

Developing a Social Media-Based Communication System Between Rural Healthcare Providers and Expert Medical Personnel in Bokeo Province, Laos PDR

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Abstract

This qualitative study investigates the development of a social media-based communication system designed to enhance interprofessional communication in Maternal and Child Health (MCH) services between rural healthcare providers and expert medical personnel (EMP) in Bokeo Province, Laos. The study addresses the issue of high maternal mortality rates attributed to poor infrastructure and the lack of timely medical interventions. It proposes using WhatsApp, a popular social media platform in Laos, to bridge this communication gap. Employing a participatory action research approach, the study involved 269 healthcare providers and four EMPs in focus group discussions. These discussions were instrumental in identifying unique communication challenges and potential solutions. Thematic analysis of the data revealed significant barriers to seeking expert advice and underscored the potential of digital health solutions like WhatsApp in overcoming these obstacles. To successfully implement such a system, considerations must include privacy, professionalism, consistent internet connectivity, adequate training, and clear usage guidelines. This study informs the development of a context-specific, comprehensive strategy that integrates technological, infrastructural, financial, educational, and cultural elements to enhance MCH outcomes in remote areas of Laos.

Keywords

Maternal and child health; remote rural area; social media-based communication; WhatsApp

Introduction

Maternal and Child Health (MCH) services in remote rural areas face numerous challenges that significantly impact healthcare access and delivery. One of the most critical challenges is inadequate transportation infrastructure (Haruna et al., 2019). Remote rural areas, such as Bokeo Province in Laos, often feature long distances and challenging terrain, including rugged roads and limited transportation routes (Subramaniyan et al., 2017). These geographical barriers pose significant obstacles for healthcare providers seeking access to expert medical personnel (EMP) in provincial hospitals. In addition to transportation challenges, Bokeo Province faces substantial socioeconomic difficulties (Bodhisane & Pongpanich, 2022). The prevalence of poverty and limited economic opportunities further compound the healthcare challenges faced by the local population. Although the poverty rate in Bokeo Province decreased from 46% to 18% between 1993 and 2019, it remains relatively high (Jetin, 2019; Liang et al., 2022; Nonaka et al., 2022; World Bank, 2020).

Furthermore, Bokeo Province is characterized by its ethnic diversity, with many minority ethnic populations residing in remote and hard-to-reach areas. Approximately 66.8% of Laos' 6.1 million inhabitants reside in rural regions, often challenging to access due to the mountainous landscape (Global Data Lab, 2022). Pregnant women in these regions face tremendous challenges in seeking prenatal care, accessing skilled birth attendants, and receiving necessary medical interventions during childbirth (Horiuchi et al., 2020; Ibi et al., 2019). To address these challenges, this research proposes developing a social media-based communication system tailored to the unique needs of MCH services in Bokeo Province, Laos. Social media platforms like WhatsApp have gained popularity nationwide and offer versatile communication modes, including text, voice, images, and videos (Pimmer et al., 2014).

There are many complexities in delivering MCH services in remote areas, where healthcare providers encounter numerous communication barriers. These barriers include limited technological infrastructure and connectivity, geographic isolation, and a lack of digital literacy. In regions like Bokeo Province, Laos, additional challenges arise from the diverse ethnic makeup, leading to language and cultural barriers (Wungrath, 2023). Resource constraints further exacerbate the situation, as limited access to digital devices and affordable data plans impede the effective use of digital communication tools. These factors are especially critical in MCH services, where timely communication is essential. This context highlights the necessity for a comprehensive strategy to enhance communication systems, encompassing improvements in infrastructure, digital literacy, and cultural understanding while ensuring privacy and security in digital communications (Krissana et al., 2024; Wungrath, 2023).

By utilizing social media technology, this research aims to facilitate seamless and efficient communication, allowing rural healthcare providers to seek expert advice, discuss complex cases, and receive guidance remotely. Moreover, social media platforms enable multimedia communication, allowing the exchange of visual information, such as images and videos, which can be crucial in diagnosing and managing complex MCH cases (Pimmer et al., 2014). The benefits and roles of social media in healthcare communication extend beyond bridging the gap between rural healthcare providers and EMP (Ventola, 2014).

Methodology

Study design

This research employed a qualitative approach, leveraging participatory action research (PAR) to actively involve healthcare providers and medical experts from Bokeo Province, Laos, in identifying and addressing communication challenges in MCH services. This democratic process informed the creation of a social media-based communication strategy customized to the specific needs of the province.

Participants and sampling

Participants in this study included 269 healthcare providers offering postnatal care in the remote rural areas of Bokeo Province. They were primarily located in five District Hospitals: Houay Xay, Ton Pheung, Meung, Pha Oudom, and Pak Tha. Additionally, the study involved four EMPs from Bokeo Provincial Hospital, specializing in MCH, obstetrics, and postnatal care. These experts comprised two obstetric doctors and two obstetric nurses.

The inclusion criteria for participants stipulated that they should have been practitioners in the field of MCH (and obstetrics for the expert practitioners) for at least one year in the area, should possess a proficient understanding and ability to communicate in Thai, should express a willingness to participate in the research study, and should be competent in using the WhatsApp application. Participants who, for any reason, were unable to provide information until the completion of the interview process – such as unwillingness to answer questions or providing incorrect information as determined by the Laotian co-researchers – were asked to discontinue and were excluded from the study. Participants' sociodemographic information is shown in Table 1.

Table 1: Participants' Sociodemographic Information

Characteristic	Participant	
	Number	Percentage
Number of participants	269	-
Age (years)		
Average = 33.5, min-max = 23-51		
20–29	78	29.00
30–39	137	50.90
40–49	50	18.60
≥ 50	4	1.50
Type of health staff		
Hygiene and sanitation officer	4	1.49
Medical assistant	78	29.00
Midwife	80	29.74
Nurse	96	35.69
Public health officer	8	2.97
Medical Doctor	3	1.12
Education level		
Diploma	94	34.90
Bachelor's degree	163	60.90
Higher than a bachelor's degree	12	4.50

Characteristic	Participant	
	Number	Percentage
Work experience (years)		-
Average = 10.4, min-max = 3–35		
1–5	46	17.10
6–10	116	43.10
11–15	66	25.40
16–20	23	8.60
> 20	18	6.70

Research setting

This study was conducted in Sub-District Hospitals in Houay Xay, Ton Pheung, Meung, Pha Oudom, and Pak Tha District. The districts above and sub-districts were selected based on criteria including their considerable distance from the Bokeo Provincial capital, complicated and inconvenient transportation access, requiring more than one hour of travel time from local hospitals to the provincial hospital, and the absence of a resident obstetrician. The selection of these areas was guided by consultations and recommendations from the Bokeo Provincial Public Health Office.

Research instrument

The Focus Group Discussion Topic Outline used in this study comprised 29 questions, crafted by the authors to gather information on several key areas: 1) issues and barriers related to seeking expert advice on MCH; 2) impacts of delayed expert advice; 3) strategies for surmounting communication obstacles and acquiring expert advice in MCH; 4) individual skills in using mobile phones and applications; and 5) developing the communication system via WhatsApp, including usage agreements and steps for consulting with experts.

Data collection

Data collection was conducted through focus group discussions, employing a process designed to stimulate the free expression of ideas from the participants. Three focus group discussions were held, each attended by approximately 35–40 participants, ensuring a broad range of perspectives. Each discussion lasted three hours, aiming to collectively identify strategies for developing a communication system through WhatsApp.

The participants were grouped into three distinct zones based on their geographic locations in the challenging terrain of Bokeo Province. Known for its remote and rugged landscape, many of its districts are isolated and hard to reach. The grouping was strategically done to minimize travel difficulties for the participants, forming three focus groups. Zone 1 encompassed the districts of Houay Xay and Ton Pheung. Zone 2 is comprised of the districts of Pha Oudom and Meung. Lastly, Zone 3 included the district of Pak Tha. In each of these groups, there was a mix of rural healthcare providers and expert medical personnel. This composition was chosen to ensure that each group had a balanced representation of different professional perspectives.

The focus group discussions were conducted in Thai due to their similarity to the Lao language, facilitating effective communication. However, two Lao researchers monitored and

verified the group conversations during these discussions. This inclusion aimed to prevent potential misinterpretations and errors in the language used for communication and to ensure the accuracy and reliability of the responses received from the participants.

Data analysis

Data was analyzed using thematic analysis, a qualitative method for identifying, analyzing, and interpreting patterns within the data. This approach facilitated the identification of common themes regarding interprofessional communication in MCH services. Initially, the data was reviewed to generate initial codes, which were then grouped into potential themes. These themes were subsequently reviewed and refined to develop a thematic map of the analysis. Each theme was thoroughly analyzed, and a detailed analysis was written, incorporating identified quotations to validate the findings (Wungrath et al., 2022). The findings informed the development of a social media-based communication system, addressing the unique communication challenges identified during the study. Themes and subthemes are presented in Table 2.

Table 2: Themes and Subthemes

Theme	Subtheme
1) Issues and barriers related to seeking expert advice on MCH	1.1 Geographical Constraints 1.2 Knowledge and Awareness 1.3 Availability and Accessibility of Expert Advice 1.4 Health System Barriers
2) Impacts of delayed expert advice	2.1 Experiences with Delayed Advice 2.2 Consequences of Delayed Advice 2.3 Trust and Confidence in Healthcare 2.4 Long-Term Health Impacts 2.5 Financial Implications of Delayed Advice 2.6 Social and Familial Impacts of Delayed Advice 2.7 Impact on Child's Growth and Development 2.8 Influence on Future Healthcare Decisions
3) Strategies for surmounting communication obstacles and acquiring expert advice in MCH include	3.1 Improving Access and Infrastructure 3.2 Enhancing Financial Support 3.3 Promoting Cultural and Social Change 3.4 Increasing Knowledge and Awareness 3.5 Leveraging Technology and Social Media
4) Individual skills in using mobile phones and applications, including Convenience and issues related to signal and internet access in various areas	4.1 Basic Technological Proficiency 4.2 Experience with social media and Communication Applications 4.3 Internet and Connectivity Issues 4.4 Interest and Willingness to Learn New Technologies 4.5 Opportunities for Training and Support 4.6 Role of WhatsApp in MCH Communication
5) Developing the Communication system via WhatsApp and Usage agreements and steps for consulting with experts	5.1 Developing the Communication system via WhatsApp 5.2 User Agreement Terms 5.3 Consultation Procedures 5.4 Expectations and Responsibilities 5.5 Ethical Considerations 5.6 Quality Control and Monitoring

Trustworthiness

To mitigate the risk of altering the intended meaning during the translation process, the interviews were conducted and transcribed in Thai. The Lao research team reviewed the translated and edited quotations to ensure they aligned with the original transcript. The background and methodology of the study have been comprehensively elucidated, allowing readers to assess its pertinence. Rigorous documentation, including field notes and memos, has established an audit trail. Data triangulation was accomplished by conducting interviews with diverse individuals across different locations and diligently recording the information in field notes and memos.

Results

This results section explores the challenges and solutions in MCH communication among rural healthcare providers in Bokeo Province, Laos. It highlights the barriers to expert advice, the impacts of delays, and the role of WhatsApp in improving communication. The section also discusses healthcare providers' digital skills and implementing a structured WhatsApp communication system for better MCH services.

Issues and barriers related to seeking expert advice on MCH

Participants unanimously agreed that remote rural healthcare providers in Bokeo Province, Laos, face compounded challenges in accessing expert advice for MCH. Geographic barriers and poor infrastructure contribute to transportation difficulties, inhibiting timely access to expert advice during critical situations. Additionally, a significant knowledge gap on MCH issues obstructs the ability to effectively recognize and address unusual symptoms or conditions. The scarcity and limited accessibility of healthcare professionals in remote areas add to these difficulties, as urgent expert advice is often out of reach, compromising immediate communication in critical scenarios. Moreover, systemic issues, such as bureaucratic hurdles, slow response times, and inadequate support systems, hinder seeking expert advice, causing delays in necessary interventions. This interplay of geographic, knowledge-based, accessibility, and systemic challenges culminates a complex obstacle for rural healthcare providers in acquiring essential MCH advice.

"We're a full day's journey away from the nearest hospital. If we encounter a complex case, the long distance and shoddy roads make it almost impossible to seek immediate expert advice."

(35-year-old Nurse, Meung)

"There are times when we face situations that are beyond our understanding. We aren't even sure what questions to ask the EMP. Our limited knowledge about some conditions stands in the way of seeking expert advice."

(29-year-old Midwife, Pha Oudom)

"When things get critical, and we desperately need advice, we often find the EMP is either unavailable or out of our reach. It's not easy dealing with these situations when the right advice isn't readily accessible."

(45-year-old Public Health Officer, Pak Tha)

"The system isn't as supportive as it should be. We manage to get in touch with EMP, but then the bureaucratic red tape slows down the process. By the time we get the advice, it's often too late."

(37-year-old Public Health Officer, Ton Pheung)

Impacts of delayed expert advice

In the remote rural healthcare settings of Bokeo Province, Laos, healthcare providers routinely grapple with complex health cases due to delays or lack of immediate expert advice. This delay induces feelings of anxiety, uncertainty, and desperation, often escalating manageable situations into critical health emergencies and causing substantial distress to both providers and patients. The negative impact on immediate health outcomes and diminished community trust in the healthcare system fuels a harmful cycle of fear and avoidance of timely healthcare. Healthcare providers underline the persistent health impacts of these delays, with mothers experiencing poor recovery and children facing potential developmental issues that could have been avoided with timely advice. The delay also often increases healthcare costs due to the need for more extensive and costly interventions, which imposes an additional financial burden on families. The consequences of such delayed advice extend beyond physical health and financial strains; it also disrupts familial and societal harmony. Social stigma and emotional distress further complicate the healing process. Due to missed interventions, the potential lifelong impacts of delayed advice on a child's growth and development are of particular concern to providers. These sentiments reflect the collective perspective of the study participants.

"I remember a time during my pregnancy when something unusual happened. My baby hadn't moved for over 10 hours, which was extremely worrying. In panic, I went to the local hospital's staff, but they couldn't resolve the situation. We had to wait for advice from a doctor at the provincial hospital, but communication was incredibly challenging. Unfortunately, my baby was harmed due to this delay and, ultimately, didn't survive."

(28-year-old Nurse, Pha Oudom)

"Without timely advice, treatable health complications evolve into serious conditions. We're left dealing with a crisis that could have been averted, and that's a tough pill to swallow."

(32-year-old Nurse, Ton Pheung)

"The effects of delayed advice often linger on. It's a painful reality seeing patients grapple with long-term health issues that could have been avoided with timely interventions."

(38-year-old Midwife, Meung)

"The cost of delayed advice goes beyond health. It becomes a financial nightmare, with families having to bear the brunt of escalated healthcare costs for conditions that were once preventable."

(41-year-old Public Health Officer, Pha Oudom)

"The societal implications of delayed advice can be equally devastating. I've seen families crumble under stress and society's critical eye, which only magnifies their trauma."

(35-year-old Hygiene and Sanitation Officer, Pak Tha)

“Seeing a child fail to reach their developmental milestones due to delayed advice is heart-wrenching. We’re not just talking about immediate effects but potentially a lifetime of struggle.”

(30-year-old Medical Assistant, Houay Xay)

“After so many delays, people are scared to even ask for help. They think it won’t come in time. This fear is causing more harm than good.”

(44-year-old Medical Doctor, Ton Pheung)

Strategies for surmounting communication obstacles and acquiring expert advice in MCH

Participants in our study advocated for a holistic approach to overcome the barriers they face in acquiring expert advice. They emphasized improving access and infrastructure, calling for better transport and more substantial healthcare facilities in remote areas. Such improvements, they felt, would expedite expert consultation and enhance health outcomes. Addressing financial constraints was another critical issue, with participants suggesting initiatives to increase financial support for rural healthcare services, thereby improving resource access and the availability of expert advice. However, they recognized that infrastructural and financial improvements alone were not sufficient. There was a call for cultural and societal changes, with participants suggesting awareness campaigns and educational programs to address societal misconceptions and cultural hurdles. Participants also called for better training programs to enhance their knowledge and understanding of MCH issues. As the discussion evolved, there was an overarching optimism for the potential of technology and social media platforms, like WhatsApp, as transformative solutions to communication barriers. They believed these platforms could expedite the seeking and receiving of expert advice and decrease patient risk. The participants agreed that embracing these digital tools marked a significant step forward from the current status quo, offering a proactive solution to long-standing challenges.

“We need better roads, faster vehicles, and more accessible healthcare facilities. These improvements would make it easier for us to consult EMP when needed and could significantly enhance our patient’s health outcomes.”

(42-year-old Public Health Officer, Houay Xay)

“More funding is required for rural healthcare services. With better financial support, we can access more resources and more expert advice, which is crucial for our work.”

(38-year-old Medical Doctor, Ton Pheung)

“Societal misconceptions and cultural taboos sometimes prevent us from seeking advice. We need campaigns to educate people about the importance of MCH, and to encourage them to support our work.”

(33-year-old Midwife, Meung)

“In addition to changing societal attitudes, we need to increase our knowledge. More comprehensive training programs are necessary so we can provide the best care for our patients.”

(29-year-old Nurse, Pha Oudom)

"WhatsApp and other social media platforms could be game-changers. They could allow us to communicate with EMP quickly, to get and give vital health information in real time. This could make a real difference in the quality of care we're able to provide, and significantly reduce the risks for our patients."

(35-year-old Medical Assistant, Pak Tha District Hospital)

"Adopting these digital tools is a step forward. It provides a proactive and practical solution to many communication challenges we've been grappling with. It's certainly better than doing nothing and letting these issues persist."

(40-year-old Hygiene and Sanitation Officer, Houay Xay)

Individual skills in using mobile phones and applications: Convenience and issues related to signal and internet access in various areas

Within the realm of digital technology as a means of communication, rural healthcare providers discussed various aspects such as their technological proficiency, experiences with social media platforms, challenges with connectivity, willingness to learn new technologies, potential for training and support, and the perceived role of WhatsApp in MCH communication. Most participants reported a basic proficiency level with mobile phones and applications. Their experiences with social media and communication applications varied, with some describing familiarity with platforms like WhatsApp, while others highlighted challenges such as lack of training or fear of misuse. Internet connectivity issues were a significant concern, especially in remote areas where poor signal strength can hamper the usage of mobile applications. Despite these challenges, the participants showed interest and openness towards learning new technologies. They suggested providing proper training and support to improve their skills using these digital tools for health-related purposes. When discussing the role of WhatsApp in MCH communication, they believed its simplicity and wide usage could make it an effective tool for improving access to expert advice. The platform's instant messaging, voice calls, and document-sharing features were seen as particularly beneficial for this purpose.

"I'm comfortable using my phone and basic apps, but I sometimes struggle with more complex platforms."

(26-year-old Nurse, Houay Xay)

"My experience with social media has been mixed; the platforms are helpful, but misuse can lead to problems. Proper training can certainly help us make better use of these tools."

(31-year-old Medical Assistant, Ton Pheung)

"I believe WhatsApp can be very useful in communicating with EMP due to its simplicity and popularity."

(37-year-old Public Health Officer, Meung)

"Internet connectivity is a big issue in my area, making it difficult to use apps consistently."

(29-year-old Midwife, Pha Oudom)

A targeted training program is necessary to improve the proficiency of rural healthcare professionals with mobile technology. This program should include basic and advanced modules, hands-on workshops, and accessible online resources. Addressing connectivity issues, providing ongoing technical support, and offering regular updates on new developments are critical components. Establishing a peer learning community and collaborating with tech companies can further enhance their skills in effectively using mobile technology in healthcare.

Developing the communication system via WhatsApp: Usage agreements and steps for consulting with experts

The research study investigated the applicability and acceptance of using WhatsApp as a communication channel for interprofessional communication in MCH services between remote rural healthcare providers and EMP. The key findings from the study can be delineated into two primary perspectives:

From the perspective of remote rural healthcare providers:

1. The WhatsApp platform enables continuous communication and seeking advice from expert practitioners, with particular emphasis on emergencies or critical situations.
2. For cases involving prenatal care, postnatal care, and the care of infants or children under five years of age, advice can be provided by nurses specializing in MCH.
3. In instances requiring consultation regarding childbirth and associated emergencies, it is mandatory that a qualified obstetrician provides the advice.
4. When consultation or advice is sought, the associated EMP should respond in the timeliest manner possible.
5. All communications must specifically pertain to the topic, i.e., MCH and childbirth. The importance of respecting individual rights, maintaining decorum, using respectful language, and honoring other participants is emphasized.
6. In situations where advice is sought on health matters unrelated to MCH and childbirth, it is at the discretion of the EMP to provide advice or consult with other expert EMPs outside the WhatsApp group.

From the perspective of EMP:

1. The WhatsApp group of EMP comprises two obstetricians and two nurses specializing in MCH from the provincial hospital of Bokeo.
2. In cases involving prenatal care, postnatal care, and the care of infants or children under five years of age, responses are primarily provided by the MCH nurses. If they are unable to deliver an adequate response, they may seek advice from a doctor.
3. An obstetrician responds to situations requiring consultation about childbirth and associated emergencies. The primary responder is the female obstetrician, and in case she is

unavailable and the response time exceeds 15 minutes, the second obstetrician, who is male, takes over.

4. For initial consultations that are non-urgent or non-emergency in nature, written messages are recommended. However, for critical and urgent situations, the use of phone calls or video calls is recommended.

5. In instances where images must be shared if they involve personal identifiers, they must be kept confidential. Unnecessary capturing of the faces of patients or any individuals is discouraged. Images should not be disseminated elsewhere, and the consent of the patient or their relatives should be taken before sharing. Once the consultation or treatment process is completed, such images should be promptly deleted.

All participants in the study agreed that the established guidelines for using WhatsApp as a medium for interprofessional communication were beneficial and facilitated the orderly use of the application. These guidelines can streamline seeking and providing consultation, reducing confusion and preventing potential harm or adverse outcomes for healthcare providers and patients. Additionally, it is suggested that a systematic evaluation of this communication system be conducted approximately six months after implementation. Such an evaluation would help identify any issues, obstacles, and operational challenges experienced by users, thereby enabling the refinement and improvement of the system. It would also provide an opportunity to collect and incorporate user feedback and recommendations to ensure the system meets their communication and consultation needs effectively and efficiently.

Discussion

The challenges illuminated by this study highlight the multifaceted and complex issues related to seeking expert advice on MCH for remote rural healthcare providers in Bokeo Province, Laos. Rural healthcare providers are geographically confronted with significant distance and poor infrastructure, making it difficult to seek and receive immediate expert advice during emergencies. This echoes the findings of previous studies, which have underscored the geographic and infrastructural disparities impacting rural healthcare globally (Jensen et al., 2020; Kumar & Pal, 2018). Additionally, a knowledge gap and lack of awareness among these healthcare providers often result in difficulties identifying and addressing unusual symptoms or conditions. These knowledge-related barriers could be attributed to a lack of professional development opportunities and access to relevant resources in remote areas (Richard et al., 2010).

Accessibility issues, such as the unavailability or inaccessibility of expert advice, were found to be particularly exacerbating for these providers during critical situations. These findings align with research conducted by Labonté et al. (2006), highlighting the role of resource distribution and access to professional networks in facilitating timely advice and intervention. Lastly, systemic issues, like bureaucratic hurdles, delayed response times, and inadequate support systems, hinder seeking expert advice and potentially compromise patient outcomes. These issues mirror the systemic shortcomings of many healthcare frameworks, especially those catering to rural and remote communities (Russell et al., 2021). The present study contributes to the existing literature by highlighting the unique barriers faced by remote rural healthcare providers in Laos in accessing expert advice for MCH. The findings suggest the

need for innovative solutions, like a social media-based communication system via WhatsApp, to alleviate these challenges and enhance interprofessional communication.

In situations requiring immediate expert intervention, delays often precipitate dire health crises and cause significant distress among healthcare providers and patients. The impacts of such delays extend beyond immediate health outcomes, undermining community trust in the healthcare system and fostering an environment of fear and hesitation that discourages future healthcare-seeking behavior (Majumdar et al., 2019). The enduring health effects of delayed interventions are particularly concerning. Mothers often experience suboptimal recovery, and children may encounter developmental issues that timely advice could have mitigated (Carandang et al., 2021). Financially, these delays translate into escalated healthcare costs due to the necessity of more extensive interventions (Cyr et al., 2019).

Moreover, the sociocultural impacts of delayed advice should not be underestimated. The stigma and emotional distress experienced by families compound the existing physical and financial burdens (Kazibwe et al., 2021). Providers also expressed concern regarding the potential long-term impact of delayed advice on a child's growth and development, emphasizing the risk of missing critical developmental milestones due to postponed interventions (Choo et al., 2019).

The findings underline several key strategies for overcoming barriers to expert advice acquisition in MCH for remote healthcare providers. First, participants advocated for systemic enhancements in access and infrastructure, including better transportation and healthcare facilities. This reflects the recognized need for improved geographical accessibility of healthcare services in rural regions. Participants further identified financial constraints as a significant impediment, suggesting the need for increased financial support for rural healthcare. This aligns with global studies that highlight the role of economic resources in ensuring the availability of expert advice and quality care (Hanson et al., 2022).

Cultural and societal changes were also stressed as important, indicating the need to address societal misconceptions and cultural barriers through targeted awareness campaigns. This underscores the importance of community engagement and awareness in facilitating healthcare access, an aspect emphasized in public health literature (Shim et al., 2023). The call for more comprehensive training programs points to the necessity of ongoing professional development to enhance healthcare provider competence, a significant factor in improving patient outcomes (Amaral et al., 2023; Cavanagh et al., 2022).

Interestingly, participants exhibited optimism towards the potential of technology and social media platforms, like WhatsApp, in addressing communication barriers. They believed that digital tools could expedite the acquisition of expert advice, thereby reducing patient risk. This highlights the increasing recognition of the transformative potential of digital health solutions in improving healthcare access and quality, particularly in remote areas (Smith & Magnani, 2019).

Digital technology proficiency emerged as a significant factor in our study, particularly regarding the use of mobile phones and applications. Most participants possessed a fundamental level of proficiency, though experiences varied, and several cited challenges, indicating the necessity for targeted training to ensure the effective use of digital health tools (Lan & Chen, 2022). Participants reported mixed experiences with social media and communication applications, with concerns about misuse and lack of training. These findings align with the broader literature emphasizing the importance of clear guidelines and

education to ensure the safe and effective use of digital health tools (Li & Ding, 2022; Parija et al., 2020).

A significant concern among participants was internet connectivity, particularly in remote areas, corroborating the recognized digital divide in healthcare, where connectivity issues limit the potential benefits of digital health solutions (Yao et al., 2022). However, participants demonstrated enthusiasm and readiness to embrace digital health tools, suggesting the need for supportive measures to facilitate their effective adoption, such as comprehensive training and ongoing support (Chike-Harris et al., 2021; Harkey et al., 2020; Pourmand et al., 2021). In the context of the proposed WhatsApp-based communication system, the platform's simplicity, widespread use, and features were seen as conducive to improving access to expert advice, underscoring the potential of social media-based interventions in enhancing healthcare communication and outcomes (Bhat et al., 2021; Eslami Jahromi & Ayatollahi, 2023; Ganapathy et al., 2020).

WhatsApp, as a communication tool in healthcare settings, offers several benefits. Its real-time messaging capability facilitates instant, accessible, and convenient dialogue between healthcare providers, enhancing collaboration and enabling timely decision-making, which can be particularly beneficial in emergencies (Anis & Amalia, 2021; Aufa et al., 2023; Ayu & Handayani, 2021). Furthermore, the platform's features, like document and image sharing, can aid in discussing complex medical cases, allowing for immediate feedback and advice from EMP (Bennani & Sekal, 2019; Bhatia et al., 2023; Das et al., 2020).

In terms of user experience, the application's ease of use and broad adoption rate make it a practical choice for healthcare communication (Barayev et al., 2021; Pacholek et al., 2021). However, successfully implementing WhatsApp in healthcare settings is not without challenges. Infrastructure issues like internet connectivity, particularly in remote areas, can hamper consistent use. Further, there is a need for targeted training to ensure that healthcare providers can effectively use the platform and adhere to privacy and confidentiality standards in medical communication. Despite these challenges, the potential of WhatsApp to enhance interprofessional communication in MCH services, particularly in remote settings, is promising.

Our findings reinforce the growing body of evidence highlighting the benefits of utilizing digital communication tools such as WhatsApp to enhance healthcare communication and consultation, particularly in remote and rural settings (Hogan et al., 2019; Onsongo et al., 2023). Participants noted that the usage of WhatsApp can enable continuous, accessible, and efficient communication between remote rural healthcare providers and EMP, providing a practical solution to the geographical and logistical challenges often associated with healthcare delivery in such regions (Guillaume et al., 2022). These findings align with previous research suggesting that digital communication tools can facilitate improved access to expert advice, especially during critical situations (Ferri et al., 2020; Haleem et al., 2021).

Notably, the study found that participants were agreeable to a set of usage guidelines for the WhatsApp platform, emphasizing the importance of respecting privacy, maintaining professionalism, and adhering to the specific consultation roles assigned based on medical expertise. This reiterates the need for clear usage policies when implementing digital communication tools in healthcare settings to ensure privacy, confidentiality, and effectiveness of medical communication (Baines et al., 2022; Saengyo et al., 2023). However, the study also highlights that there is still a need for ongoing evaluation and feedback collection to improve the system's utility and efficiency further. This is crucial to ensuring the

communication system is adaptable and responsive to the changing needs and challenges of healthcare delivery in remote and rural settings (Aceto et al., 2020).

Conclusion

This study underscores the significant barriers rural healthcare providers face in Laos when seeking expert advice for MCH, including geographic and infrastructural limitations, knowledge gaps, systemic hurdles, and financial constraints. Digital health solutions like WhatsApp can be crucial in overcoming these challenges, offering a platform for timely expert advice and improving interprofessional communication. However, successful implementation requires adequate training, clear usage guidelines, and attention to privacy, professionalism, and consistent internet connectivity. Regular feedback and evaluation are critical to adapt the platform to changing healthcare delivery needs. Addressing these barriers necessitates a comprehensive, context-specific approach combining technological, infrastructural, financial, educational, and cultural strategies.

Strengths and limitations of the study

This study carries significant strengths that lend credence to its findings. First and foremost, the comprehensive approach employed in the study allows it to address the multifaceted barriers remote rural areas face in accessing expert advice in MCH services. This holistic investigation encompasses geographical, infrastructural, knowledge, systemic, and technological aspects. Another substantial strength lies in using a participatory action research (PAR) approach. By actively involving the participants as key contributors to the study, their firsthand experiences and perspectives enrich the data collected. Furthermore, the study's exploration of WhatsApp as a communication tool exemplifies the innovative use of digital technology in healthcare, offering novel solutions especially pertinent to resource-limited settings. Lastly, the thorough exploration of themes facilitated by focus group discussions and thematic analysis lends depth and nuance to understanding the issues and strategies discussed.

Despite its strengths, the study also has certain limitations. One primary constraint is the limited generalizability of the findings. As the study focuses on specific districts in Bokeo Province, Laos, its insights may not extend to other regions or countries with differing healthcare systems and levels of technological access. Dependence on self-reported data is another limitation, as the study's conclusions rely heavily on participants' willingness to share their experiences and views. This can introduce potential biases or inaccuracies in their responses. Finally, WhatsApp as a critical solution depends on internet connectivity, a significant challenge in the remote areas under study. This poses a potential obstacle to the widespread and consistent application of the digital solution proposed.

Recommendations and further study

This study highlights several key recommendations. First, structured training programs on digital communication tools like WhatsApp for healthcare providers are vital, particularly for MCH services. Such training will enable providers to effectively use these tools for expert consultations and better patient outcomes. Second, enhancing internet connectivity in remote

areas is crucial to facilitate the consistent use of digital tools and reliable access to expert advice.

Further research is needed to expand upon these findings. Exploring a variety of technological platforms could reveal new ways to improve interprofessional communication in MCH services. Additionally, conducting similar studies in different countries, including Laos, will help evaluate the broader applicability of these strategies. It is also essential to consider these regions' financial, infrastructural, and cultural factors to tailor effective MCH strategies, particularly assessing the cost-effectiveness and cultural adaptability of technology interventions.

The study's recommendation of using WhatsApp for healthcare communication in remote areas faces significant challenges due to limited internet connectivity, affecting its widespread and consistent application. In addition, in resource-limited settings, the effectiveness of WhatsApp is further compromised by issues such as data affordability, varied digital literacy among healthcare providers, and cultural barriers to digital adoption. These factors underscore the need for alternative or supplementary strategies to address these inherent limitations effectively.

However, in addressing the challenges faced in MCH services, the paper underscores the need for developing and implementing strategies that focus on improving access and enhancing infrastructure. This recommendation recognizes that communication barriers, particularly in remote areas, significantly impede the ability to acquire expert advice and deliver effective healthcare. By prioritizing enhancing connectivity and technological infrastructure, healthcare providers in these areas can gain more reliable access to necessary information and support.

Implication of the study

The findings of this study have significant implications for healthcare providers, particularly in resource-limited settings. It highlights the potential role of digital tools such as WhatsApp in facilitating access to expert advice and improving communication in MCH services. This could ultimately lead to improved health outcomes for mothers and children in remote areas. Furthermore, the identified challenges serve as crucial insights for health policymakers, emphasizing the need to consider remote areas' unique geographical and infrastructural barriers. The innovative use of digital technology could be included in broader health strategies and policies, particularly those aimed at improving rural healthcare. Lastly, this study underscores the importance of continuous learning and adaptation in healthcare. As technologies evolve, so should our strategies and tools to deliver care, even in the most remote and resource-limited settings. The practical implementation of these digital tools will require ongoing evaluation and adjustment based on user feedback and changing healthcare needs.

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