



HEALTHCARE SERVICE INNOVATION IN ISOLATED REGIONS: AN ANALYSIS OF THE MOBILE PUSKESMAS PROGRAM IN PAPUA

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Abstract :

Health service accessibility in isolated areas of Papua represents a critical problem faced by Indonesia, where communities must travel 2-3 days on foot to reach the nearest health facility, resulting in high maternal and infant mortality rates. This study aims to analyze the effectiveness of the Mobile Health Center (Puskesmas Bergerak) Program implementation in Papua in improving access and quality of health services in isolated areas using Everett M. Rogers' diffusion of innovation theory. This research employs a qualitative method with data collection through in-depth interviews with key informants including the Head of Yakonde Village Kurulu District Yahukimo Regency, Head of Wainaga Village, health center staff, and service recipients. Primary data was collected through direct observation and analysis of program evaluation documents to understand the dynamics of health service innovation adoption in isolated areas. Research findings indicate significant success of the Mobile Health Center Program with total elimination of maternal mortality over the past 3 years in Yakonde Village, elimination of infant mortality cases due to diarrhea and high fever, and spontaneous program adoption by neighboring villages through observational learning. This program has successfully transformed health service accessibility from previously unreachable to routine reality with medical team visits every two weeks. The study recommends strengthening the monitoring system, increasing operational budget, developing service protocols adapted to Papua conditions, and establishing local health cadres for program sustainability.

Keywords: Mobile Health Center; Isolated Areas; Diffusion of Innovation

INTRODUCTION

Public health in Indonesia faces significant challenges related to disparities in access and quality of services between urban and rural areas. In major cities like Jakarta and Surabaya, modern healthcare facilities are readily accessible, while in remote areas, access is limited. Limited infrastructure and adequate medical personnel are major barriers, forcing people in remote areas to travel long distances to receive medical care. (Multazam & Andayanie, 2024). According to many regions, particularly in Papua and several areas in Kalimantan, Sumatra, and Nusa Tenggara, the shortage of doctors and trained medical personnel is worsening the health conditions of the people there. Health disparities are even more pronounced in remote and isolated areas. Difficult geographical conditions and lack of infrastructure complicate the distribution of health services. Papua, as one of the provinces with the highest



poverty rates in Indonesia, faces significant challenges in providing equitable health services. The lack of health facilities and medical personnel in remote areas exacerbates the health service disparity, making it difficult for people there to access necessary care.(Calundu, 2025).

To address this disparity, the Indonesian government has launched various programs, such as the National Health Insurance (JKN), to provide more equitable access to healthcare services. However, implementation on the ground still faces obstacles, particularly in remote areas. The lack of adequate infrastructure and medical personnel remains a challenge. Improving health education, distributing medical personnel, and building more adequate healthcare facilities in underserved areas are crucial steps to reduce this disparity.(Widjaja et al., 2025)Papua, as one of Indonesia's outermost provinces, faces significant challenges in providing adequate healthcare services to its population. Its hilly, isolated geography and limited transportation infrastructure severely limit access to healthcare facilities. Most Papuans live in remote, hard-to-reach areas, making healthcare often unavailable or severely limited. According to data from the Central Statistics Agency (BPS), Papua has the lowest household electrification ratio in Indonesia, at around 45.93% in 2015, indicating limited access to basic services such as electricity and clean water. These limitations also impact the quality and reach of healthcare services in the region.(Apay et al., 2024).

The high maternal and infant mortality rates in Papua are a clear indicator of the region's health crisis. Papua has higher maternal and infant mortality rates than the national average. Factors such as a lack of adequate health facilities, limited medical personnel, and low levels of education and public health awareness contribute to these high rates. Furthermore, the prevalence of infectious diseases such as malaria, tuberculosis, and diarrhea remains high in Papua, further worsening public health conditions.(Ahyuni & Sutjipto, 2023)These diseases are often not properly managed due to limited access and available health facilities. The lack of health infrastructure in Papua, both in terms of facilities, medical personnel, and drug distribution, is a major obstacle to improving public health. Most health facilities in Papua lack adequate medical equipment, and many lack access to electricity and clean water. Furthermore, drug distribution is often hampered by difficult-to-reach geographic conditions, resulting in inaccurate timely supplies. A shortage of medical personnel is also a serious problem, with many reluctant to work in remote areas due to unfavorable working conditions. Papua has a very low doctor-to-population ratio, indicating an urgent need to increase the number and distribution of medical personnel in the region.(Medyati et al., 2024).

Community Health Centers (Puskesmas) serve as the primary healthcare service units for communities throughout Indonesia. As the vanguard of the national healthcare system, Puskesmas have a strategic role in providing promotive, preventive, curative, and rehabilitative healthcare services. However, Puskesmas face significant challenges in carrying out their duties in remote areas, particularly related to geographic constraints, a lack of medical

personnel, and limited facilities. (Mangonto et al., 2024) According to research in remote areas of Indonesia, community health centers (Puskesmas) are often staffed by only one nurse or midwife responsible for thousands of residents, resulting in extremely high workloads and limited services. Geographical constraints such as difficult terrain and limited transportation impede community access to health services. Furthermore, the uneven distribution of medical personnel and the lack of health facilities affect the quality of services provided. For example, in Papua, community health centers often lack basic facilities such as electricity and clean water, and lack essential medicines and adequate medical equipment. This makes it difficult for community health centers to provide optimal services to the community. (Devi et al., 2022).

To address these challenges, innovation in healthcare services is crucial. The implementation of information and communication technology, such as electronic medical record systems and telemedicine, can improve the efficiency and reach of community health center services in remote areas. Research by [] suggests that implementing electronic medical record systems in Indonesian healthcare facilities can reduce patient waiting times and improve patient satisfaction through faster and more accurate data access. Furthermore, developing community-based healthcare models and empowering communities can also strengthen the role of community health centers in improving access to and quality of healthcare services in remote areas. Innovation in healthcare services in isolated areas, particularly in Papua, has become a major focus in efforts to improve access and quality of healthcare services. One significant innovation is the implementation of mobile healthcare services, designed to reach communities in remote areas that are difficult to reach by fixed healthcare facilities. According to research by [], mobile healthcare services in Papua have proven effective in improving community access to basic healthcare services, including immunizations, prenatal checkups, and treatment of infectious diseases. However, service quality still faces challenges, such as limited human resources, inadequate medical equipment, and logistical constraints.

The Mobile Community Health Center (Puskesmas Bergerak) program in Papua is a strategic initiative designed to improve access and quality of healthcare services in remote areas. For example, the West Papua Provincial Health Office is implementing the Mobile Health Service (PKB) in Kaimana Regency, covering the villages of Wainaga, Moyana, and Kokoroba. This program involves a team of specialist doctors and health workers from the Tugarni Community Health Center, with the aim of providing accessible, affordable, and high-quality healthcare services to communities in very remote areas. The PKB is implemented by directly visiting hard-to-reach villages using operational vehicles provided by the Biak Numfor Regency Health Office. In Padaido District, for example, the program not only provides medical services but also conducts health screenings and mentoring of health cadres at the village level. This approach aims to ensure that the healthcare services provided are not only curative, but also preventive and promotive, to improve the overall health of the community.

Although the implementation of the Mobile Health Center (PKB) faces various challenges, such as limited infrastructure, a shortage of medical personnel, and logistical constraints, according to a report from the West Papua Provincial Health Office, there are still 41 districts in West Papua that do not have a Community Health Center (Puskesmas), indicating a gap in the distribution of health facilities. Furthermore, the placement of medical personnel in remote areas is also a challenge, with only a small proportion willing to serve in these areas. Therefore, collaborative efforts between local governments, communities, and the private sector are needed to overcome these obstacles and ensure the sustainability and effectiveness of the Mobile Health Center (Puskesmas Bergerak) program in Papua. This study aims to analyze the implementation of the Mobile Health Center (Puskesmas Bergerak) program in Papua and its contribution to improving access to health services in remote areas. Focusing on hard-to-reach areas, this study evaluates the program's impact on reducing health disparities between isolated areas and the rest of Indonesia. Using a qualitative approach, this study identifies factors influencing the program's effectiveness and challenges faced in its implementation. The main objective of this study is to provide a comprehensive overview of the role of Mobile Health Centers (Puskesmas Bergerak) in improving access to and quality of health services in Papua. According to research by the Mobile Health Services program in Keerom Regency, it has succeeded in increasing community access to maternal health services, although there are still challenges related to limited medical personnel and incentives received by health workers. (Nurjaman & Patty, 2024).

RESEARCH METHOD

This study uses a descriptive qualitative approach to analyze the implementation of the Mobile Community Health Center (Puskesmas Bergerak) program in Papua and its contribution to improving access to healthcare services in isolated areas. This approach allows researchers to explore the experiences, views, and perceptions of the community and healthcare workers regarding the implementation of the Mobile Community Health Center (Puskesmas Bergerak) program in meeting healthcare needs in remote areas. Data were collected through in-depth interviews, direct observation, and documentation related to the healthcare services provided by the Mobile Community Health Center. The collected data were then analyzed to identify the program's impact on improving access to and quality of healthcare services in Papua. (Alaslan, 2023).

This study focuses on exploring the effectiveness of the implementation of Mobile Community Health Centers (Puskesmas Bergerak) in reducing health disparities in isolated areas, using the Diffusion of Innovation theory and Public Service theory as analytical frameworks. This study aims to assess the extent to which the implementation of Mobile Community Health Centers (Puskesmas Bergerak) can improve the quality of health services in terms of speed, accessibility, and community satisfaction in remote areas. In addition, this

study also identifies challenges and obstacles faced in program implementation, and assesses community acceptance of this innovation. This study was conducted in several remote areas in Papua, focusing on the experience of service users and evaluating the performance of health workers involved in this program.

FINDINGS AND DISCUSSION

1. Service Innovation of the Mobile Health Center Program in Papua

In this study, researchers analyze the effectiveness of the implementation of the Mobile Health Center program in Papua in improving access and quality of health services in isolated areas, using innovation theory. In this study, innovation elements are analyzed through five innovation indicators, namely Relative Advantage in the theory of innovation diffusion developed by Everett Rogers is the extent to which an innovation is perceived as better than existing alternatives. This relative advantage can be measured in various ways, such as economic benefits, increased comfort, convenience, or satisfaction felt by users of the innovation. Innovations that have clear and significant relative advantages tend to be adopted more quickly by individuals or society. This advantage is not only seen in an objective framework, but is also greatly influenced by individual perceptions of the value and benefits they receive. (Rauf et al., 2025) Rogers explained that the greater the perceived relative advantage, the greater the likelihood of adoption of the innovation in the community. In this study, relative advantage is an important aspect in assessing the effectiveness of the Mobile Health Center Program in Papua. As an innovation in health services, the Mobile Health Center has a relative advantage because this program provides more accessible health access to communities in remote areas, who previously had difficulty obtaining health services. By using operational vehicles, the Mobile Health Center medical team can directly visit hard-to-reach villages, providing health services directly to the community. This relative advantage, which includes increased access, convenience, and time efficiency, is felt to be very beneficial by people living in remote areas in Papua, thus increasing the adoption and use of this service. Along with increasing relative advantage, the Mobile Health Center program also helps reduce health disparities between isolated areas and the rest of Indonesia. People who previously had to travel long distances to get health services can now enjoy health services more quickly and easily. This shows that, from the perspective of the diffusion of innovation theory, this program not only provides objective benefits in terms of ease of access, but also creates positive perceptions among the public, which encourages wider and more sustainable adoption. (Layrvina et al., 2025).



Picture1 Mortality Rate Decline Graph (2021-2024)

The graph above demonstrates the significant impact of the Mobile Community Health Center Program on reducing mortality in Yakonde Village, Kurulu District, Yahukimo Regency. A drastic decline in maternal mortality can be seen, from 8 cases in 2021 to 0 since 2022. Infant mortality also decreased significantly from 15 cases to 0, demonstrating the program's success in addressing critical health issues in isolated areas.

This is in accordance with informants according to the service recipient community (patients), who stated that:

"Previously, we had to travel long distances, often for days, just to get basic healthcare. Having the Mobile Community Health Center come directly to our village has been a huge help. The services provided are much faster and more accessible, especially for checkups for pregnant women and immunizations for children. I feel more comfortable because the doctors and nurses come here, so we don't have to go to a distant city. The benefits of this program are very noticeable, because previously we could only hope for services, and now we can get them directly without many obstacles. We feel safer and more satisfied with the faster service, without having to face the many obstacles we used to experience."

Based on an interview with one patient, it can be explained that the relative advantage of the Mobile Health Center program lies in the ease of access and speed of service, which is greatly appreciated by the community. This program enables people in remote areas to obtain basic health services that were previously difficult to access. With the presence of the Mobile Health Center, previously long and expensive travel times can be shortened, increasing community comfort and satisfaction. Therefore, the advantages of this innovation include increased accessibility, reduced geographic constraints, and efficiency in the delivery of health services that are more responsive to community needs.(Eka, 2024). The benefits of this innovation are evident in the reduction in time and costs incurred by the public, as well as increased levels of satisfaction and trust in healthcare services in isolated areas like Papua. Fit in

the theory of innovation diffusion refers to the extent to which an innovation is consistent with the values, past experiences, and needs of the society that adopts the innovation. Innovations that are compatible with the culture and values of a society are more easily accepted and adopted. This fit also includes the match between the innovation and the existing practices and needs of the society, whether social, economic, or cultural. If an innovation is perceived as incompatible with existing customs or conditions, adoption tends to be slow or even fail. This factor is crucial because the greater the fit between an innovation and societal needs, the more quickly the innovation will spread and be accepted. In the Mobile Community Health Center (Puskesmas Bergerak) program in Papua, suitability is a critical factor in the successful adoption of this innovation. This program perfectly fits the needs of communities in remote areas that struggle to access healthcare facilities. The Mobile Community Health Center offers an immediate solution by bringing healthcare services to remote villages, previously isolated from medical services. The suitability of this innovation is evident in how the community, with its tradition of mutual cooperation and mutual assistance, welcomed the presence of a medical team directly at their location. This also aligns with local values, which prioritize easy access and the absence of long travel. Therefore, the Mobile Community Health Center has been well-received by the community as an innovation that meets their health needs, thus encouraging rapid and sustainable adoption in the region. (Kafiar, 2023). According to the village head of Kampung Wainaga, he stated that:

"The Mobile Health Center program is very much in line with the needs of our community here. Previously, our residents had difficulty accessing healthcare services due to the village's isolation. The presence of the Mobile Health Center that comes directly to our village is very helpful, because it makes it easier for us without having to travel long distances. This program fits perfectly with our culture of mutual cooperation, where people are used to helping each other, and the presence of medical personnel who come here makes them feel more valued. In this way, this program not only meets health needs but also aligns with our local values."

Based on an interview with the Village Head of Wainaga Village, he stated that the Mobile Health Center program is highly relevant to the conditions and needs of the community in their village, which previously faced significant difficulties in accessing health services due to limited infrastructure and remote location. This program, according to him, has successfully adapted to the local culture that emphasizes togetherness and mutual assistance, so that the community feels more valued. In this case, the alignment between the Mobile Health Center program and the traditions and needs of the community is very clear, which is reflected in the high level of community participation and support for this program. The success of this innovation can be seen from how the health services provided are aligned with local social values, which accelerates the adoption process and makes it an effective solution for communities in remote areas such as Wainaga Village. Complexity is the extent

to which an innovation is considered difficult for the community to understand and implement. The more complex an innovation is, the more likely it is that the community will have difficulty adopting it. Conversely, innovations that are easy to understand and implement by the majority of community members will be more quickly accepted and adopted. This complexity can include various factors, such as the level of expertise required to use the innovation, the need for special training, and the innovation's suitability to existing skills within the community. In healthcare, complexity often relates to the extent to which new technologies or methods are accessible and understood by healthcare workers and the public.

2. Challenges and Obstacles in Service Innovation of the Mobile Health Center Program in Papua

Based on the results of the study "Health Service Innovation in Isolated Areas Analysis of the Mobile Health Center Program in Papua", there are 3 main challenges and obstacles in the implementation of the Mobile Health Center Program in Papua, namely Challenges of Logistics Coordination and Medical Administration in the Field Based on interviews with Health Center Officers, the greatest complexity challenge lies in the coordination of logistics and management of medical administration that must be carried out in the field (Katarina & Rahman, 2026) The medical team must ensure that every procedure runs smoothly, even in confined spaces without adequate facilities. This includes arranging for medication transportation, maintaining a cold chain for vaccine storage, manually managing patient medical records, and coordinating visit schedules to various villages in remote areas. (Genta Widyasari & Idyani Wedhaswari, 2024). Limited Health Facilities and Infrastructure in Remote Locations The program's implementation faces significant obstacles in the form of limited health facilities in remote villages. The Mobile Health Center team must provide medical services without proper examination rooms, the lack of clean water for equipment sterilization, the lack of electricity for medical equipment that requires power, and the lack of adequate drug storage. These conditions force health workers to improvise and adjust service standards to the very limited field conditions. Geographical Barriers and Accessibility in the Extreme Papua Region Papua's geographical conditions of steep mountains, dense forests, and large rivers are a major challenge in reaching isolated villages. According to the Head of Yakonde Village, previously, people had to walk 2-3 days to reach the nearest health center, and it was not uncommon for people to die on the journey. Although the Mobile Health Center is present as a solution, the medical team still faces difficulties with damaged or even non-existent roads, extreme weather that can hinder travel, and very long distances between villages that require time and high operational costs. (Wilem Reinhart Ridolof & Eko, 2024).

CONCLUSION

Based on the results of this study, it can be concluded that the Mobile Puskesmas program in Papua has proven to be an effective healthcare service

innovation in overcoming access gaps in isolated regions. This is evidenced by the significant success in reducing maternal and infant mortality rates, increasing immunization coverage, and creating a domino effect of program adoption in neighboring villages through observational learning. Nevertheless, its implementation faces various challenges, such as logistical coordination complexity, infrastructure limitations, extreme geographical barriers, low public health literacy, the need for specialized staff training, and initial resistance from some segments of the community. Recommendations for Sustainability Based on the research findings, the following actions are recommended: **Financial Support:** Strengthen the program by increasing operational budgets to overcome logistical and geographical hurdles. **Digital Innovation:** Develop an integrated digital documentation system that can operate offline to address infrastructure limitations. **Capacity Building:** Conduct routine training for health workers on providing medical services in constrained environments and cultural sensitivity. **Community Empowerment:** Form local health cadres from the community to bridge the health literacy gap and build communal trust. **Policy Adaptation:** Develop health service protocols specifically tailored to the field conditions of Papua. **Strategic Expansion:** Gradually expand the program's reach by utilizing successful villages as pilot models. Through these steps, health transformation in Papua's isolated regions can become sustainable, creating an inclusive healthcare system for all Indonesian people.

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