Jurnal Rekam Medis dan Informasi Kesehatan Indonesia
Volume. 4 Nomor. 1, Desember 2024
e-ISSN : 2828-5867; p-ISSN : 2829-341X, Hal. 48-54
DOI: https://doi.org/10.62951/jurmiki.v4i1.90
Tersedia: https://jurmiki.org/index.php/Jurmiki

Review of the Preparation for the Implementation of Electronic Signatures for the Authentication of Medical Records Based on a Fishbone Diagram at the Ngebel Community Health Center

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Abstract. *Background: The application of electronic signatures (TTE) is an essential step in supporting digitalization efforts to authenticate medical record documents (RME) in a secure and efficient manner. This study aims to review the readiness for TTE implementation at Puskesmas Ngebel using the Fishbone Diagram analysis (5M: Man, Method, Material, Machine, Money). Subjects and Methods: This research uses a qualitative method with data collection conducted through interviews with respondents including the Head of Puskesmas (for triangulation), medical record officers, registration staff, doctors, and nurses. Research Results: The results show that Puskesmas Ngebel is still in the initial stage of implementation and faces various obstacles as identified through the Fishbone Diagram analysis. This study is expected to review the level of readiness for TTE implementation and offer solutions to overcome the identified challenges. By applying the Fishbone Diagram approach, this research successfully identifies institutional barriers in preparing for the implementation of electronic signatures for authenticating medical record documents. The findings are expected to contribute to strategic planning for digitalization in community health centers.*

Keywords: *Community Health Center; Electronic Signature; Fishbone Diagram; Implementation; Medical Records.*

1. BACKGROUND

In this era of digitalization, Health Information Technology Systems continue to evolve, necessitating innovations in health technology to optimize healthcare services and management across all levels of healthcare delivery. To manage RME in healthcare facilities, technological innovations such as verification and authentication systems related to electronic signatures have helped ensure data security. According to Article 31 of Ministry of Health Regulation No. 24 of 2022, an electronic signature is an electronic signature containing electronic information used for data authentication. A secure encryption system for electronic signatures prevents forgery or misuse by unauthorized parties. However, in preparing for the implementation of electronic signatures in healthcare facilities, particularly community health centers (Puskesmas), various challenges remain. The Ngebel Community Health Center is one example currently in the preparation phase for implementation. This study aims to assess the readiness for implementing Electronic Signatures using a Fishbone Diagram Analysis, which covers five main aspects : Man, Method, Material, Machine, and Money.

Naskah Masuk: 18 November 2024; Revisi: 29 November 2024; Diterima: 27 Desember 2024;
Terbit: 30 Desember 2024

2. THEORETICAL STUDY

A fishbone diagram, or cause-and-effect diagram, is an analysis used to identify various factors causing a problem. In this context, it is used to analyze obstacles in the implementation of electronic signatures at community health centers. An electronic signature is a signature containing electronic information that serves to authenticate data. A secure encryption system for electronic signatures prevents signature forgery or misuse by irresponsible parties. Electronic signatures used to legalize electronic documents must be certified. By issuing and managing Electronic Certificates, one of the organizations under the National Cybersecurity Agency (BSSN) is the Electronic Certificate Office (BsrE), which oversees and issues electronic certifications to comply with government regulations related to data security. Additionally, it ensures that the authentication and verification processes for documents are conducted properly.

3. RESEARCH METHOD

This type of research is descriptive qualitative. Data was collected through interviews with five respondents from the Ngebel Community Health Center, namely the Head of the Community Health Center, medical record officers, registration officers, doctors, and nurses. The sampling technique used was purposive sampling. The data collection instruments consisted of interview guidelines and triangulation. Data analysis was conducted using the Fishbone Diagram approach to identify obstacles and solutions based on five aspects, namely : Man, Method, Material, Machine, and Money.

4. RESULTS AND DISCUSSION

General Data

Respondent Characteristics Based on Profession

Figure 1. Diagram of Respondent Characteristics Based on Profession at the Ngebel Community Health Center.

Based on the characteristics of respondents according to their professions, as determined by interviews conducted by the researcher, there were a total of five respondents, consisting of one head of a community health center (20%), one doctor (20%), one nurse (20%), one medical records officer (20%), and one TPP officer (20%). The characteristics of respondents based on their professions indicate the involvement of each profession in the process of medical record service and management at the Community Health Center. The selection of respondents from various professional backgrounds, namely the Head of the Community Health Center, Doctor, Nurse, Medical Records Officer, and TPP Officer, was done to obtain a comprehensive view regarding the readiness for the implementation of Electronic Signatures (TTE) in the authentication of medical records documents.

According to Notoatmodjo (2010), individual characteristics such as occupation or profession greatly influence how a person understands, accepts, and responds to policy changes or new technologies in their work environment. Therefore, by involving various professions in this study, researchers can identify the obstacles and potential of each role in terms of readiness for TTE implementation.

Respondent Characteristics Based on Gender

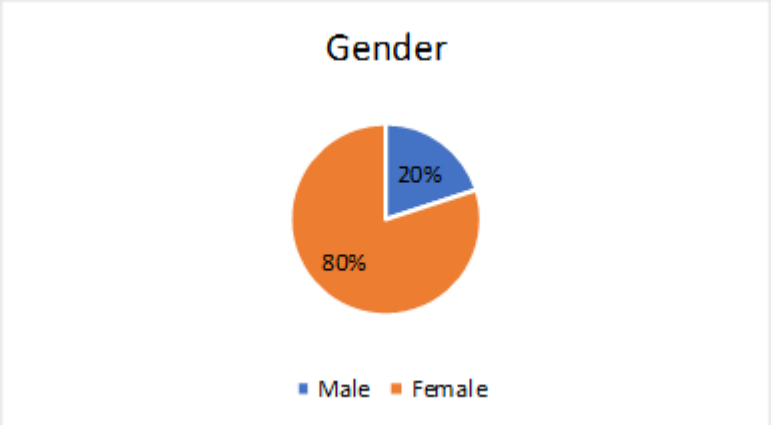
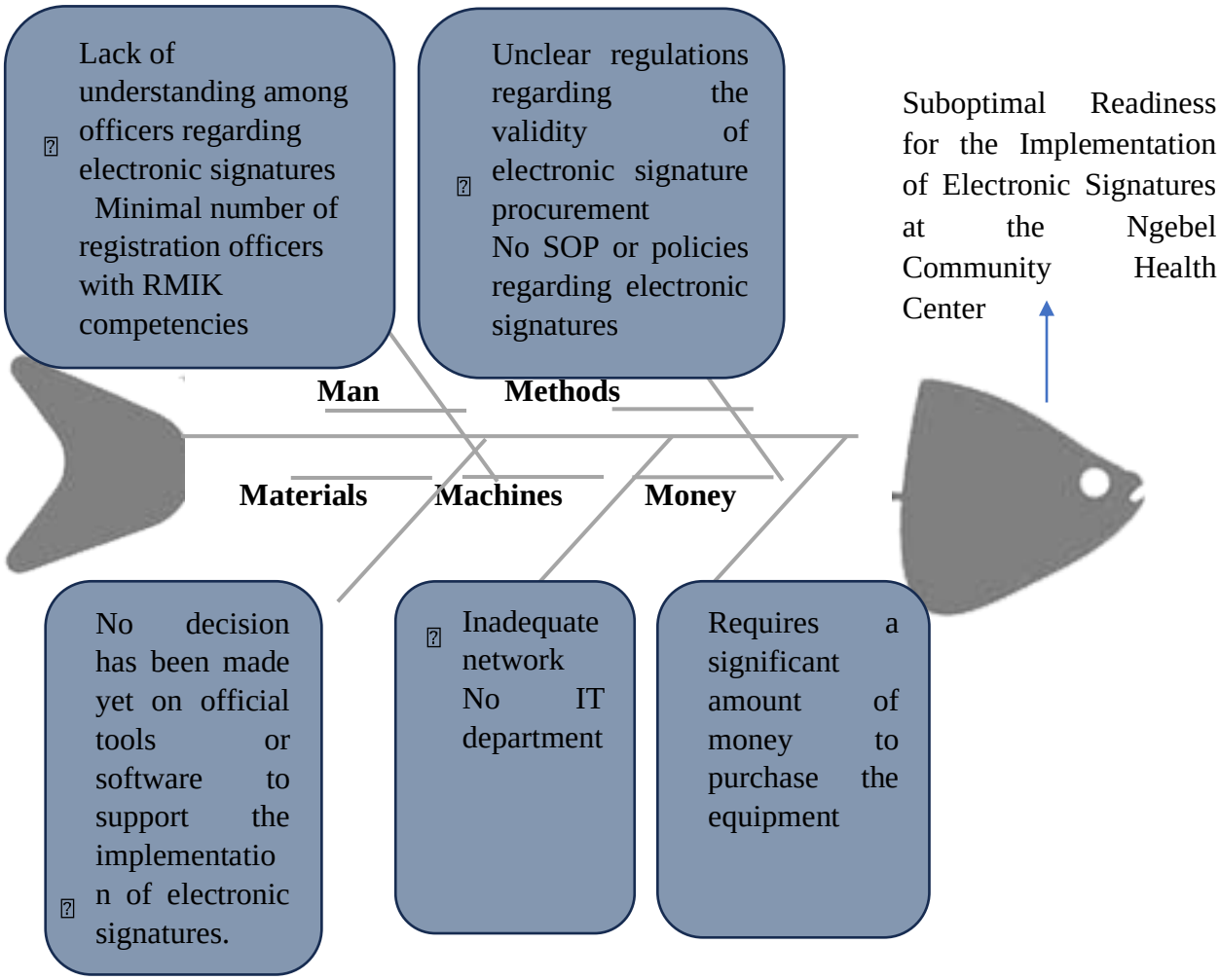


Figure 2. Diagram of Respondent Characteristics Based on Gender at the Ngebel Community Health Center.

Based on the characteristics of respondents by gender, there were a total of 5 respondents, with 1 male (20%) and 4 females (80%). According to Notoatmodjo (2010), gender is one of the demographic factors that can influence a person's perceptions, attitudes, and behaviors in responding to a program or policy, including in the context of health technology adoption.

Special Data



Research shows that the Ngebel Community Health Center is still in the early stages of preparing to implement Electronic Signatures (TTE). Through a Fishbone Diagram analysis (5M: Man, Method, Material, Machine, Money), various obstacles were identified, such as a lack of understanding among human resources, the absence of SOPs and technical regulations, limited equipment and networks, a lack of supporting devices, and budget constraints. Despite this, the health center demonstrates commitment and enthusiasm for digital transformation. This study also proposes strategic solutions to address these challenges to ensure optimal implementation of the Electronic Signature System (TTE).

Source Triangulation

Based on triangulation of sources from the Head of the Community Health Center, preparations for the implementation of TTE at the Ngebel Community Health Center still face various challenges. In terms of human resources, only some staff understand electronic signatures and there has been no official training, while officers with RMIK competencies are also limited. In terms of methods, there are no standard operating procedures or internal

policies to support this. From a material perspective, there is no legal software in use, and the Health Center is still searching for a suitable application. Technological infrastructure such as computers and the internet is available, but the network is unstable and there are no specialized TTE tools. Although a budget has been allocated, training and procurement of tools have not yet been carried out.

5. CONCLUSION AND RECOMMENDATIONS

Conclusion

After identifying several obstacles in each important aspect using Fishbone Diagram analysis, including the Man aspect, Methods aspect, Materials aspect, Machines aspect, and Money aspect, it can be concluded that the readiness of the Ngebel Community Health Center to implement Electronic Signatures for Medical Record Document Authentication is still in its early stages and is not yet ready to be realized in the near future. There are several solutions to the obstacles identified through the Fishbone Diagram analysis. From the Man aspect (Human Resources), it is proposed that the Health Office provide training or technical guidance for all Community Health Centers in the district and increase the number of human resources with specialized medical record-keeping skills.

Methods: Conduct comparative studies with agencies that have implemented TTE in accordance with regulations, and community health centers can take the initiative to draft SOPs or policies based on Minister of Health regulations and consult with the Health Office for validation. Materials Aspect (Supporting Materials/Components): Recommendation for Cloud-based TTE applications such as PrivyID. Machines Aspect (Machinery/Technology): Provide a dual-SIM Mifi (Mobile Wifi) as a backup solution to ensure internet connectivity availability in case of main network disruptions or outages, and propose to the Health Office for additional IT personnel. The final aspect is Money (budget). The appropriate solution for this challenge is to prepare a Budget Expenditure Plan (BEP) to determine the detailed requirements for implementing Electronic Signatures or to apply for assistance funds from the Health Department.

Recommendations

Based on the results of the study, it is recommended that the Ngebel Community Health Center, together with the Health Office, conduct more comprehensive and structured planning before implementing Electronic Signatures (TTE) in the medical record system.

ACKNOWLEDGEMENTS

The author realizes that the preparation of this scientific paper would not have been possible without the help, support, and guidance of various parties. Therefore, the author expresses his deepest gratitude. The author realizes that this scientific paper is still far from perfect. Therefore, constructive criticism and suggestions are highly appreciated for future improvements.

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