

WORK EFFICIENCY OF INTEGRATED SERVICE POST CADRES IN MONITORING THE GROWTH AND DEVELOPMENT OF CHILDREN UNDER FIVE THROUGH THE USE OF THE E-POSYANDU KESEHATAN (EPOK) APPLICATION

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ABSTRACT

Integrated service post (Posyandu) cadres play a vital role in monitoring the growth and development of children under five, yet they often face challenges in work efficiency due to manual data recording and limited access to information. This study aimed to analyze the effect of the e-Posyandu Kesehatan (ePoK) application on the work efficiency of cadres in conducting child growth monitoring and stimulation. A quasi-experimental design with a one-group posttest-only approach was employed. A total of 60 cadres were selected using proportional stratified random sampling. Data were collected using a validated and reliable questionnaire consisting of seven dimensions: time efficiency, data accuracy, productivity, information access, digital competence, communication and coordination. The results of multiple linear regression showed that all dimensions simultaneously had a significant influence on work efficiency ($F = 221.075$; $p < 0.05$) with an Adjusted R^2 of 0.962. Partially, information access ($\beta = 0.677$) and productivity ($\beta = 0.388$) were the most dominant dimensions. It is concluded that ePoK enhances cadre efficiency by accelerating data access, increasing productivity, and simplifying workflows. It is recommended to strengthen digital training for cadres and expand the implementation of ePoK to other regions as part of a broader community-based health service improvement strategy.

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1. INTRODUCTION

The Integrated Service Post (Posyandu) serves as one of the primary pillars of basic healthcare services in Indonesia, particularly in the monitoring of children under five growth and development. The effectiveness of Posyandu largely depends on the role of community health cadres in data recording, reporting, and educating parents of young children. However, the manual process of recording and reporting often presents several challenges, such as data inaccuracies, delays in reporting, and suboptimal monitoring of child development [1].

The advancement of information technology has opened up significant opportunities to improve the work efficiency of Posyandu cadres through digitalization [2], [3]. One such innovation is the implementation of the e-Posyandu Kesehatan (ePoK) application, a mobile-based platform designed to assist cadres in recording child growth and development data in real-time, while also facilitating integrated reporting to health facilities [4], [5].

Previous studies have demonstrated the positive impacts of digital applications in Posyandu activities. Damayanti et al. revealed that the use of ePoK in Tanjungpinang significantly improved cadres' knowledge and skills in child monitoring. Furthermore, from the perspective of parental engagement, the application contributed to enhanced autonomy in child growth tracking [4], [5], [6], [7]. Other studies on Posyandu applications have also shown that digitalization improves data accuracy and service coverage [3], [8], [9].

Work efficiency serves as a critical indicator in evaluating performance quality at both individual and organizational levels. In the context of Posyandu cadres, efficiency refers to the ability to optimally carry out the processes of monitoring and evaluating child growth and development, in alignment with early childhood health service targets both in terms of data accuracy and service coverage. Efficiency implies that a task can be completed effectively using all available resources, including time, labor, and skills, to their fullest potential. In this regard, efficiency is not merely measured by the speed of task completion but also includes procedural accuracy, precision in recording anthropometric and developmental data, and the use of digital tools like ePoK to streamline processes, reduce task duplication, and enhance data validity [10].

Work efficiency in this study encompasses task execution time, ease of data entry, and increased cadre productivity in monitoring child development. The use of digital applications can significantly enhance work efficiency. Through such systems, recording becomes faster and more accurate, data analysis is automated, and recommended actions are readily available within the application. As a result, working time can be optimized, and the quality of interventions delivered becomes more targeted and effective [11], [12], [13].

This study aims to evaluate the work efficiency of Posyandu cadres in monitoring child growth and development through the use of the ePoK application in Tanjungpinang City. The novelty of this study lies in its empirical approach to systematically measure the contribution of digital applications to the productivity and work quality of cadres, while also providing data-based recommendations for the development of information technology-based healthcare services.

2. RESEARCH METHOD

This study employed a quasi-experimental design using a one-group posttest-only design approach. The research was conducted from June to August 2023 in the working area of Mekar Baru Primary Health Care, Tanjungpinang City. The study population consisted of all posyandu cadres within the designated area. However, the sample was purposively selected based on inclusion criteria, which included: willingness to participate as respondents, active status as posyandu cadres, ownership of an Android device with a minimum version of 5.0, and basic skills in operating the device. The exclusion criterion was cadres with a professional health background, to avoid bias in the assessment of task-related skills.

The e-Posyandu Kesehatan (ePoK) application was used by the respondents for one month during the implementation of child growth and development monitoring activities. After the one-month usage period, the effectiveness of cadre performance was assessed across six dimensions: time efficiency, data accuracy, productivity, information access, digital competence, communication and coordination. These variables were measured using a questionnaire consisting of 35 items, rated on a five-point Likert scale (strongly agree, agree, neutral, disagree, strongly disagree). The questionnaire had been previously tested for validity and reliability.

A total of 60 respondents were involved in the study, determined using the Slovin formula. The sampling technique used was proportional stratified random sampling, in which cadres were proportionally selected from the 12 posyandu units under the jurisdiction of Mekar Baru Primary Health Care. Ethical approval for this study was granted by the Ethics Committee of STIKES Patria Husada Blitar, with approval number: EC.238/KEPK/STKBS/VII/2023.

3. RESULTS AND ANALYSIS

This study was conducted in Tanjungpinang City from June to August 2023. A total of 60 posyandu cadres from the working area of Mekar Baru Primary Health Care participated in the study, having met the predetermined inclusion and exclusion criteria. The characteristics of the respondents are presented in Table 1 below:

Table 1. Respondent Characteristics

Variable	Frequency	Percentage (%)
Age (Years)		
< 20, > 40	5	8,3
20-40	55	91,7
Education		
Low (< Senior High School)	15	25,0
High (\geq Senior High School)	45	75,0

Occupation		
Housewife	46	76,6
Employed	14	23,3
Years of service		
< 5 years	10	16,7
≥ 5 years	50	83,3
Participation of Training		
Never	22	36,7
Ever Participated	38	63,3
Total	60	100

Based on the data presented in Table 1, the majority of respondents were in the productive age group, ranging from 20 to 40 years, accounting for 91.7%. In terms of educational background, most respondents had a higher education level (≥ senior high school), comprising 75.0% of the sample. The majority were housewives entrusted with the responsibility of serving as posyandu cadres, with a percentage of 76.6%. Regarding their experience, most respondents had served as cadres for more than five years (83.3%), indicating a relatively high level of familiarity with community health tasks. Furthermore, 83.3% of the respondents reported having attended cadre training in the past five years, reflecting ongoing capacity-building efforts through formal training.

The results of the multiple linear regression analysis used to examine the factors influencing cadre work efficiency are presented in Table 2 below:

Table 2. Results of Regression Analysis on Cadre Work Efficiency

Table 2: Results of Regression Analysis on Cadre Work Efficiency						ANOVA	Adjusted R-Square	
Model	Coefficients ^a		Standardized Coefficients	t	Sig.			
	Unstandardized Coefficients	Std. Error						
(Constant)	1,755	1,012		1,733	0,089	221,075	0,000*	0,962
Productivity Dimension	0,358	0,062	0,388	5,765	0,001*			
Data Accuracy Dimension	-0,010	0,028	-0,010	-0,360	0,721			
Digital Competence Dimension	0,001	0,111	0,001	0,006	0,995			
Information Access Dimension	0,608	0,117	0,677	5,184	0,001*			
Time Efficiency Dimension	-0,029	0,024	-0,34	-0,034	0,233			
Communication and Coordination Dimension	-0,008	0,030	-0,08	-0,008	0,791			
Dependent Variable: Efisiensi Kerja Kader								

Dependent Variable: Efisiensi Kerja Kader

The results of the multiple linear regression analysis presented in Table 2 show that, simultaneously, all independent variables comprising time efficiency, data accuracy, digital competence, information access, productivity, communication and coordination had a statistically significant influence on the work efficiency of posyandu cadres. This is supported by the F-value of 221.075 with a significance level of 0.000 ($p \leq 0.05$), indicating that the regression model constructed is statistically feasible. Furthermore, the Adjusted R-Square value of 0.962 indicates that 96.2% of the variation in cadre work efficiency can be explained by the variables in the model, while the remaining 3.8% is influenced by other factors outside the model.

Partially, the information access dimension emerged as the most dominant factor influencing cadre efficiency, as reflected in the highest Beta coefficient value of 0.677 and a significance level of 0.001 ($p \leq 0.05$). This means that improvements in information access significantly contribute to increased work efficiency. The productivity dimension also showed a significant effect, with a Beta value of 0.388 and a significance level of 0.001, indicating that higher productivity in task execution is associated with greater efficiency. Conversely, other dimensions such as data

accuracy, digital competence, time efficiency, communication and coordination did not demonstrate statistically significant effects on efficiency when assessed individually ($p > 0.05$). This could be attributed to the homogeneity in respondent perceptions or limitations in the measurement instruments used. Nevertheless, these variables still contribute significantly to the overall regression model when considered collectively.

The work efficiency of posyandu cadres in monitoring and stimulating child growth and development is influenced by multiple interacting dimensions, including time efficiency, data accuracy, productivity, information access, digital competence, communication and coordination. Time efficiency enables cadres to complete service and recording tasks promptly, allowing more time for educational interaction with parents. Data accuracy is critical in determining the correct nutritional and developmental status of children under five; errors in data recording can lead to inappropriate interventions. Thus, digital systems such as ePoK, which offer automatic calculations and data validation features, play a vital role in enhancing cadre efficiency. This finding is supported by WHO (2022), which emphasizes that data quality serves as the foundation for effective and sustainable healthcare services [14].

Cadre productivity reflects the ability to complete more tasks within a limited timeframe. Digital applications support this by accelerating work processes, reducing administrative burdens, and increasing service output. Within the framework of the Human Performance Model, productivity is viewed as a direct indicator of efficiency. Studies have shown that the use of mobile technology enhances cadre productivity, particularly in primary healthcare services. Meanwhile, the information access dimension stands out as a dominant factor influencing work efficiency, as cadres require fast, accurate, and integrated information to make timely and appropriate decisions. The ePoK application facilitates this by providing real-time access to child growth charts, historical data, and educational materials aligning with the Knowledge-Based View (KBV), which emphasizes information as a strategic resource for enhancing individual and organizational performance. [15].

Digital competence and communication–coordination skills also play an important role in the work efficiency of cadres. Cadres with high levels of digital literacy are better able to understand and operate application features, minimize data input errors, and avoid confusion when navigating the system. As emphasized by the WHO, digital literacy among health workers is essential to ensure the successful implementation of digital health interventions and to maximize their intended benefits. Effective communication and coordination further support task execution by facilitating smoother collaboration between cadres, healthcare facilities, and community members—thus optimizing the delivery of child health services at the community level. [14], [16]. Communication and coordination skills enhance the effectiveness of posyandu activities, as they are closely related to community engagement, task distribution, and collaboration between cadres and healthcare professionals. With the implementation of ePoK, coordination with the Mekar Baru Primary Health Care becomes more efficient due to integrated data systems, while communication with parents is more evidence-based—supported by growth charts and developmental visualizations provided in the application. Accordingly, all these dimensions synergistically contribute to improving cadre work efficiency, making posyandu services more effective, adaptive, and sustainable in the digital era.

This study found that information access is the most dominant factor contributing to improved work efficiency among cadres. This finding is aligned with the Knowledge-Based View (KBV) theory, which posits that access to knowledge and information serves as a strategic resource for enhancing both individual and organizational performance. In the context of posyandu cadres, timely access to health information, service procedures, and child growth and development data is crucial to improving service quality. Accurate and readily available information enables cadres to make rapid and informed decisions, thereby providing more efficient and responsive services [15].

Furthermore, the role of information access in enhancing cadre work efficiency cannot be separated from the integration of Health Information Systems (HIS). These systems are designed to provide the right information, at the right time, in the right place, to the right people, thereby supporting both service efficiency and quality. The implementation of HIS integrated with digital technology enables real-time data access, reduces administrative workload, and supports more accurate decision-making processes. Such systems empower cadres to perform their tasks with greater precision, timeliness, and responsiveness ultimately contributing to improved health outcomes in community-based services. [17], [18], [19].

Numerous studies in the field of mobile health (mHealth) have confirmed the contribution of digital technologies in improving the work efficiency of health workers. Features such as automated reporting, growth chart visualization, and service reminders embedded in mobile applications have been proven to reduce manual documentation time and significantly accelerate access to clinical data. The findings of this study align with those results, demonstrating that the use of the ePoK application by posyandu cadres—which includes data upload functionality, growth chart visualization, and digital educational materials effectively enhances information access and supports the quality of service interventions conducted directly in the field. [5], [20], [21], [22], [23].

Overall, the positive responses from 60 cadres to the five questionnaire items related to information access including ease of access, educational content, availability of historical data, growth chart features, and relevance of



information reflect the effectiveness of the ePoK application as a digital platform that supports work efficiency in monitoring child growth and development. These findings are consistent with various international and national studies, as well as with the Health Information System (HIS) and Knowledge-Based View (KBV) theories, both of which assert that the availability of digital information significantly improves the speed, quality, and outcomes of community health worker interventions. [10], [14], [15], [17], [24].

Cadre productivity, characterized by the ability to complete more tasks within a limited time frame, contributes significantly to work efficiency. Respondents' statements such as "I can monitor more children under five in a single working day since using ePoK" and "Using ePoK has increased the amount of child data I am able to report" illustrate how the application facilitates a daily increase in work output. This finding aligns with the WHO (2023) report, which states that the use of digital technologies has been proven to improve the productivity of health workers by reducing administrative time and accelerating the reporting process. [16]. This has also been supported by several research findings, which indicate that the use of mobile phones has been proven to improve the performance of community health workers in low- and middle-income countries [25], [26].

Within the Human Performance Model framework, productivity is conceptualized as a key element influencing individual work efficiency. This principle is reinforced by the studies of Braun et al. (2013) and White et al. (2016), which found that mHealth applications consistently improve the productivity of community health workers in carrying out community-based tasks such as data collection and home visits, particularly in low- and middle-income countries. [27], [28]. This underscores the notion that digital technology not only accelerates processes but also increases the volume of service output. Cadres become more productive in completing posyandu activities through the use of the ePoK application.

Respondents also reported that their workload felt lighter due to the features provided in ePoK, and that the application made posyandu activities more efficient and streamlined. These findings are consistent with systematic reviews from several studies, which highlight that workflow digitalization, automated reminders, and in-app feedback mechanisms help cadres organize schedules, manage tasks, and coordinate with supervisors thereby enhancing productivity and reducing manual workload. [29], [30].

The integration of productivity as a key dimension in this study provides empirical evidence that the ePoK application not only increases the number of tasks completed by cadres but also streamlines their workload through a structured information system. With the support of digital technology, cadres become faster, more organized, and more effective in carrying out growth and development monitoring functions, thereby strengthening the quality of interventions at the level of primary health services. These findings support a recommendation to continuously enhance the digital capacity of cadres and to integrate technology into posyandu programs as a strategic effort to improve evidence-based community health services.

4. CONCLUSION

The use of digital applications has been proven to improve the work efficiency of posyandu cadres in monitoring the growth and development of children under five. The results of the multiple linear regression analysis indicated that all dimensions of work efficiency collectively had a significant impact on cadre performance, with information access and productivity emerging as the most dominant individual factors. The integration of the ePoK application has been shown to reduce manual workload, accelerate data processing, and improve the overall quality of cadre services.

These findings demonstrate that digital innovations in the health sector significantly contribute to enhancing child growth monitoring services at the community level. Future research is recommended to examine the long-term impact of digital application use on the sustainability of cadre performance, to expand the geographic scope of the study, and to incorporate behavioral change indicators in order to assess user engagement over time. The development and scaling of applications like ePoK may serve as a crucial foundation for the digital transformation strategy of national health services, particularly in remote and underserved areas.

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