ANALYSIS OF THE IMPLEMENTATION OF DIGITAL HEALTH INFORMATION SYSTEMS IN PUBLIC HEALTH CENTERS (PUSKESMAS) IN INDONESIA: AN HEALTH ADMINISTRATION PERSPECTIVE

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ABSTRACT
Digital transformation in primary healthcare services has become a strategic priority in health administration policy in Indonesia. This study aims to analyze the implementation of the Digital Health Information System (SIMPUS/SATUSEHAT) in Public Health Centers (Puskesmas), focusing on organizational readiness, administrative efficiency, data governance, and service quality. A mixed-methods approach was conducted across selected primary care facilities, combining quantitative survey evaluation with qualitative in-depth interviews of health administrators, medical staff, and IT personnel. The results indicate that while digital integration significantly improves medical record accuracy, reduces patient waiting times, and streamlines reporting to central health offices, significant administrative challenges remain. These include infrastructure disparities in rural areas, inadequate digital literacy among healthcare workers, and fragmented data interoperability between local and national health databases. Strategic recommendations emphasize the need for continuous administrative capacity building, standardized data protection protocols, and sustained infrastructure funding to ensure equitable digital health governance.

Keywords: *Digital Health Information System, Puskesmas, Health Administration, SATUSEHAT, Health Policy, Governance*

INTRODUCTION

Digital health transformation represents one of the most critical structural shifts in contemporary health administration. In global health systems, the integration of electronic medical records, standardized health reporting tools, and centralized administrative databases is crucial for enhancing care delivery, resource management, and evidence-based policymaking (World Health Organization, 2021). Following the alignment of national health development goals with the Sustainable Development Goals (SDGs)specifically Target 3.8 on achieving universal health coverageIndonesia has initiated aggressive policy reform to modernize its primary healthcare infrastructure.

At the core of Indonesia's healthcare delivery system are Public Health Centers (Puskesmas), which serve as the first line of defense for disease prevention, health promotion, and basic clinical management. Historically, administrative processes within Puskesmas relied heavily on fragmented paper-based registers, leading to data redundancy, delayed reporting to municipal health offices (Dinas Kesehatan), and high administrative burdens on health personnel (Ministry of Health RI, 2022). To solve these operational bottlenecks, the Indonesian Ministry of Health launched national digital health

architecture guidelines, mandating the integration of primary care health information systems (SIMPUS) into the national unified platform, SATUSEHAT.

Despite progressive regulatory mandates, the implementation of digital health systems across diverse geographical and socioeconomic regions encounters substantial health administration obstacles. Issues such as digital infrastructure gaps, varying technical competencies among healthcare workers, and data security concerns complicate the transition. Therefore, this research aims to analyze the current role and operational challenges of digital health information system implementation in Puskesmas from a health administration perspective.

RESEARCH METHODS

This study utilized a descriptive mixed-methods design incorporating both qualitative and quantitative approaches to assess system implementation across selected Puskesmas facilities (Notoatmodjo, 2012; Moleong, 2010). Data collection was conducted over a two-month period from October to November 2025. Primary data were gathered through semi-structured in-depth interviews, field observations, and administrative survey questionnaires administered to healthcare administrators, health information system managers, doctors, nurses, and administrative officers.

Informants were selected using purposeful sampling based on criteria of operational experience and direct involvement in health administration processes. A total of 12 key informants participated in the qualitative evaluation, while 45 staff members completed structural administrative questionnaires. Secondary data were collected by reviewing monthly Puskesmas administrative reports, IT infrastructure audit documents, and regional health office regulations.

RESULTS AND DISCUSSION

Table 1 summarizes the socio-demographic and institutional characteristics of the primary qualitative informants involved in evaluating system administration.

Code	Gender	Age	Education	Role / Position	Information Source
INF-01	Female	42	S1 Public Health	Head of Health Admin	Puskesmas Admin
INF-02	Male	35	S1 Computer Sci	SIMPUS IT Officer	System Operator
INF-03	Female	29	D3 Nursing	Registration Officer	Frontline User
INF-04	Male	48	S1 Medicine	Head of Puskesmas	Primary Decision Maker
INF-05	Female	38	S1 Pharmacy	Pharmacy Admin	Supply & Medication
INF-06	Male	31	S1 Public Health	Epidemiologist	Reporting & Data

1. Operational Efficiency and Administrative Workflow Modernization
   The implementation of SIMPUS integrated with national standards has significantly streamlined patient registration and clinical workflow. Administrative processing times per patient were reduced from an average of 18 minutes under paper systems to less than 6 minutes under digital intake. This shift reduces patient queue duration and optimizes staff workload distribution (Febrina, 2018). Furthermore, computerized prescription entries directly connect clinical consultations with pharmacy dispensaries, minimizing transcription errors.
1. Data Governance, Accuracy, and Interoperability
   Health administration relies heavily on timely, accurate data for epidemiological surveillance and resource allocation (Herawati et al., 2020). Digital health administration systems eliminate duplicate record entries and facilitate real-time synchronization with municipal health databases. However, full interoperability with the central SATUSEHAT platform is occasionally hindered by server latency, internet bandwidth instability, and inconsistent field data standards across regional facilities.
2. Human Resource Readiness and Infrastructure Challenges
   While management support for digitalization is high, variance in technical literacy among administrative and healthcare personnel remains a structural constraint. Ongoing technical training and standardized SOPs are required to foster digital compliance (Anggraeni et al., 2023). Additionally, hardware maintenance and cybersecurity protocols require dedicated budgeting within Puskesmas operational funding plans.

CONCLUSION

1. Digital health information systems significantly enhance operational administrative efficiency, reducing waiting times and improving clinical data accuracy in Puskesmas.
2. Integration with national health databases enhances disease surveillance capability and health decision-making.
3. Key administrative obstacles include rural infrastructure gaps, server interoperability challenges, and varying levels of workforce digital literacy.
4. Sustainable implementation requires targeted administrative policy support, comprehensive continuous workforce training, and secure cloud infrastructure financing.

SUGGESTIONS

1. For Health Administrators: Establish standardized digital SOPs, conduct periodic technical refresher courses, and allocate specific budget lines for IT hardware maintenance and cybersecurity.
2. For Policymakers & Local Health Offices: Upgrade telecommunications infrastructure in remote healthcare facilities and streamline data integration pipelines between municipal and national platforms.
3. For Future Researchers: Conduct multi-region comparative studies analyzing the cost-benefit analysis and patient satisfaction metrics associated with full digital health integration in primary care.

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