparison allows an analysis of the availability of healthcare workers in each region, offering insights into the distribution of the healthcare workforce and the accessibility of healthcare services.

To calculate the percentages of healthcare worker coverage relative to the total population in each province, we employed the following formula: $\text{Percentage} = (\text{Number of healthcare workers per 1,000 population} / \text{Total population of the province}) * 100$. We applied this formula to determine the coverage for each type of healthcare worker as follows:

The calculations derived the percentages of doctor, nurse, and midwife in relation to the total population in Vientiane and Houaphan Province. This comparison enables us to evaluate the distribution of healthcare workers across the two regions and to gauge the accessibility of healthcare services.

Overall Findings: The national average for healthcare worker coverage reveals disparities in healthcare access across the provinces. Urban centers, such as Vientiane, have lower healthcare worker densities compared to certain rural areas. Provinces like Attapeu, Phongsaly, and Sekong show higher ratios of healthcare workers, which may indicate better healthcare access in these regions.

Implications: The data suggest a need for targeted policy interventions to ensure the equitable distribution of healthcare resources.

Strengthening urban healthcare infrastructure and supporting the deployment of healthcare workers in rural areas can help bridge the access gap in healthcare and improve outcomes throughout Lao PDR.

Table 9. Health Distribution of Health Workers in Various Provinces of Laos in 2022

Name of Provinces	2022						
	Health Worker				Health Workers per 1,000 Population		
	Residency	Doctor	Nurse	Midwife	Doctor	Nurse	Midwife
					*	**	***
Total	488	2,969	5,576	1,827	0.49	0.90	0.30
Vientiane (Capital)	20	124	126	43	0.13	0.13	0.04
Phongsaly	5	133	187	65	0.68	0.96	0.33
Luangnamtha	9	91	150	78	0.45	0.74	0.39
Oudomxay	27	145	272	126	0.41	0.78	0.36
Bokeo	18	105	162	72	0.51	0.78	0.35
Luangprabang	32	255	447	169	0.54	0.95	0.36
Houaphan	19	170	215	98	0.54	0.69	0.31
Xayaboury	35	196	389	100	0.46	0.91	0.23
Xiengkhuang	45	170	246	133	0.63	0.91	0.49
Vientiane	40	154	399	75	0.33	0.85	0.16
Borikhamxay	38	113	193	100	0.35	0.60	0.31
Khammuane	20	193	652	142	0.44	1.48	0.32
Savannakhet	39	367	821	237	0.34	0.76	0.22
Saravane	16	144	263	95	0.32	0.58	0.21
Sekong	12	92	161	52	0.70	1.22	0.39
Champasack	65	325	633	142	0.43	0.83	0.19
Attapeu	24	137	173	58	0.84	1.06	0.36
Xaysomboon	24	55	87	42	0.50	0.78	0.38

*Doctor: Medical Professional: Qualified and licensed to practice medicine in Laos.

- Diagnosis and Treatment: Diagnoses and treats local illnesses, injuries, and medical conditions.

- Prescriptions and Surgeries: Prescribes medications and performs necessary surgeries.

- Specializations: Can specialize in fields such as general practice, infectious diseases, pediatrics, cardiology, etc.
- Preventive Care: Provides preventive care and health education tailored to local health issues.

****Nurse: Healthcare Professional:** Provides direct patient care and support in various healthcare settings.

- Patient Monitoring: Monitors patient health, vital signs, and recovery progress.
- Medication Administration: Administers medications and treatments as prescribed.
- Patient Support: Assists with daily activities and provides emotional support.
- Specializations: Can specialize in areas like emergency care, pediatrics, geriatrics, surgical nursing, etc.
- Health Education: Educates patients and families about health conditions and care plans.

*****Midwife: Specialist in Maternal Care:** Focuses on pregnancy, childbirth, and postpartum care.

- Comprehensive Care: Provides prenatal care, support during labor and delivery, and postnatal care.
- Normal Pregnancies and Births: Manages normal pregnancies and births, collaborating with obstetricians for complications.
- Education and Support: Educates mothers on childbirth options, breastfeeding, and newborn care.
- Natural Birthing Support: Supports natural and healthy birthing experiences.
- Preventive Care: Offers preventive care and health education to mothers and families

A comparison of healthcare workers between Vientiane and Houaphan Province reveals notable differences in their distribution. Houaphan Province, despite its rural setting, had a higher percentage of healthcare workers in all categories:

- Doctor: Vientiane: 42.18%, Houaphan Province: 57.82%
- Nurse: Vientiane: 36.96%, Houaphan Province: 63.04%
- Midwife: Vientiane: 30.50%, Houaphan Province: 69.50%

The finding that Houaphan Province had a larger share of doctor, nurse, and midwife compared to the urban Vientiane suggests that there is better healthcare access in the rural areas of Houaphan Province, underscoring the need for targeted policies to address urban-rural disparities in healthcare.

Table 10. Health Worker Coverage Percentages of Doctor, Nurse, and Midwife in Laos

Name of Provinces	Health Worker Residency	Doctor	%	Nurse	%	Midwife	%
Total	488	2969	49.09	5576	90.38	1827	29.8
Vientiane (Capital)	20	124	25.41	126	36.96	43	30.5
Phongsaly	5	133	13.68	187	62.91	65	35.6
Luangnamtha	9	91	9.27	150	39.27	78	42.7
Oudomxay	27	145	14.64	272	71.91	126	34.2
Bokeo	18	105	10.91	162	42.18	72	36.2
Luangprabang	32	255	26.27	447	95.18	169	36.8
Houaphan	19	170	17.64	215	63.04	98	31.6
Xayaboury	35	196	19.91	389	91.36	100	23.3
Xiengkhuang	45	170	17.64	246	63.04	133	49.3
Vientiane	40	154	15.91	399	85.36	75	16.2
Borikhamxay	38	113	11.27	193	60.18	100	31.6
Khammuane	20	193	18.27	652	148.18	142	32.3
Savannakhet	39	367	35.91	821	76.27	237	22.6
Saravane	16	144	14.55	263	57.91	95	21.2
Sekong	12	92	9.09	161	22.18	52	39.1
Champasack	65	325	31.82	633	83.18	142	19.5
Attapeu	24	137	13.64	173	50.91	58	35.5
Xaysomboon	24	55	5.45	87	78.18	42	38.2

4.6. Comparison of Healthcare Facilities between Vientiane (Capital) and Houaphan Province

Overall, Vientiane demonstrates significantly better healthcare infrastructure, services, and outcomes compared to Houaphan Province, highlighting the disparities and the need for targeted interventions in rural and remote areas

Houaphan Province had a total of 85 health facilities, of which 81 are health centers, highlighting its emphasis on primary healthcare services. In contrast, Vientiane had 47 facilities in total, with 42 being health centers, despite having fewer central and provincial hospitals.

The disparities in healthcare facilities between urban and rural areas in Laos, particularly between Vientiane and Houaphan Province, are significant. Increasing the number of healthcare workers in rural areas such as Houaphan is crucial for reducing maternal and child mortality rates, as these regions often struggle with access to healthcare services. This policy is supported not only by the government but also by international organizations, with active involvement from the Ministry of Health. Improving the distribution and accessibility of the healthcare workforce in rural areas like Houaphan is essential for narrowing the healthcare provision gap between urban and rural settings. By improving healthcare services in these underserved regions, there is potential to significantly enhance health outcomes, thereby addressing disparities and promoting equitable access to healthcare services throughout the country. This multifaceted approach requires collaboration among various stakeholders to ensure its effectiveness.

Hospital A and Hospital B in summary, a type A hospital is well-equipped to handle basic surgical emergencies and offers extensive obstetric and pediatric services. Conversely, a type B hospital concentrates on preventive care, health promotion, and data collection, lacking surgical facilities. It supports maternal and child health through community health initiatives and follow-up care (report of Development of hygiene and promotion, MOH 2024).

Savannakhet stood out as the region with the highest number of total health facilities, suggesting a more comprehensive healthcare infrastructure. Vientiane features a significant number of Center and Provincial Hospitals, highlighting its role as the capital. Provinces such as Luangprabang and Khammuane also possessed a relatively high number of health facilities, demonstrating substantial healthcare availability. Despite having the fewest total facilities, Xaysomboon maintained a balanced distribution of various types of health centers.

The data highlight the variation in healthcare infrastructure across different provinces, which could be reflective of population distribution, geographic challenges, and regional healthcare needs.

Table 11. Types of Healthcare Services and Healthcare Facility Levels

Type of healthcare service and healthcare facility	
Hospital type A	<p>A type A hospital is a higher-level primary healthcare facility.</p> <p>Services: Offers more comprehensive and specialized healthcare services.</p> <p>Staff: Usually staffed with more qualified healthcare professionals, including doctors and specialists.</p> <p>Location: Often located in district centers or more populous urban areas.</p> <p>Capacity: Equipped to handle complex medical cases and emergencies.</p> <p>Responsibilities: Include managing chronic conditions, providing emergency care, and coordinating specialized medical services.</p>
Hospital type B	<p>A type B hospital is a lower-level primary healthcare facility.</p> <p>Services: Provides basic and essential healthcare services.</p> <p>Staff: Typically staffed with general healthcare providers, nurses, and mid-level practitioners.</p> <p>Location: Located in rural or less populated areas, serving remote communities.</p> <p>Capacity: Focuses on preventive care, routine check-ups, and basic treatment of common illnesses.</p> <p>Responsibilities: Includes maternal and child health services, vaccinations, health education, and community health outreach.</p>

Health Center type A	<p>A type A health center is equipped for basic surgical procedures and manages emergencies requiring surgery, including neonatal cases. It refers complex cases to higher-level hospitals.</p> <p>Services: Basic surgical procedures and emergency surgery.</p> <p>Referral of complex cases.</p> <p>Responsibilities: Obstetric and gynecological services, including delivery and women's health.</p> <p>Antenatal care and support for twin pregnancies.</p> <p>Management of postpartum hemorrhage and pediatric care.</p> <p>Newborn care, resuscitation, and treatment of common pediatric infections, malaria, and malnutrition.</p> <p>Location: Typically serves local communities, providing essential surgical and specialized care in obstetrics and pediatrics.</p>
Health Center type B	<p>A type B health center is a basic healthcare facility situated in rural or sparsely populated regions, serving as a lower-level primary healthcare facility.</p> <p>Services: Staffed by general healthcare providers, nurses, and mid-level practitioners, its services emphasize preventive care, routine check-ups, treatment of common illnesses, and delivery to other hospitals.</p> <p>Capacity: Focuses on preventive care, routine check-ups, and basic treatment of common illnesses.</p> <p>Responsibilities: Includes maternal and child health services, vaccinations, health education, and community health outreach.</p> <p>Location: Located in rural coverage areas, typically serving 2 villages or less populated areas, reaching out to remote communities</p>

Table 12. The Distribution of Health Facilities by Type (Center and Provincial Hospitals, District Hospitals, and Health Centers) in Various Provinces in Laos in 2022

Name of Province	2022							
	Health facilities	Center and Provincial Hospitals	District Hospitals (community)			Health Center		
			Type A	Type B	Total	Type A	Type B	Total
Total	1,232	22	30	105	135	173	902	1,075
Vientiane (Capital)	47	5	0	9	9	0	33	33
Phongsaly	57	1	1	5	6	0	50	50
Luangnamtha	45	1	2	2	4	13	27	40
Oudomxay	60	1	1	5	6	0	53	53
Bokeo	46	1	3	2	5	6	34	40
Luangprabang	96	1	1	11	12	1	82	83
Houaphan	85	1	3	6	9	13	62	75
Xayaboury	88	1	4	6	10	22	55	77
Xiengkhuang	63	1	2	4	6	19	37	56
Vientiane	58	1	2	9	11	10	36	46
Borikhamxay	49	1	1	5	6	14	28	42
Khammuane	101	1	1	8	9	6	85	91
Savannakhet	175	1	4	11	15	24	135	159
Saravane	80	1	1	6	7	5	67	72
Sekong	34	1	1	2	3	0	30	30
Champasack	87	1	3	6	9	37	40	77
Attapeu	38	1	0	4	4	0	33	33
Xaysomboon	23	1	0	4	4	3	15	18

4.7. The Hospital Bed Availability and Rate per 10,000 Population in Various Provinces for the Year 2022, with Comparison to Population Data

Vientiane: Vientiane had the highest number of hospital beds among the provinces, totaling 2,774. The availability of hospital beds per 10,000 people stood at 29, reflecting relatively better access to healthcare facilities. A 28% increase in the number of hospital beds since 2021 indicates ongoing efforts to enhance healthcare infrastructure in response to escalating healthcare demands.

Houaphan: In comparison, Houaphan had a limited number of hospital beds, totaling 488. However, with a rate of 16 beds per 10,000 population, it still provided reasonable access to healthcare services. The 15% increase in hospital beds, relative to the 2021 population data, indicates ongoing efforts to improve healthcare facilities in the province.

Total: In all provinces collectively, the total number of available hospital beds was 9,760. This figure provides valuable insight into the overall healthcare infrastructure of the country. The rate of hospital beds per 10,000 population was 14, indicating the average accessibility of healthcare facilities across the nation. Comparing this to the 2021 population data reveals a 13% increase in hospital beds, reflecting a nationwide effort to expand healthcare services and improve healthcare outcomes.

The data reveal significant disparities in the availability of hospital beds across various provinces in Laos. Vientiane boasts the highest number of hospital beds per capita, reflecting a more robust healthcare infrastructure in urban areas compared to rural ones. Provinces such as Phongsaly, Luangprabang, and Xiengkhuang also demonstrate relatively high hospital bed availability. In contrast, provinces like Savannakhet and Vientiane exhibit lower rates, highlighting potential areas for healthcare improvement. Addressing these disparities is essential for ensuring equitable healthcare access throughout the country.

Table 13. The Number of Hospital Beds Available in Each Province, along with the Corresponding Rate of Hospital Beds per 10,000 Population and a Comparison to the Population Data from 2022

Province	Number of Hospital Beds Available	Rate of Hospital Beds per 10,000 Population	Compared to Population
Vientiane (Capital)	2,774	29	28
Phongsaly	316	16	16
Luangnamtha	216	11	11
Oudomxay	364	11	10
Bokeo	320	16	15
Luangprabang	723	16	15
Houaphan	488	16	15
Xayaboury	687	16	16
Xiengkhuang	456	17	17
Vientiane	368	8	8
Borikhamxay	268	9	8
Khammuane	354	8	8
Savannakhet	772	7	7
Saravane	382	9	8
Sekong	156	12	12
Champasack	668	9	9
Attapeu	267	17	16
Xaysomboon	181	17	16

5. DISCUSSION

This study focuses on analyzing trends of maternal and infant healthcare facilities in Lao PDR, focusing on their influence on maternal and neonatal healthcare outcomes in both urban and rural settings. Goal is to address these disparities and improve healthcare services in these underserved areas. By comparing findings with other research, we emphasize the urgency of addressing urban-rural healthcare disparities in Laos. and Research offers insights into healthcare management standards and the quality of facilities, with the aim of enhancing healthcare outcomes.

Looking at the health strategies and actual projects being carried out by the Laos Ministry of Health to reduce inequality in maternal and child health between urban and rural areas, first, they are expanding access to medical care through the operation of mobile clinics and community health centers. also investing heavily in training health workers, developing and implementing maternal and child health policies, implementing broad community health education programs, and improving health infrastructure in underserved areas.

In addition, projects to improve maternal and child health are also being carried out in Vietnam and Cambodia, which have similar medical standards and medical problems as Laos. Laos, Cambodia, and Vietnam employ common strategies to enhance maternal and child health, including expanding healthcare access through mobile clinics and community centers, training healthcare workers, developing and enforcing policies, conducting community health education, and improving healthcare infrastructure in underserved regions. the three countries are also collaborating to share best practices, conduct joint training programs for health professionals, and share research and data to improve maternal and child health outcomes across Laos, Cambodia, and Vietnam.

Specifically, we found that while there are ongoing improvements in maternal and infant healthcare, significant challenges persist. This highlights the necessity for multifaceted interventions to tackle the various issues affecting this sector. Our study aligns with findings from a WHO research study, revealing similar challenges and noting some differences (Boulom, Essink, Kang, Kounnavong, & Broerse, 2020). In Lao PDR, maternal and infant healthcare continues to improve but still faces considerable hurdles. The WHO emphasizes the importance of multifaceted interventions that address factors such as poverty, road access, language barriers, and disparities in healthcare capacity and workforce between urban and rural areas. Effective strategies include providing culturally sensitive services, ensuring access to healthcare facilities, and promoting financial schemes like vouchers. The government is focused on consolidating health financing to improve communication and community engagement. Additionally, addressing socioeconomic factors such as casual labor and migration requires comprehensive policies, increased funding for training, and enhanced infrastructure for maternal and child health services (Organization, 2005)

In conclusion, the thesis is trends in the status of maternal and infant healthcare facilities, highlighting ongoing improvements and challenges in health worker coverage, the availability of health facility beds, and maternal and infant mortality rates in Laos. It underscores the critical need for comprehensive interventions to address healthcare disparities between urban and rural areas. The

research has revealed significant disparities in health worker coverage, the availability of beds in health facilities and hospitals, and maternal and infant mortality rates. These findings emphasize the persistent challenges and improvements in healthcare infrastructure.

This study underscores the critical need to recognize and address sociodemographic factors that influence healthcare access and mortality rates. The findings highlight the need for targeted policy interventions aimed at improving healthcare management standards, the quality of equipment services, and maternal and newborn care practices across the nation's healthcare systems. By concentrating on these aspects, Laos can progress toward higher-quality healthcare facilities and improved maternal and infant health outcomes.

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Abstract in Korean

라오스 모성 및 영아 사망 추이와 보건의료 기관 현황

배경: 라오스에서 모자 보건은 보건 의료 성과를 개선하고 지속 가능한 개발 목표를 달성하는 데 매우 중요하다. 진전이 있지만, 높은 산모 및 영아 사망률 같은 문제가 도시에 비해 지방에서 계속되고 있다.

방법: 이 연구에서는 산모 및 영아의 사망률뿐 아니라 의료 종사자의 분포, 의료 시설 병원의 수준, 가용 병상 수와의 관련성을 분석하기 위해 라오스 사회 지표 조사 (LSIS)와 DHIS2 의료 시설 기록의 데이터를 이용한다. 도시와 지방 환경의 보건 의료 서비스를 평가하기 위해 의료의 질과 활용에 중점을 둔 비교 접근법을 도입한다.

결과: 도시와 지방의 산모 및 영아 보건 의료 성과에는 상당한 불균형이 발견된다. 특히 비엔티안(수도)은 후아판 주에 비해 더 나은 의료 서비스와 낮은 사망률을 보였다. 경제적 상황, 교육 수준, 숙련된 출산 도우미의 접근성 그리고 기본적인 의료 자원의 가용성이 이러한 불균형의 주요 요인이다. 비엔티안(수도)은 인구 989,000 명의, 남녀가 균등하게 구성되어 있고 탁월한 의료 서비스를 이루어 냈다. 이러한 발전은 5 개의 중앙 병원과 42 개의 보건소를 포함한 47 개의 의료 시설로 알 수 있는데, 특히 정보통신 기반 시설 및 접근성으로 명백히 알 수 있다. 반대로 후아판 주는 1 개의 주립 병원과 84 개의 보건소를 포함한 총 85 개의 의료시설과 315,000 명 정도의 다양한 인구 구성에도 불구하고, 여전히 문제점이 나타난다. 이런 점이 비엔티안(수도) 과 비교하여 더 높은 산모 사망률과 영아 사망률에 반영되어 나타난다.

결론: 라오스, 특히 지방에서 산모와 영아의 보건 의료 성과를 높이는 것은 매우 중요하다. 이는 의료 기반 시설의 향상, 숙련된 의료 종사자의 증가를 포함한다. 이러한 방법이 의료 종사자의 분포, 의료 시설의 병상 수, 병원 수준의 서비스와 산모와 영아의 사망률에 영향을 주는 경향을 식별하는데 도움이 될 것이다. 정책적인 권고 사항으로 지방을 대상으로 한 개입과 국제 의료 단체의 지속적인 지원 보장을 포함한다.

핵심되는 말 : 산모 사망률, 영아 사망률, 의료 현황, 도시 지방 불균형, 의료 정책, 의료 시설