

Implementation of the Si Cantik Application in Reducing the Maternal and Child Mortality Rate at the Sidoarjo Regency Health Office

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ABSTRACT

Objective: The research aims to analyze the implementation of the Sicantik application as an innovation in health information systems designed to improve maternal and child health services, particularly through enhanced monitoring and emergency referrals. **Method:** A descriptive qualitative approach was applied to identify factors influencing the effectiveness of the program, using data collected from observations, interviews, and documentation. **Results:** The findings reveal that the Sicantik application has contributed positively by increasing awareness and access to health services for pregnant women, thereby supporting efforts to reduce AKI and AKB. However, challenges persist, including limited technological understanding among health workers and insufficient government facility support, which hinder optimal utilization. **Novelty:** This study highlights the significance of integrating digital health innovations into maternal and child health services at the regional level, emphasizing that sustainable improvements require not only technological tools but also capacity building for health workers and stronger institutional support to ensure long-term effectiveness.

INTRODUCTION

Indonesia has one of the highest maternal and child mortality rates in Southeast Asia, which is a serious concern for governments and world health organizations. According to WHO data, in 2015, the maternal mortality rate (MMR) in Indonesia reached 239 per 100,000 live births, a figure that is far above the global average. This figure reflects major challenges in the maternal and neonatal health system, where many pregnant women face a high risk of complications during childbirth, such as bleeding, infection, and hypertension. Maternal and child health has been set in the development goals of the Millennium Development Goals (MDGs) in the period 2000-2015 and continued into the Sustainable Development Goals (SDGs) in the period 2015-2030 with the aim of ensuring healthy lives and promoting welfare for all people and all ages, especially to reduce the maternal mortality rate (AKI) to below 70 per 100,000 births live and end infant mortality (AKB) up to 12 per 1,000 live births and toddler mortality rate (AKBA) up to 25 per 1,000 live births. The target maternal mortality rate (AKI) that has not been achieved in Indonesia in 2015 is 102 per 100,000 live births and the infant mortality rate (AKB) is 23 per 1,000 live births (Ministry of Health of the Republic of Indonesia 2010) [8].

This condition certainly requires immediate efforts to reduce AKI and AKB which are indicators of public health status and quality of health services (Ministry of Health of the Republic of Indonesia 2019). The trend of maternal mortality in Sidoarjo Regency

fluctuates with the number still quite high. In the year Sidoarjo entered the top 5 cities/regencies in East Java with the number of maternal deaths reaching 30 cases. In 2018, the Sidoarjo government succeeded in reducing the number of maternal deaths to 23 cases. Even so, Sidoarjo is still in the top 10 city districts in East Java with the highest number of maternal deaths. In 2017, as many as 90% of deaths occurred in hospitals and as many as 40% of mothers who died had passed two referral relays (East Java Provincial Health Office 2018). The death of the mother can be directly caused by bleeding, eclampsia, infection or other comorbidities. As many as 40% of all maternal deaths in 2017 were due to bleeding. As many as 56.7% of mothers died during the postpartum period. The coverage of ANC K1 in 2017 has reached 100% and the coverage of K4 is 99.63%. The coverage of postpartum visits is also quite high, which is 97.66% (Sidoarjo Regency Health Office, 2018) [6].

The situation of health status is described in four indicators of health development, including mortality (East Java Health Office, 2015). Maternal death is one of the important issues which means that it requires serious handling in efforts to prevent it. Every hour, one woman dies during childbirth or from causes related to pregnancy (UNICEF Indonesia, 2012). Almost every two minutes, somewhere in the world, a woman dies due to complications of pregnancy and childbirth (Lawson & Keirse, 2013). The success of maternal health efforts can be seen through the AKI indicator (Ministry of Health of the Republic of Indonesia, 2017). AKI is the number of maternal deaths during pregnancy to postpartum pregnancy and is caused by pregnancy, childbirth, and postpartum or its handling but not other causes such as disasters or so on every hundred thousand live births (Ministry of Health of the Republic of Indonesia, 2016). Efforts to reduce AKI are included in the third goal in the SDGs program with the target of reducing the ratio of pregnancy mortality to below 70 per 100,000 live births (Ministry of National Development Planning, 2017). Efforts to reduce AKI in Indonesia until 2016 have not been able to achieve the target set in the SDGs. East Java until 2012 is included in the six largest contributors of AKI in Indonesia (Ministry of Health of the Republic of Indonesia, 2014). The CPI in East Java in 2016 increased to 91.00 compared to 2015 at 89.6. The increase in AKI was followed by a decrease in antenatal visits, linakes, and postpartum health care. K1 antenatal visits in 2015 were 98.75 percent, decreased in 2016 at 97 percent, while for K4 in 2015 at 91.24 percent, decreased in 2016 at 89.53 percent. The coverage of childbirth by health workers was from 95.81 percent in 2015 to 95.10 percent in 2016, while the coverage of postpartum health was 94.8 percent in 2015 and decreased in 2016 by 93.8 percent (East Java Health Office, 2017) [4].

Table 1. Maternal Mortality Rate (AKI) Data 2021-2023

Data_Indicator	Unit	2021	2022	2023
Maternal Mortality Rate (AKI)	Per 100,000 live births	59.69	37.31	45.53

Source: Profile of the Sidoarjo Regency Health Office 2025

In the last three years, there has been a significant dynamic in the Maternal Mortality Rate (MMR). In 2021, the CPI was recorded at 59.69, then decreased drastically to 37.31 in 2022. This decline reflects the likely success of various maternal health interventions, such as improved coverage and quality of antenatal services, better access to childbirth in health facilities, and strengthened early pregnancy risk detection and monitoring systems. However, in 2023, the CPI again increased to 45.53, or an increase of around 22% compared to the previous year. This increase can be caused by a number of factors, including delays in the referral process for obstetric cases, lack of early detection of pregnancy complications, and the continued impact of the COVID-19 pandemic which still affects the health service system, especially at the primary level. Although there was an overall decline in AKI between 2021 and 2023, the fluctuations that occurred showed that the challenges in efforts to reduce AKI were still considerable. Therefore, more intensive monitoring, thorough evaluation of the implementation of maternal health programs, and continuous improvement of service quality are needed to ensure that every mother receives safe and quality health services throughout pregnancy, childbirth, and postpartum period [3].

Table 2. Infant Mortality Rate (AKB) Data 2021-2023

Data_Indicator	Unit	2021	2022	2023
Infant Mortality Rate (AKB)	per 1,000 live births	3.01	2.41	2.82

Source: Profile of the Sidoarjo Regency Health Office 2025

In the period from 2021 to 2023, the Infant Mortality Rate (AKB) shows a fluctuating pattern that reflects the dynamics in newborn health services. In 2021, the AKB was recorded at 3.01 and managed to decrease to 2.41 in 2022. This decline indicates an increase in neonatal services, including immunization coverage, newborn care, and early detection and treatment of congenital diseases or disorders. However, in 2023, the AKB has again increased to 2.82. This increase is likely influenced by a number of factors, such as lack of nutritional intake in pregnant women which has an impact on the baby's condition, delays in handling high-risk babies, and cases of neonatal infections that are not handled optimally. While infant mortality rates are generally relatively low compared to many other regions, these fluctuating trends—similar to patterns in Maternal Mortality Rates (MMRs)—indicate that there are challenges in maintaining consistency in the quality of maternal and infant health services. Therefore, more integrated and sustainable efforts are needed to improve the quality of services, especially in the perinatal and neonatal phases, so that the reduction in AKB can be achieved in a stable and sustainable manner [11].

The AKI of East Java Province in 2017 reached 91.92 per 100,000 live births. The highest AKI in 2017 was found in Mojokerto Regency with a value of 171.88 per 100,000

live births or maternal deaths in 2017 in Mojokerto Regency as many as 29 people. The AKI value is obtained from data on the number of maternal deaths consisting of the number of deaths of pregnant women, the number of maternal deaths, and the number of deaths of postpartum mothers. The data on each indicator of the number of maternal deaths is a calculated data and contains a zero value in the data that can cause a violation of the assumption of equidispersion. The AKI of East Java Province in 2017 reached 91.92 per 100,000 live births. The highest AKI in 2017 was found in Mojokerto Regency with a value of 171.88 per 100,000 live births or maternal deaths in 2017 in Mojokerto Regency as many as 29 people. The AKI value is obtained from data on the number of maternal deaths consisting of the number of deaths of pregnant women, the number of maternal deaths, and the number of deaths of postpartum mothers. The data on each indicator of the number of maternal deaths is a calculated data and contains a zero value in the data that can cause a violation of the assumption of equidispersion. (Hotspot Analysis on Infant Mortality Cases in East Java Province in 2023) [14].

One of the health information systems (SIK) that is being developed at the Sidoarjo Regency Health Office is the Sidoarjo Prevent Maternal and Child Mortality (Si Cantik) information system in December 2017 as a breakthrough effort to follow up maternal and child health monitoring (KIA) which aims to suppress AKI and AKB. The results of the development are in the form of software regarding the collection of data from pregnant women to giving birth based on websites and android that can be used online for Puskesmas and Hospitals (Sidoarjo Regency Health Office, 2019). The advantage of using the Si Cantik information system is that if there are pregnant women with high risk, they can be immediately identified and given interventions to prevent complications so that the safety of the mother and child is the top priority (Sidoarjo Regency Health Office, 2019) [2].

The SiCantik application began to be implemented in April 2018, coinciding with the commemoration of Kartini Day. The launch of this application is part of Sidoarjo Regency's efforts to improve maternal and child health services, in line with the government's commitment to achieve the Sustainable Development Goals (SDGs) related to maternal and neonatal health. **The person in charge** of the development and implementation of this application is the Sidoarjo Regency Health Office. The Health Office is responsible for supervision, training, and evaluation of the use of applications in health services. They also serve as a liaison between the government and the community in terms of health information. **Users** of this application include: **Health Workers:** Doctors, midwives, and health workers involved in the care of pregnant women. They use the app to enter and monitor pregnant women's health data. **Pregnant Women:** Expectant mothers can use the app to get information about their health, checkup schedules, and reminders to get regular checkups [1].

This Sicantik application can be said to be an application for monitoring maternal pregnancy and child development from birth to toddlers, monitored for growth and development to anticipate stunting (Health Office of Sidoarjo Regency, 2021:23), an

interesting emergency alert feature in this application if pressed can provide first aid to mothers and children by visiting patients who press the emergency alert button on the application. The Sicantik application allows users to optimize usage because it can be directly connected to the nearest health center according to the sub-district they are occupied [5].



Figure 1. Front Page View of the Sicantik Application Login Section
Source : Google Play Store access year 2025

The display on the Sicantik application when you are about to log in and access the Sicantik application, for the data entered on the front page, namely NIK/email and password. Please note that the data entered is the one that has been registered. After registration is complete, pregnant women can access the application at any time [3].



Figure 2. Display of the Feature of the Sicantik Application New Data Section
Source : Google Play Store access year 2025

New data is a feature used for patients in adding data to the Sicantik application. The data entered consisted of full name, place of birth, date of birth and profile photo of pregnant women [3].

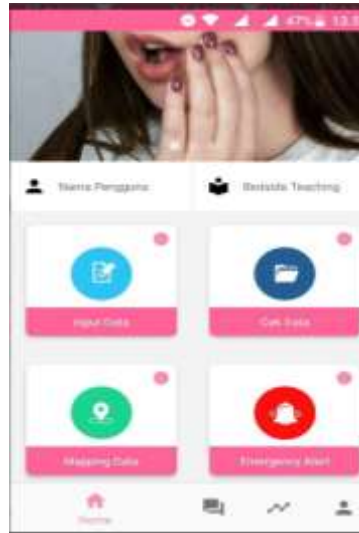


Figure 3. Display of Sicantik Application Features Data Check, Mapping, and Emergency Features

Source : Google Play Store access year 2025

Data check is a feature to view pregnant women's data and edit data from pregnant women by entering the NIK that has been registered in the Sicantik application. Data mapping in the Sicantik Application is used to see data on pregnant women according to village areas based on pregnancy categories. This emergency feature can be used by pregnant women during critical circumstances such as amniotic rupture, unstable conditions and others. The way to use this feature is to press the button on the bell image to fill out the form according to the mother's personal data registered in the application and additional options, namely the condition of the pregnant woman and hospital referrals, the data so that the health center comes and handles quickly according to the complaints filled in the application without having to ask questions to pregnant women who are sick [7].

Various efforts and innovations have been made to reduce maternal and child mortality rates, one of which is through the development of health information systems such as the SiCantik Application (Sidoarjo Prevent Maternal and Child Deaths). This application was developed as a form of technology-based intervention to strengthen the recording and monitoring of maternal and child health digitally [19].

Based on the research of Jannah & Pradana (2021), the implementation of the SiCantik Application at the Taman Sidoarjo Area Health Center showed positive results. Based on the five indicators used, the app was rated adequate in terms of content, reliability, and connectivity, with an average satisfaction score above 85%. This study confirms that SiCantik is able to be an effective means of supporting KIA services.

Furthermore, Kurniawan and Atmojo (2020) showed that the implementation of programs facilitated by the Welfare Office also ran according to procedures and received a positive response from the community. Although it has not had a significant impact on the decline in AKI, the quality of service is considered better than the previous year.[20] In order to understand the effectiveness of policy implementation related to the SiCantik Application, the researcher uses George C. Edward III's policy implementation theory, which emphasizes four main indicators: communication, resources, bureaucratic attitudes, and bureaucratic structure. *Communication* : The implementation of the SiCantik Application has gone through a good communication process, where the Sidoarjo Regency Health Office as a policy maker has determined and disseminated the decision to implement this application to all health service facilities since its release in 2018. The transmission and clarity of information is considered quite effective because the application has become the official instrument for recording KIA. *Resources*. The availability of resources is an important aspect. In this case, health workers—especially midwives and medical personnel—have been equipped with the ability to access and operate the application. Even though the application is "off the record" or not open to the public, this system is still able to record data systematically, even though access is limited to authorized health workers. *Bureaucratic Attitude*. Support from policy implementers greatly determines the success of implementation. The Health Office has appointed a coordinating midwife at each health center to ensure that the implementation of the application runs optimally. The existence of a data editing restriction system (within only three days) also increases the accuracy and integrity of the data inputted, while encouraging officers to work more carefully and professionally [17].

Bureaucratic Structure. The supporting bureaucratic structure is characterized by the existence of formal regulations. The SiCantik application is implemented based on the Sidoarjo Regent Regulation Number 27 of 2020 concerning the Implementation of Maternal and Child Health Services. This regulation requires all health service facilities to record all data of pregnant women into the application system as part of a more integrated monitoring effort. This is the legal basis as well as a clear SOP in the operation of the system [16].

RESEARCH METHOD

This study uses a qualitative method with an interview approach. The selection of this method aims to gain a deep understanding of the implementation of the SiCantik Application in reducing maternal and child mortality rates. Through a qualitative approach, researchers can explore experiences, challenges, and application implementations based on data from informants. The research location is focused on the Sidoarjo Regency Health Office, which is the center of the SiCantik Application program. The data sources of this research include various documents and reports, including the official report of the Sidoarjo Regency Health Office which contains the latest information

related to maternal and child mortality rates, scientific articles that discuss maternal and child health. Data collection was carried out through interviews. The determination of informants is carried out selectively by considering the credibility of the source. The informants in this study include Mr. Soffah as the coordinator of the Sicantik application at the Sidoarjo Regency Health Office and also Mrs. Heni as the user of the Si Cantik application. The data that has been collected is analyzed through several stages, ranging from information reduction, systematic data presentation, to drawing conclusions based on findings from various literature that has been reviewed [11].

RESULTS AND DISCUSSION

Results

Sicantik is a Web- and Android-based application that functions for recording, storing and searching for pregnant women's health examination data, as a tool to monitor pregnant women's health services, early detection of high-risk pregnant women (bumilristi), scheduling referrals for planned pregnancy and handling emergencies in the delivery process, Emergency/emergency referrals, as well as reporting the results of data input recapitulation for monitoring the area of maternal health examination results pregnant (K1-K4) in PWS KIA in the Sidoarjo Regency area. Health services for maternity, postpartum mothers, newborns and toddlers are input in the Baby Beauty Menu. (PWS Pregnant Women). Every pregnant woman, maternity mother, and newborn receives services according to standards which are then documented in maternal and child health data in the SiCantik application and make it easier to record, store and search data for pregnant women in the Sidoarjo Regency area. Sicantik as a communication tool between health workers related to maternal and child health so as to improve coordination with primary and secondary health service facilities in services.

Features of the Sicantik Application [18].



Figure 4. Front Page View of the Sicantik Application Login Section

Source : Google Play Store access year 2025

The display on the Sicantik application when you are about to log in and access the Sicantik application, for the data entered on the front page, namely NIK/email and password. Please note that the data entered is those that have been registered, for patients who have not registered, the health office will direct or assist patients in the registration process and data input until the health authorities can ensure that pregnant women patients the registered data can be tracked in the Sicantik application database at the Sidoarjo Regency Health Office. After registration is complete, pregnant women can access the application at any time [15].

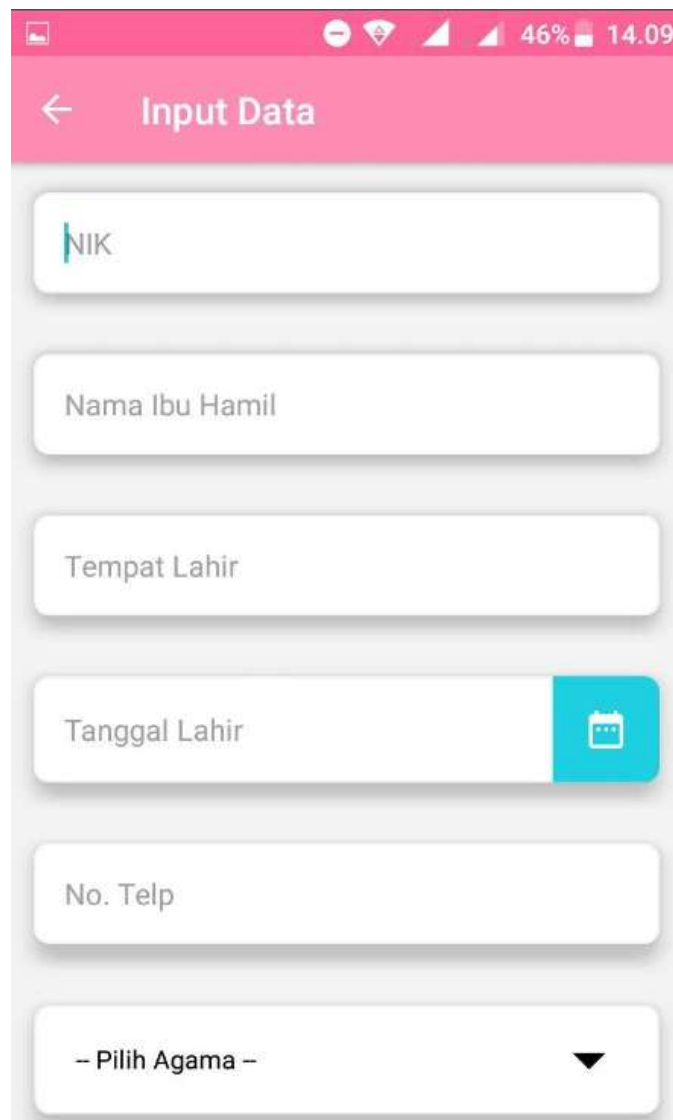


Figure 4. Front Page View of Sicantik Application Data Input Section

Source : Google Play Store access year 2025

New data is a feature used for patients in adding data to the Sicantik application. The data entered consisted of full name, place of birth, date of birth and profile photo of pregnant women [13].

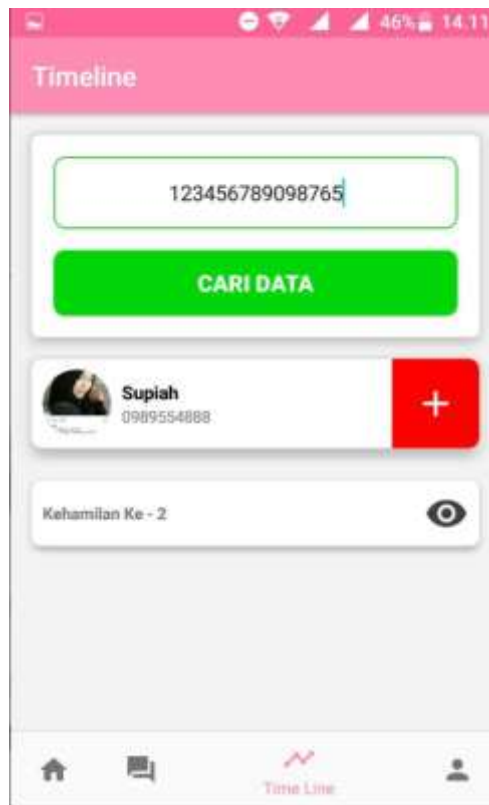


Figure 4. Front Page View of the Sicantik Application Data Check Section

Source : Google Play Store access year 2025

Data check is a feature to view pregnant women's data and edit data from pregnant women by entering the NIK that has been registered in the Sicantik application [3].

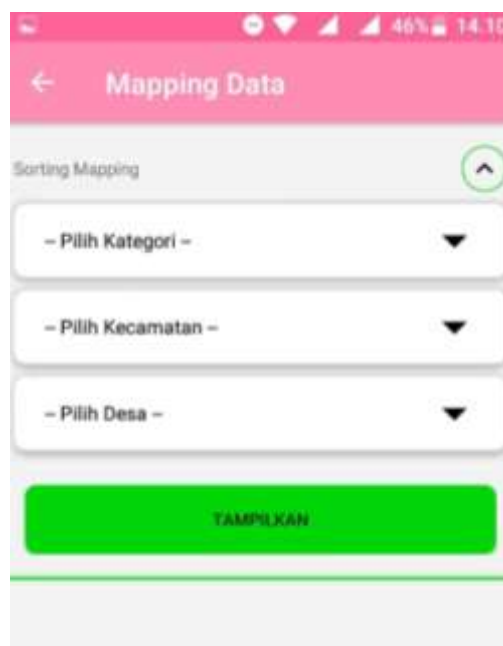


Figure 5. Front Page View of the Sicantik Application Mapping Section

Source : Google Play Store access year 2025

Data mapping in the Sicantik Application is used to see data on pregnant women according to village areas based on pregnancy categories.[3]

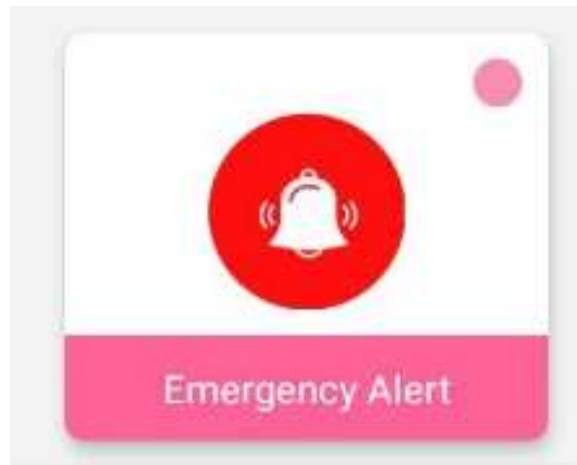


Figure 5. Front Page View of the Sicantik Application Emergency Feature Section
Source : Google Play Store access year 2025

This emergency feature can be used by pregnant women during critical circumstances such as amniotic rupture, unstable conditions and others. The way to use this feature is to press the button on the bell image to fill out the form according to the mother's personal data registered in the application and additional options, namely the condition of the pregnant woman and hospital referrals, the data so that the health center comes and handles quickly according to the complaints filled in the application without having to ask questions to pregnant women who are sick [6].

The focus of this research is to determine the success of the implementation of the policy proposed by George C. Edward III which consists of four variables, so that the four variables will be reviewed one by one to explain how the Implementation of the Sicantik Application in Reducing the Maternal and Child Mortality Rate at the Sidoarjo Regency Health Office. The review is as follows: [4]

1. Communication

In the process of implementing the communication strategy, information transmission is the main factor that greatly determines the effectiveness of the implementation of *the Sicantik* application. The Sidoarjo Regency Health Office has made efforts to disseminate information through socialization activities to all health centers. This socialization included an exposure to *the Sicantik application*, starting from the introduction, systematics, to how it operates. Based on the results of an interview conducted by the researcher with one of the pregnant women, Mrs. Heni, it is known that the information conveyed by midwives at the health center is very helpful in understanding *the Sicantik* application. The researchers found that midwives were actively not only introducing the app, but also facilitating the registration process and providing direct guidance on its features and how to use them. Even in certain situations, the patient's family, such as the husband and other family members, are also involved in

the process of understanding the use of this application. This shows that the process of information transmission takes place in a personal and participatory manner, so that the reception of information by the public, especially pregnant women, runs well [13].

From the results of the interviews collected, it appears that *the Sicantik* application was delivered with a clear and simple explanation by health workers at the health center. The researcher noted that application users, including pregnant women, felt facilitated by the exposure provided directly by midwives. In practice, the registration process to the use of the application takes place without significant obstacles because it is guided directly. The researcher also observed that the simplicity of features in the application is one of the supporting factors in the understanding process. The limited but functional features make users feel unburdened. This indicates that clarity in communication and user-friendly application design are strengths in the implementation of Sicantik, especially for target groups from non-technical backgrounds [18].

In terms of consistency, the researcher found that the Sidoarjo Health Office has tried to disseminate information repeatedly and periodically, in accordance with the guidelines that have been set in the regulations. Socialization about the Sicantik application is carried out not only in the early stages, but also when there are updates or changes in the application system. However, based on field findings, this implementation has not been fully optimal. The researcher noted complaints from application users who experienced confusion when the application experienced interruptions or updates. The absence of information that is conveyed simultaneously to all users causes uncertainty. Some users even have to come directly to the health center or Health Office to ask about the status of the application. This condition shows that even though structurally information is conveyed consistently, in terms of user acceptance, there is still a communication gap, especially when there is a system update [20].

Based on the results of an interview with Mrs. Heni as an application user, she said that the explanation of midwives at the health center about the SiCantik application was very helpful in understanding how to use it. She added that midwives not only introduce the application, but also help in the registration process and provide direct guidance regarding the features of the application. This shows that communication carried out by health workers is personal and participatory. The findings are in line with Edward III's theory (in Winarno, 2012) which emphasizes that the success of implementation is greatly influenced by the clarity and consistency of communication. This result is also in accordance with the research of Jannah and Pradana (2021) which found that the satisfaction rate of SiCantik application users reached more than 85%, indicating that effective communication is the key to success in application acceptance [19].

2. Resources

Human resources, especially staff in charge of operating the Sicantik application, were considered quite adequate by the interviewed informants. The researcher noted that the assigned implementation team had a clear and functionally distributed role structure. The staff involved consisted of application operators at the Health Office level, data administration staff, and health workers, especially midwives, who were the spearhead

in delivering direct services to pregnant women. This distribution of tasks not only supports the effectiveness of internal work, but also creates efficient communication channels from the policy level to the community as an end-user. In the field, the implementation of duties by midwives has a very vital role. Midwives not only function as medical personnel, but also as a bridge of communication between the digital system (Sicantik application) and the community. This role is very strategic because it concerns the trust of the public, especially pregnant women, in receiving information and using technology-based services. The researchers observed that the interpersonal approach taken by midwives in introducing and operating the app greatly contributed to the successful implementation. Pregnant women feel more comfortable and helped when the socialization and mentoring process is carried out personally and in easy-to-understand language [18].

However, although staff availability and competence were assessed adequately, the study also found that the system was not fully able to anticipate technical constraints that arose in the implementation of the application. One of the main problems identified is the delay in response or lack of information delivered to the user when the application experiences an update or technical glitch. When the application is inaccessible or login is disrupted, users – in this case pregnant women – do not get enough information regarding the cause of the disruption or estimated repair time. This situation causes some users to feel confused and eventually stop using the application because there is no certainty of service. The researcher concluded that the unpreparedness in providing real-time technical support shows that there are still gaps in crisis communication management and management of digital health service information systems. This shows that the successful implementation of a digital public service system does not only depend on the number and competence of staff, but also on the readiness of other supporting structures such as a disturbance reporting system, feedback mechanism, and fast and precise public communication. Therefore, even though human resources in the implementation of the Sicantik application have met basic criteria, capacity building in the responsive and coordinating aspects of technical problems needs to be improved to ensure the sustainability and trust of users in the digital service [11].

Meanwhile, according to Mr. Soffah as the application coordinator at the Sidoarjo Health Office, The role of health workers, especially midwives, is very vital because they are not only tasked with providing medical services, but also assisting the community in understanding this digital application. But he acknowledged that there are still obstacles, especially when the application experiences technical glitches or system updates, as users are often confused and don't get clear information about the fix. This condition illustrates the limitations in the aspect of technical resources, as explained by Edward III that the availability of resources is a crucial factor in policy implementation. This is also strengthened by the research of Kurniawan and Atmojo (2020), which emphasizes that maternal and child health applications play a major role in improving the quality of services, although they still face technical challenges in the field [10].

3. Bureaucratic Attitude

The researcher found that the process of appointing staff in the management of the Sicantik application was organized quite systematically and planned. The Sidoarjo Regency Health Office has established a technical implementation structure at the health center level consisting of five people, with a composition that has been adjusted to the operational needs of the field. The five people consist of one application coordinator who is responsible for managing and supervising implementation, three administrative staff who handle data collection, recording, and processing, and one midwife who is in direct duty in interaction with the program's main target, namely pregnant women. The placement of midwives as part of this structure shows a direct-oriented approach to community services, particularly vulnerable groups in maternal and child health services. From the results of observations and interviews conducted, the researcher concluded that this appointment process was not carried out haphazardly. The determination of personnel is based on an internal coordination meeting at the Health Office, which considers various technical and non-technical criteria, including competence, work experience, and understanding of basic information technology needed to run the Sicantik application [9].

This step reflects the prudence in determining human resources who will carry out the digital service policy, so that it is not only based on fulfilling the staff quota alone, but also paying attention to the compatibility between the duties and capacities of the appointed individual. An organized and selective bureaucratic attitude like this provides a strong enough foundation to support the successful implementation of the Sicantik application. A clear work structure also has a positive impact on the effectiveness of coordination between staff in the field, as each has a specific and non-overlapping description of tasks. In addition, with the presence of a coordinator in each health center, the vertical communication line between the Health Office and the service unit under it becomes more efficient, allowing the distribution of information and policies to be carried out more quickly and precisely [8].

However, the researchers also note that the success of bureaucratic appointments is not only determined by a rigorous selection process, but also needs to be supported by ongoing capacity building mechanisms such as periodic training, field supervision, and periodic performance evaluations. This is important so that officers not only understand their initial role, but also be able to adapt to changes, especially in the context of technology-based application dynamics that tend to undergo periodic system or feature updates. Overall, it can be concluded that the tendency of a structured, selective, and functional bureaucracy in the appointment of staff in the Sicantik application program is one of the positive indicators in the governance of digital-based health service policies. Even so, the challenges ahead remain open, especially in maintaining the consistency of performance and adaptability of human resources to technological changes and the evolving needs of society [2].

In terms of bureaucratic attitude, interviews with the Health Office show that the determination of application implementation staff is carried out selectively, taking into

account competence and work experience. According to the informant's explanation, each health center has an application coordinator assisted by administrative staff and field midwives to ensure the running of the program. This bureaucratic attitude reflects strong support for the implementation of the application, although there is a need for capacity building through periodic training so that implementers are able to adapt to technological developments. This is in line with Edward III's theory that bureaucratic disposition is one of the keys to successful policy implementation [9].

4. Bureaucratic Structure

The bureaucratic structure in the implementation of the Sicantik application has been neatly arranged and refers directly to the legal framework, namely the Sidoarjo Regent Regulation (Perbub) No. 27 of 2020 concerning the Implementation of Maternal and Child Health Services. The researcher found that this regulation was used as the basis for compiling Standard Operating Procedures (SOP) as a technical guideline for implementation in the field. With the SOP, all implementing elements starting from the Health Office as the main manager to officers at the health center level have the same and standardized work references. The implementation of SOPs in daily service activities is one of the indicators of the functioning of a good bureaucratic structure. The researcher noted that in various processes of implementing the Sicantik application, such as registering pregnant women, assisting in the use of the application, to managing pregnancy development data, all officers followed the work stages in accordance with the SOPs that had been set. This shows the commitment of the bureaucracy in carrying out digital-based programs in a systematic and orderly manner. Furthermore, SOPs not only function as a tool to ensure uniformity of procedures between work units, but also as an instrument of internal control (control) over staff performance [16].

In field observation, SOPs serve as guidelines to avoid procedural deviations, minimize technical errors, and serve as a reference in solving obstacles that arise. The existence of SOPs also simplifies the monitoring and evaluation process, because indicators of success or failure can be measured based on the level of conformity of implementation to standard procedures. However, although SOPs have been available and implemented, researchers also highlight that the effectiveness of SOPs is highly dependent on the level of understanding and commitment of implementers. Some staff may still need additional training to truly be able to translate SOPs into consistent work actions, especially when dealing with situations of a technical or emergency nature. Therefore, there needs to be a routine evaluation of the implementation of SOPs, as well as capacity building for implementers so that they not only understand SOP documents as administrative obligations, but also as applicable practical guidelines. In addition, flexibility in the implementation of SOPs is also important to consider. In the context of an application Squirt, where digital technology continues to develop, the SOPs used must be able to keep up with the dynamics of system changes and community needs. This means that the bureaucratic structure must have the ability to revise and adapt SOPs periodically, based on the results of evaluation and input from the field [15].

Discussion

In addition, based on information from the Health Office, the implementation of the SiCantik application already has a strong legal basis, namely Sidoarjo Regent Regulation Number 27 of 2020 concerning the Implementation of Maternal and Child Health Services. This regulation is a legal umbrella that ensures that all health centers are obliged to record pregnant women's data in the application. The existence of this regulation is in line with Edward III's theory of the importance of a clear bureaucratic structure, and supports the findings of the Ministry of Health's Pusdatin (2016) that the health information system will run effectively if it has a strong regulatory foundation. From a user's perspective, the emergency alert feature is one of the most beneficial. Mrs. Heni revealed that this feature provides a sense of security because it can immediately connect patients with the nearest health center in the event of an emergency. These findings are consistent with the UNICEF (2012) and Lawson & Keirse (2013) reports which emphasize the importance of early detection of pregnancy complications as well as early access to emergency services. Thus, the SiCantik application is not only a data recording system, but can also function as an instrument to save the lives of mothers and babies [7].

CONCLUSION

Fundamental Finding : The implementation of the Sicantik application at the Sidoarjo Regency Health Office has shown positive outcomes supported by effective communication, competent human resources, selective staff placement, and a clear bureaucratic structure based on Standard Operating Procedures, although challenges remain in technical responsiveness, crisis communication, and consistency of information delivery. **Implication :** These findings imply that strengthening digital health systems requires not only regulatory frameworks but also continuous training, improved coordination, and adaptive SOPs to ensure responsiveness to technological changes and evolving community needs, thereby enhancing maternal and child health outcomes. **Limitation :** This study is limited by its focus on internal implementation aspects without comprehensive assessment of user experience or long-term health impact data, which constrains the ability to fully measure the system's effectiveness in reducing maternal and child mortality. **Future Research :** Further studies should incorporate quantitative health outcome evaluations, explore user satisfaction among pregnant women and families, and compare digital health application implementations across different regions to identify scalable best practices for maternal and child health service innovation.

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