

## Original Research

# Optimization of Infrastructure and Medical Equipment Application (ASPAK) at Bumi Arjo Health Center Using the Hot-Fit Model

Setria Nur Afifah<sup>1</sup>, Siti Halimatul Munawarah<sup>1\*</sup>, Iwan Stia Budi<sup>1</sup>, Indah Fasha Palingga<sup>1</sup>

<sup>1</sup>Health Policy Administration, Faculty Of Public Health, Sriwijaya University, Palembang, Indonesia

### ABSTRACT

**Background:** Technology plays an essential role in improving the quality of health services by supporting the planning of facilities, infrastructure, and medical equipment through the Application of Facilities, Infrastructure, and Medical Devices (ASPAK). At Bumi Arjo Health Center, ASPAK achievement is only 41.52%, which is far below the target of >60%, indicating the need for optimization.

**Objective:** This study aimed to analyze the optimization of ASPAK implementation at Bumi Arjo Health Center using the HOT-Fit framework (Human, Organization, Technology, and Environment).

**Method:** A descriptive qualitative approach was employed. Data were collected through in-depth interviews with six informants, supported by observation and document review for triangulation. Data were analyzed using content analysis.

**Result:** From the human aspect, the main obstacles were the use of complex technical terms and a time-consuming data upload process. The organizational aspect showed participation and commitment from individuals, teams, and leadership in supporting ASPAK implementation. Technological challenges included frequent system errors, vulnerability to security risks, difficulty in interpreting data presentation, incomplete supporting devices, and the absence of feedback on submissions. From the environmental aspect, ASPAK implementation requires stronger support and collaboration from stakeholders to address unmet needs for facilities, infrastructure, and medical equipment.

**Conclusion:** ASPAK implementation at Bumi Arjo Health Center still faces several challenges. Optimization efforts should focus on improving staff capacity, enabling offline data entry and backup, ensuring active follow-up on submissions, and establishing continuous monitoring and evaluation mechanisms.

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### CONTACT

\*Siti Halimatul Munawarah  
[siti.halimatul@fkm.unsri.ac.id](mailto:siti.halimatul@fkm.unsri.ac.id)  
Health Policy Administration,  
Faculty Of Public Health, Sriwijaya  
University Palembang, South  
Sumatra, Indonesia

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## INTRODUCTION

Improving the quality and efficiency of health services requires not only adequate facilities but also strategic location optimization, infrastructure improvements, and the adoption of digital healthcare systems. Recent studies emphasize that integrating digital solutions and spatial planning can enhance access, reduce inequities, and strengthen primary healthcare delivery (1)

Technology is a key factor in improving the quality of health services. One example is the Application of Health Facilities, Infrastructure, and Equipment (ASPAK), which is designed to support the management of health facilities, infrastructure, and medical devices (SPA). ASPAK also ensures that health facilities function optimally in meeting fixed service standards (2). This system is web-based, with a desktop version used for uploading SPA data and information as evidence of service readiness (3). In practice, ASPAK helps health facilities manage and monitor SPA effectively and efficiently.

Each health center is required to achieve a minimum ASPAK threshold of 60%, consisting of 50% facilities, 10% infrastructure, and 40% medical devices. This threshold refers to Regulation No. 19 of 2024 on Community Health Centers, which requires facilities to meet standards for location, buildings, infrastructure, and equipment. SPA must be available, functional, and ready for use. When ASPAK is not implemented properly, service quality declines. This is reflected in unavailable or non-functional SPA, which can hinder preventive and promotive efforts.

Ogan Komering Ilir Regency has 33 health centers. Data from the 2023 Public Health Practicum at the District Health Office showed that 28 health centers (84.85%) met the minimum ASPAK threshold, while five centers (15.15%) did not. One of them is Bumi Arjo Health Center, which scored only 41.52%, with details of 62.22% for facilities, 38.89% for infrastructure, and 16.3% for medical devices. Not reaching the 60% threshold may reduce the optimization of health services and indirectly affect community health. Since medical devices are crucial in healthcare delivery, proper logistics management is required to ensure quality and quantity standards (4). At Bumi Arjo Health Center, problems often arise in ASPAK implementation. Data entry is sometimes inaccurate due to human error, adding to the workload of health workers. System-related issues are also common, while unstable internet networks further reduce system performance and lower staff morale (5).

Standardized models for evaluating digital health interventions in Primary Health Care remain limited. Recent research in Brazil underscores the importance of context-specific evaluation frameworks to ensure quality improvement in healthcare delivery (6). These issues can be analyzed using the HOT-Fit model. The human aspect refers to staff resources, understanding, experience, and training. The organizational aspect focuses on roles and structures. The technological aspect covers system, information, and service quality. The environmental aspect emphasizes external support for optimizing ASPAK (7). Based on these considerations, this study aims to optimize ASPAK implementation at Bumi Arjo Health Center using the HOT-Fit framework.

## METHOD

This research is a qualitative study, which focuses on exploring in-depth information related to *human, organization, technology, and environment* on Optimizing the Application of Health Facilities, Infrastructure and Equipment at Bumi Arjo Public Health Center. The research was conducted at Bumi Arjo Public Health Center, OKI Regency in December 2024. Data collection was carried out using in-depth

interviews with 6 informants, observation and document review. Informants in this study were determined by researchers referring to the principles of suitability and adequacy. The tools used in this research were in-depth interview guidelines, observation *checklist* sheets and supporting documents such as ASPAK data, SOP, policy guidelines. The data were analyzed using content analysis, which involved systematic coding, categorization, and interpretation of qualitative data to identify patterns, themes, and relationships relevant to the research focus. The analysis process included transcription of interviews, initial coding, grouping codes into categories, and developing themes that reflected the dimensions of the HOT-Fit framework. To ensure validity, the findings were cross-checked across different data sources (interviews, observations, and documents) through triangulation. The conclusions were then drawn and connected with relevant theories. This research has received approval from the Health Research Ethics Commission of the Faculty of Public Health, Sriwijaya University Number: 435/UN9.FKM/TU.KKE/2024.

## RESULTS

The results of the study are based on HOT-Fit theory which includes elements of human, organization, technology, and environment. Interviews were conducted with 6 informants as follows:

**Table 1. Characteristics of Research Informants**

No	Initials	Gender	Last education	Period of Service	Position
1	IP01	Male	Ners Profession	25 Years	Head of health center
2	IP02	Female	D-IV Midwifery	5 years	ASPAK Officer
3	IP03	Female	Ners Profession	15 Years	Person in charge of Administration
4	IP04	Female	D-III Nursing	5 Years	In charge of essential
5	IP05	Female	D-III Nursing	5 Years	In charge of SME development
6	IP06	Female	Ners Profession	5 years	In charge of UKP

*Source: Data Primary, 2025*

### **Human**

Based on the interview results, optimizing the use of ASPAK at Bumi Arjo Health Center is strongly influenced by the level of understanding, the presence of meetings, and the level of use. ASPAK officers feel that the application is easy to use, challenges arise from the level of understanding of technical terms related to the names of facilities and infrastructure that can be confusing when inputting data. This can be seen from the following interview results:

*"It's not that difficult to use, we can understand it from the book that was given at the beginning, most of the names of these tools" (IP01).*

The ASPAK officer is 1 person and has attended meetings organized by the health department. This can be seen from the following interview:

*"Yes, 1 person who is a representative of PJ ASPAK himself is mentioned" (IP05).*

ASPAK at Bumi Arjo Health Center provides significant benefits in managing facilities, infrastructure, and medical devices. Overall, user satisfaction with ASPAK is quite satisfied, it's just that at the stage of uploading a lot of data with inadequate signals can affect the level of user satisfaction. This is in accordance with the results of the interview as follows:

*"Alhamdulillah, I am satisfied because we can immediately click on what we need in the application ....."* (IP01)

*"In my opinion, it is enough to support, it is enough to complement and facilitate the input of data suggestions and infrastructure"* (IP06)

*"Updating the application is difficult and time-consuming due to numerous required inputs and slow photo uploads, worsened by poor network conditions"* (IP02)

### Organization

Clarity of roles in the use of the Health Facilities, Infrastructure, and Equipment Application (ASPAK) at Bumi Arjo Health Center has been regulated in a letter of assignment. The role of Public Health Center leaders and staff shows a positive attitude and supports this application because of its benefits in improving services. Good coordination has been carried out between ASPAK officers and the person in charge of the programme. This is in accordance with the results of the interview as follows:

*"There is, there is a letter of assignment well... there the tasks are explained"* (IP02).

*"Well ... it happens that there is a separate officer, yes, a separate task, at least ASPAK is because it is related to medical equipment...."* (IP01)

*" ASPAK involves officers, UKM and UKP program holders, and head of the health center, with officers supported by an assignment letter "* (IP03).

*" Coordination between ASPAK and UKP officers has been good, with regular communication and reporting of damaged or lacking items "* (IP04).

Based on the results of the interviews that have been conducted, it can be seen that the head of the Public Health Center supervises the use of ASPAK by looking at the report before it is entered into the application, then helps to meet the needs related to the use of ASPAK by providing the facilities needed. This is in accordance with the quotation from the interview results from the informant as follows:

*" The head provides supervision and support, with available Wi-Fi and laptops, making ASPAK effective and helpful for decision-making"* (IP02).

*"Application entries require leadership approval through signature and stamp before being submitted according to health center needs."* (IP03).

### Technology

The system quality of the ASPAK at Bumi Arjo Health Center shows ease of use. Data security is guaranteed, but system reliability is also a concern, especially when

experiencing disruptions, such as errors and *hacker* attacks, which result in delays in data entry and the completeness of supporting devices is still not fulfilled. This is in accordance with the following interview results:

*"... sometimes it's an error, like last month you can't open ASPAK because there was a hacker, so you are not allowed to input for fear that the data will be lost and you have to wait until the agency informs you" (IP02).*

From the results of the interview, the quality of information in the Application of Facilities, Infrastructure, and Medical Devices (ASPAK) at the Bumi Arjo Health Center shows that this application is optimal in presenting information that is accurate, complete, consistent and relevant. Presentation of information displayed in the form of a table. This is based on the results of the interview:

*"Yes, we always report to the aspak officer if there is a shortage or there is a deer every periodic period we do reporting and recording" (IP06).*

*"The data are displayed in tables showing device brand, availability, funding source, procurement year, and funder, making the results easy to view" (IP02).*

ASPAK can improve service quality. The use of ASPAK facilitates data access and maximizes facilities and infrastructure, making services to patients more efficient. However, there is no feedback regarding the fulfilment of facilities and infrastructure. This is in accordance with the results of the interview:

*"Yes, the response is fast, for example if we want to see the medical equipment data, we just need to click on the data" (IP02).*

*"There has been no feedback from the health department" (IP01).*

### **Environment**

ASPAK at Bumi Arjo Health Center is not bound by certain policies that affect its use. There are no ASPAK standards from Bumi Arjo Health Center, but the standard for public health center accreditation is 60%, while to meet the needs of SPA at Bumi Arjo Health Center there is still a lack of facilities and infrastructure, such as dental rooms and EKG equipment. Based on the results of the interview as follows:

*"Yes, there is still something missing, such as the ECG is still not available" (IP05).*

*"..... at our Puskesmas we do not yet have a dental room and dental care equipment specifically for the dental room so our dental room makes use of other rooms" (IP03).*

## **DISCUSSION**

### **Human**

At Bumi Arjo Health Center, ASPAK officers' understanding remains limited despite the availability of a guidebook, with unfamiliar medical terminology (e.g., "tuning fork") posing challenges. This finding aligns with shows that understanding is a benchmark for determining success who emphasize that user comprehension is a determinant of digital system success (8). Training and periodic meetings organized by the Health Office have improved officers' skills, consistent with Isrin, et al (2022), yet

broader collaboration across units is still needed in accordance with MoH Regulation No. 13/2018 (9).

These findings reflect a broader national challenge. A recent multicenter study assessing ICT maturity across nine provinces in Indonesia found that the human resource dimension scored only at a basic-to-intermediate level (mean 2.71/5), indicating that staff are not fully prepared to operate digital health systems effectively (10). This reinforces that the limited understanding of ASPAK officers in Bumi Arjo is not an isolated case but part of a systemic issue in primary healthcare digitalization.

Despite these challenges, ASPAK is valued by users for simplifying data entry and enhancing service quality through effective monitoring of facilities and medical devices. This supports previous studies highlighting that digital systems improve data management and indirectly strengthen service delivery. However, infrastructural barriers particularly unstable internet networks undermine efficiency and staff satisfaction. Offline entry via Excel, as suggested by Putra, Dangnga, & Majid (2020), provides a practical solution and illustrates how contextual adaptations can sustain system usability in low-resource settings. (11).

## Organization

Clarity of roles in the Application of Facilities, Infrastructure, and Medical Devices (ASPAK) is emphasized at Bumi Arjo Health Center through assignment letters based on the Head's decree, ensuring that ASPAK officers, program holders, and leaders have clearly defined responsibilities. Such clarity fosters collaboration and supports the recording, procurement, and reporting of medical devices, thereby enhancing service quality and responsiveness. This aligns with Hannari et al. (2024), who highlight that role clarity strengthens team collaboration and contributes to a positive, community-responsive work environment (12).

Leadership is also pivotal. At the Public Health Center, leaders supervise report validation before submission to the Health Office and ensure the availability of necessary infrastructure such as internet connectivity and devices. This active involvement demonstrates organizational commitment that leadership is essential for aligning organizational functions with strategic goals (13). Similarly, Mutale et al. (2022) show that Kenya's DHIS2 implementation succeeded where organizational structures allowed both accountability and decentralized autonomy for frontline health workers, avoiding the delays caused by overly rigid bureaucratic processes (14). Taken together, the findings at Bumi Arjo reflect both strengths and challenges. While clear roles and leadership support exist, bureaucratic procedures risk slowing responsiveness.

## Technology

Users at Bumi Arjo Health Center find ASPAK relatively easy and effective to use, supported by user-friendly features and data grouping by category (general data, facilities, infrastructure, and medical devices). This aligns with Lusiana (2023) who found that well-designed features improve usability and user satisfaction (15). Data security is also prioritized through password protection, although further security risk analysis is needed to prevent information leaks and system failures (16).

System reliability, however, remains a challenge. Risks of errors and limited supporting equipment (only one computer and one laptop) hinder optimal use, underscoring the importance of regular data backup as part of disaster recovery strategies (17). This is consistent with findings by Provenzano et al (2025), which emphasize that inadequate technological infrastructure not only undermines data

reliability but also limits the capacity of digital systems to support evidence-based decision making and service quality (18). In this context, better infrastructure provision at Bumi Arjo Health Center would not only strengthen ASPAK's operational reliability but also align with international recommendations for building resilient health information systems.

The accuracy and completeness of ASPAK data are positively rated by users, enabling evidence-based decisions such as medical device procurement. The tabular presentation of data, combined with Excel download features, facilitates analysis, although minor errors in presentation may affect data quality. Regular reporting in accordance with Ministry of Health standards also helps ensure consistency and relevance.

ASPAK has proven responsive in fulfilling data requests, both online and offline, allowing quick access to facility and equipment information. This reflects findings by Putra, Dangnga, & Majid (2020), who highlighted the importance of responsive search functions in digital health systems. However, feedback gaps remain problematic. Officers' requests for additional facilities (e.g., separate rooms for dental and MCH services) have not been followed up by the Health Office, negatively impacting service quality (11). Setyawan A, Adi M MS, Widijanarko B. (2020) emphasize that timely feedback and follow-up are essential for effective medical equipment governance (19).

## Environment

The use of the Facilities, Infrastructure, and Medical Devices Application (ASPAK) at Bumi Arjo Health Center is not tied to a specific policy that directly affects its implementation. Although there are several regulations related to health center standards, such as the Minister of Health Regulation, the Health Office only reminds officers about filling in data without giving strict sanctions if there is a delay. In addition, there is also support in supervision by the BPK and inspectorate which aims to make the existing SPA in accordance with the standards. Shows that ASPAK officers have followed the Standard Operating Procedure (SOP), which facilitates the operation of the system (20). However, Sampson et al (2024) shows that regulation alone does not guarantee compliance; a multicenter study in Nigeria revealed that less than 50% of primary healthcare facilities met minimum quality standards for infrastructure and equipment despite existing national guidelines, underscoring the need for enforcement and adequate resource allocation (21).

Although ASPAK at Bumi Arjo Health Center already exists, the level of accreditation achievement is still below 60%, which is 41.52%. This shows that the completeness of facilities, infrastructure, and medical devices has not been fulfilled optimally. The need for space and medical equipment, such as dental rooms and EKG equipment, is still lacking. The increase in the number of patient visits from year to year indicates an urgent need for improved service quality. Supports that the provision of quality medical facilities and equipment is essential for accreditation and quality of care (22).

## CONCLUSION

The implementation of ASPAK at Bumi Arjo Health Center faces several barriers, including limited staff understanding, unstable internet connectivity, technical issues, and the absence of structured feedback mechanisms. These challenges have resulted in accreditation achievements and incomplete fulfillment of infrastructure and

medical device standards. To address these gaps, strengthening staff competence, ensuring reliable digital infrastructure, and improving coordination with the Health Office are critical. Policy support is also needed by integrating ASPAK into primary healthcare regulations with clear enforcement and incentives. Future research should assess the impact of ASPAK on accreditation performance and explore best practices across different health center settings to inform nationwide scale-up.

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