

Readiness of Community Health Center Health Workers in Implementing Telemedicine Reviewed from the Tam Model in Yahukimo Regency, Papua Mountains

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Abstract. *Telemedicine is an important strategy for improving access and quality of healthcare services, particularly in remote areas such as Yahukimo Regency, Papua Mountains. However, the success of its implementation is greatly influenced by the readiness of healthcare workers as the primary users of the technology. This study aims to analyze the readiness of healthcare workers at Community Health Centers (Puskesmas) in implementing telemedicine based on the Technology Acceptance Model (TAM). The study used a quantitative approach with an explanatory design. The study population consisted of 100 healthcare workers at three Community Health Centers in Yahukimo Regency, with a sample of 80 respondents selected using proportionate random sampling. Data were collected through a closed-ended Likert-scale questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with the help of SmartPLS. The results showed that Perceived Usefulness, Perceived Ease of Use, Attitude Toward Using, and Behavioral Intention to Use significantly influenced healthcare workers' readiness in implementing telemedicine. Perceived Usefulness was the most dominant factor with a path coefficient of 0.407. The research model explained 42.9% of the variation in healthcare worker readiness ($R^2 = 0.429$). The study concluded that increasing perceived benefits, ease of use, positive attitudes, and intention to use telemedicine can strengthen healthcare worker readiness to support telemedicine implementation in remote areas.*

Keywords: *Behavioral Intention, Health Workforce Readiness, Perceived Ease of Use, Perceived Usefulness, Telemedicine*

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INTRODUCTION

Telemedicine has emerged as a strategic innovation in the transformation of the global healthcare system, expanding access to services, increasing efficiency, and reducing geographic barriers, a key challenge in remote areas (Rudiyanto et al., 2026; Lukito & Gani, 2024; Zulfikar, 2025; Firdaus et al., 2025). The World Health Organization defines telemedicine as the provision of remote healthcare services through the use of information and communication technology to support diagnosis, treatment, disease prevention, research, and the education of healthcare professionals. The increased use of telemedicine has become increasingly evident following the COVID-19 pandemic, as it has proven effective in maintaining continuity of healthcare services when mobility is restricted (Portnoy et al., 2020).

In Indonesia, the digital transformation of healthcare has also driven the development of telemedicine as part of efforts to ensure equitable healthcare services, particularly in areas with

limited access to referral healthcare facilities (Nugroho et al., 2024). Despite its significant benefits, telemedicine implementation still faces various challenges that could potentially hinder its success. Various studies have shown that the success of telemedicine implementation is determined not only by the availability of technology, but also by user readiness, perceptions of the technology's usefulness, ease of use, and adequate organizational and infrastructure support (Nigatu et al., 2024; Isiaku & Adalier, 2024; Tsourela & Roumeliotis, 2015; Kiberu et al., 2019).

In developing countries, limited internet access, low digital literacy among healthcare workers, and disparities in technological infrastructure remain key factors influencing the adoption rate of telemedicine services (Zahwa et al., 2025; Maisarah et al., 2026; Nugroho et al., 2024). Therefore, assessing healthcare worker readiness is crucial to ensure effective and sustainable telemedicine implementation. These problems are further compounded in Yahukimo Regency, Papua Mountains Province, which is characterized by its mountainous geography, limited transportation access, and relatively difficult distances between regions. Public health services in this area rely heavily on Community Health Centers (Puskesmas) as primary healthcare facilities.

However, limited healthcare workers, a shortage of doctors, and limited supporting facilities remain challenges for most Puskesmas in the region (Sebong et al., 2025; Akbar et al., 2025). This situation is exacerbated by limited and unequal internet connectivity, which hinders the use of digital technology in healthcare (Ministry of Health of the Republic of Indonesia, 2023; WHO, 2022). Telemedicine, however, has the potential to be a solution to expand the reach of healthcare services to communities in remote and difficult-to-access areas (Portnoy et al., 2020). At the implementation level, preliminary studies indicate that telemedicine programs in several community health centers (Puskesmas) in Yahukimo Regency are still in the introduction and planning stages. Telemedicine services cannot yet be operationally implemented due to limited network infrastructure, unstable internet signal quality, and the lack of adequate support systems. Furthermore, the capabilities and readiness of healthcare workers to utilize digital technology also vary (Tombili, 2025; Fahyudi et al., 2025; Trisnadoli et al., 2025; Palapessy & Susanti, 2025). This situation indicates a gap between the need for technology-based healthcare services and the availability of available resources. If this situation is not addressed immediately, the gap in access to healthcare services between urban and remote areas has the potential to widen, making it difficult to achieve the targets of equitable distribution and improving the quality of national healthcare services (Nugroho et al., 2024).

Based on these conditions, this study aims to analyze the readiness of Community Health Center (Puskesmas) health workers in implementing telemedicine in Yahukimo Regency using the Technology Acceptance Model (TAM) framework, which includes Perceived Usefulness, Perceived Ease of Use, Attitude Toward Using, and Behavioral Intention to Use. This research is important because it can provide an empirical basis for local and central governments in formulating telemedicine implementation strategies that are appropriate to the characteristics of the 3T (Underdeveloped and Remote Areas) region. In addition, this study is novel because it examines the readiness of Community Health Center (Puskesmas) health workers in remote mountainous areas of Papua Mountains using a more comprehensive TAM construct compared to previous studies that generally focused on hospitals, general user perceptions, or urban area contexts (Alexandra et al., 2021; Indria et al., 2020; Ma et al., 2022).

METHODS

This study uses a quantitative approach with an explanatory design to analyze the influence of Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Using (ATU), and Behavioral Intention to Use (BIU) on the readiness of healthcare workers in implementing telemedicine in Yahukimo Regency, Papua Mountains. The quantitative approach was chosen because it allows for objective measurement of variables and testing of relationships between variables using statistical analysis, while the explanatory design is used to explain causal relationships based on the Technology Acceptance Model (TAM) framework (Sugiyono, 2022;

Creswell & Creswell, 2023). The study population consisted of all healthcare workers working at three Community Health Centers (Puskesmas) in Yahukimo Regency, totaling approximately 100 individuals. The sample size was 80 respondents, determined using the Slovin formula with a 5% margin of error. The sampling technique used was proportionate random sampling to ensure that each healthcare worker had an equal opportunity to be a respondent while maintaining proportional representation at each Community Health Center (Sugiyono, 2022; Sudaryono, 2023). The research instrument was a closed-ended questionnaire using a five-point Likert scale. The PU, PEOU, ATU, and BIU variables were each measured using three indicators, while the healthcare worker readiness variable was measured using the dimensions of technical readiness, psychological readiness, and organizational readiness. The instrument was developed based on previous research on technology acceptance and telemedicine readiness in healthcare facilities (Alexandra et al., 2021; Ma et al., 2022; Nugroho et al., 2024). The research procedure began with obtaining research permits and coordinating with the Community Health Center (Puskesmas), followed by selecting respondents according to the research criteria. After respondents agreed to participate, questionnaires were distributed directly to obtain research data. Prior to use, the instruments were tested for validity and reliability to ensure measurement accuracy and consistency (Creswell & Creswell, 2023; Hair et al., 2022). Data analysis was performed through editing, coding, scoring, and tabulating. Furthermore, the data were analyzed using descriptive statistics to describe respondent characteristics and the level of preparedness of healthcare workers. Hypothesis testing was conducted using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method using SmartPLS to analyze the influence of PU, PEOU, ATU, and BIU on healthcare worker preparedness in implementing telemedicine, both partially and simultaneously (Hair et al., 2022; Sarstedt et al., 2024; Nugroho et al., 2024).

RESULT AND DISCUSSION

Respondent Description

Table 1. Respondent Characteristics

Respondent Characteristics		
Gender	Amount	%
Man	30	38%
Woman	50	63%
Total	80	100%
Age	Amount	%
25-34 Years	34	43%
35-44 Years	41	51%
≥45 Years	5	6%
Total	80	100%
Profession	Amount	%
Doctor	7	9%
Nurse	29	36%
Midwife	7	9%
Nutritional Power	3	4%
Pharmacy Staff	6	8%
Cadre	22	28%
CS	3	4%
Public health	3	4%
Total	80	100%
Length of work	Amount	%
1 year	4	5%
2-3 Years	30	38%
4-5 Years	26	33%
≥6 Years	20	25%

Total	80	100%
Education	Amount	%
D3	33	41%
S1	16	20%
Profession	8	10%
S2	2	3%
Senior High School	21	26%
Total	80	100%

Source: Processed by Researchers, 2026

Based on Table 1, it is known that of the total 80 respondents, the majority were female, namely 50 people (63%), while 30 people were male (38%). Based on age, the majority of respondents were in the 35–44 years range, as many as 41 people (51%), followed by 25–34 years old as many as 34 people (43%), and ≥45 years old as many as 5 people (6%). Viewed by profession, the largest number of respondents were nurses as many as 29 people (36%), then cadres 22 people (28%), while the profession of doctor and midwife each as many as 7 people (9%). Based on length of service, most respondents had worked for 2–3 years as many as 30 people (38%), followed by 4–5 years as many as 26 people (33%), and ≥6 years as many as 20 people (25%). Meanwhile, based on the last education, the majority of respondents had a Diploma 3 education as many as 33 people (41%), followed by High School as many as 21 people (26%), Bachelor's degree as many as 16 people (20%), Professional as many as 8 people (10%), and Master's degree as many as 2 people (3%). This data shows that the study respondents were predominantly female health workers, productive age 35–44 years, with the profession of nurse, 2–3 years of work experience, and a Diploma 3 educational background.

Measurement Model (Outer Model)

The measurement model in this study uses a reflective approach, meaning that each variable in the Technology Acceptance Model (TAM) Perceived Usefulness, Perceived Ease of Use, Attitude Toward Using, Behavioral Intention to Use and the dependent variable, healthcare worker readiness in implementing telemedicine are measured through indicators reflecting the psychological condition and perceptions of healthcare workers. To ensure that these indicators are truly able to explain the variables, several instrument feasibility tests were conducted. First, the quality of the indicators was evaluated through the loading factor value, where each indicator must have a minimum value of 0.70 to be declared valid in representing the construct of healthcare worker perception and readiness. Second, construct reliability was tested by looking at the Composite Reliability and Cronbach's Alpha values, which must be above 0.70 to prove that healthcare workers' answers are consistent in describing perceptions related to telemedicine. Furthermore, convergent validity was evaluated using the Average Variance Extracted (AVE) value, which must be greater than 0.50, indicating that the indicators are able to explain more than half of the variance of the measured construct. Finally, discriminant validity was tested using the Heterotrait–Monotrait Ratio (HTMT) value, which must be below 0.90, to ensure that each TAM variable is conceptually distinct, for example, the benefits of telemedicine are not confused with ease of use or the attitudes of healthcare professionals. The complete results of the instrument testing are presented in Table 2 as a basis for ensuring that all constructs in this study have met measurement quality standards.

Table 2. Outer Loading, Composite Reliability and Average Variance Extracted

Variables	Measurement Items	Outer Loading	Cronbac's Alpha	Composite Reliability	AVE
PerceivedUsefulness(X1)	PU.1	0.868	0.901	0.936	0.831
	PU.2	0.934			
	PU.3	0.931			
	PEOU.1	0.873			

Perceived Ease of Use(X2)	PEOU.2	0.879	0.852	0.908	0.767
	PEOU.3	0.874			
Attitude Toward Using(X3)	ATU.1	0.917	0.865	0.916	0.785
	ATU.2	0.897			
	ATU.3	0.842			
	BIU.1	0.924	0.878	0.925	0.803
Behavioral Intention to Use (X4)	BIU.2	0.890			
	BIU.3	0.875			
Health Worker Readiness (Y)	Y.1	0.748	0.875	0.905	0.615
	Y.2	0.775			
	Y.3	0.790			
	Y.4	0.780			
	Y.5	0.818			
	Y.6	0.790			

Source: Processed by Researchers, 2026

The data in Table 2 shows that all question items for each variable have high outer loading values (above 0.7), so all indicators are considered valid in measuring their variables. Cronbach's Alpha and Composite Reliability values are also above 0.7, indicating excellent internal consistency and reliability of the instrument. Furthermore, the AVE value for each variable is greater than 0.5, indicating that each construct is able to adequately explain the variance of its indicator. Simply put, this table demonstrates that the research instrument used is valid and reliable, making it suitable for further analysis.

According to Hair, the use of HTMT is recommended because it is considered more sensitive and accurate in determining whether variables are truly different from each other. The recommended value is below 0.90. The test results showed that all HTMT values between pairs of variables were below 0.90. This means that each variable in this study is sufficiently distinct and does not overlap, thus discriminant validity can be considered met. In other words, each variable explains its own indicators more strongly than it explains the indicators of other variables (Hair et al., 2021). The following are the HTMT test results, which can be seen in Table 3:

Table 3. Discriminant Validity (HTMT)

	Attitude Toward Using	Behavioral Intention to Use	Health Worker Readiness	Perceived Ease of Use
Behavioral Intention to Use	0.128			
Health Worker Readiness	0.312	0.450		
Perceived Ease of Use	0.165	0.232	0.287	
Perceived Usefulness	0.051	0.115	0.473	0.134

Source: Processed by Researchers, 2026

Table 3 of the HTMT shows that all correlation values between variables are well below the maximum limit of 0.90. This means that each variable in the study has clear differences from one another and there is no overlap in meaning between constructs. In other words, each variable, such as Attitude Toward Using, Behavioral Intention to Use, Perceived Ease of Use, Perceived Usefulness, and Health Worker Readiness, actually measures a different aspect. Overall, these results confirm that discriminant validity has been met and the research instrument is suitable for use.

Structural Model (Inner Model)

Multicollinearity Evaluation (Inner VIF)

Before testing the hypothesis on a structural model, it is first necessary to determine whether there is a strong relationship between the independent variables (multicollinearity). This is tested using the inner VIF value. Based on the calculation results, all inner VIF values in this study were below 5. This means there is no strong relationship between the variables, so the model used is safe and the analysis results are reliable (unbiased). Simply put, multicollinearity occurs when several independent variables are strongly related to each other. If this occurs, the analysis results can be inaccurate because it is difficult to clearly determine the influence of each variable. Therefore, the VIF value is used as a reference, where a value below 5 indicates a good condition and is not problematic (Yamin, 2023). The following table shows the inner VIF in this study, which can be seen in Table 4:

Table 4. Inner VIF

	Health Worker Readiness
Attitude Toward Using	1,041
Behavioral Intention to Use	1,062
Perceived Ease of Use	1,073
Perceived Usefulness	1,018

Source: Processed by Researchers, 2026

Based on the analysis results in Table 4 (Inner VIF), all variables in the model have VIF values below 5, indicating there is no strong correlation between the variables used in the study. In other words, each variable can stand alone in explaining its influence, so the analysis results are clearer and do not interfere with each other. Therefore, it can be concluded that the data in this study meets the requirements and the model used is reliable and worthy of further analysis.

R-Square Value

After confirming that there are no multicollinearity issues, the next step is to look at the R-square (R^2) value to determine how much the variables in the model are able to explain the results being studied. Simply put, R^2 indicates how strong the influence of the causal variables is in explaining the outcome variable. The value has categories: around 0.19 means low influence, 0.33 means medium, and 0.66 means high. So, the higher the R^2 value, the better the model is at explaining the actual conditions (Yamin, 2023): The R-Square table can be seen in Table 5 as follows:

Table 5. R-Square

	R Square	R Square Adjusted
Health Worker Readiness	0.429	0.398

Source: Processed by Researchers, 2026

The R-Square value of 0.429 indicates that four variables, namely Attitude Toward Using, Behavioral Intention to Use, Perceived Ease of Use, and Perceived Usefulness, together are able to explain 42.9% of the variation in Healthcare Worker Readiness. This means that healthcare worker readiness is quite influenced by their attitude towards using the system, their intention to use it, their perception that the system is easy to use, and the extent to which they feel the system is useful. These four variables play an important role in shaping readiness, although there are still other factors outside the model that contribute around 57.1% of the influence on these variables. Thus, the model has provided a fairly strong picture of the main factors that influence healthcare worker readiness.

Predictive Relevance (Q^2)

The Q^2 value is used to determine whether the model is able to predict research results well. Simply put, if the Q^2 value is greater than 0, it means the model has good predictive ability for the variables studied. Therefore, the higher the Q^2 value, the better the model is at predicting actual results (Sihombing et al., 2024). The following are the Q^2 results based on Smart-PLS data processing, which can be seen in Table 6.

Table 6. Predictive Relevance (Q^2)

	RMSE	MAE	MAPE	Q^2_{predict}
Y.3	0.702	0.542	23,044	0.291
Y.5	0.818	0.645	28,836	0.266
Y.2	0.819	0.620	27,237	0.194
Y.6	0.762	0.590	24,598	0.189
Y.1	0.754	0.631	23,292	0.143
Y.4	0.819	0.652	27,239	0.154

Source: Processed by Researchers, 2026

Based on the Q^2_{predict} value in the Predictive Relevance Table, all indicators in the variable Readiness of Community Health Center Health Workers in Implementing Telemedicine have a positive Q^2 value (0.143–0.291). This indicates that the TAM model used with the variables Perceived Usefulness, Perceived Ease of Use, Attitude Toward Using, and Behavioral Intention to Use has adequate predictive ability for health worker readiness. Indicators with the highest Q^2 values, such as Y.3 (0.291) and Y.5 (0.266), indicate that certain aspects of readiness, such as readiness related to understanding telemedicine functions, readiness to follow digital workflows, or readiness to use devices, are the parts most strongly predicted by the TAM variables. Meanwhile, indicators with lower values such as Y.1 (0.143) and Y.4 (0.154) indicate that some aspects of readiness, perhaps related to initial technical skills or readiness to change work culture, are still less strongly predicted by the model. Overall, these results confirm that the TAM model is indeed relevant and capable of explaining the readiness of health workers at Community Health Centers in Yahukimo Regency in implementing telemedicine, although its predictive power varies for each readiness indicator.

Hypothesis Testing

Direct Effect

Table 7. Bootstrapping

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
AttitudeToward Using -> Health Workforce Readiness	0.289	0.306	0.082	3,500	0.001
BehavioralIntention to Use-> Health Workforce Readiness	0.297	0.300	0.078	3,830	0,000
PerceivedEase of Use-> Health Workforce Readiness	0.193	0.197	0.092	2,093	0.037
PerceivedUsefulness-> Health Workforce Readiness	0.407	0.403	0.077	5,301	0,000

Source: Processed by Researchers, 2026

Based on table 7 bootstrapping, the following is a description of each variable:

***Perceived Usefulness*→ Health Worker Readiness**

Perceived Usefulness has the highest coefficient of 0.407 with a p-value of 0.000, making it the strongest factor influencing the readiness of Community Health Center (Puskesmas) health workers to implement telemedicine. In Yahukimo Regency, where access between regions is often hampered by weather, limited transportation, and difficult terrain, perception of the benefits of telemedicine is crucial. If health workers perceive that telemedicine can speed up the consultation process, facilitate referrals, reduce distance barriers, improve case handling accuracy, and support more effective patient monitoring, they will be much more ready to adopt it. A high perception of benefits can also increase the internal motivation of health workers to overcome obstacles such as network constraints, lack of equipment, or adapting to new systems. Therefore, perception of the usefulness of telemedicine is a key factor in implementation readiness in mountainous areas like Yahukimo.

***Perceived Ease of Use*→ Health Worker Readiness**

Perceived Ease of Use has a coefficient of 0.193 with a p-value of 0.037, indicating a significant influence although not as large as other factors. In the context of Community Health Centers in Papua Mountains, the perception of system ease is very important considering the technical and Limited infrastructure, such as unstable internet connections, insufficient device availability, and varying technological skills among healthcare workers. If telemedicine is perceived as easy to use, for example, by logging in easily, not requiring complicated procedures, and offering simple communication features, healthcare workers will be more prepared and feel less burdened. Although the influence of this variable is the smallest, perceived ease of use remains the first step before healthcare workers are willing to use telemedicine in routine services, especially in areas where digital literacy levels vary.

***Attitude Toward Using*→ Health Worker Readiness**

A coefficient of 0.289 with a p-value of 0.001 indicates that the attitudes of health workers at Community Health Centers (Puskesmas) in Yahukimo Regency toward telemedicine significantly influence their readiness to implement the service. In the context of mountainous areas with limited geographic access, positive attitudes, such as feeling that telemedicine is beneficial, convenient to use, and can support health services, are important factors. Health workers who accept and view telemedicine positively tend to be more ready to integrate it into the Puskesmas workflow, for example, in remote consultations, digital referrals, or patient monitoring. This positive attitude also serves as an emotional foundation that strengthens their motivation to try and maintain the use of telemedicine in areas with infrastructure challenges like Yahukimo.

***Behavioral Intention to Use*→ Health Worker Readiness**

A coefficient of 0.297 with a p-value of 0.000 indicates that healthcare workers' intention to use telemedicine is a significant and strong factor in driving readiness to implement this service. This intention may arise from the highly relevant need for remote healthcare services in Yahukimo Regency, which has a vast area, limited transportation access, and mountainous geography. Healthcare workers with strong intentions are generally more motivated to learn the system, participate in telemedicine training, and adopt new workflows. In other words, the greater the commitment and desire of healthcare workers to try telemedicine, the greater their readiness to implement it consistently in community health center services.

Simultaneous Effects

Table 8. Simultaneous Effects Based on Q2 Values

	SSO	SSE	Q ² (=1-SSE/SSO)
Attitude Toward Using	240,000	240,000	
Behavioral Intention to Use	240,000	240,000	

Health Worker Readiness	480,000	363,385	0.243
Perceived Ease of Use	240,000	240,000	
Perceived Usefulness	240,000	240,000	

Source: Processed by Researchers, 2026

Based on Table 8, the Q-Square value was 0.243. This value indicates that the variables Perceived Usefulness, Perceived Ease of Use, Attitude Toward Using, and Behavioral Intention to Use simultaneously have predictive relevance to healthcare worker readiness. Thus, the research model is considered capable of explaining and predicting the endogenous variables studied quite well.

Goodness of Fit (Fit Model Evaluation)

Model fit evaluation is conducted to determine whether the research model created aligns with the data collected in the field. In other words, this test helps ensure that the relationships between variables in the model reflect the actual conditions. To verify this, several metrics are used, such as SRMR, NFI, and GoF. These values are used as a benchmark to determine whether the model is good or needs improvement. Furthermore, the GoF (Goodness of Fit) calculation is carried out using several specific steps according to the guidelines used in this study (Yamin, 2023):

Table 9. Fit Model

	Rule of Thumb	Estimated model	Information
SRMR	< 0.10	0.072	Fit
NFI	Approaching Value 1	0.755	Fit
GoF	0.1 (Small GoF), 0.25 (Moderate GoF), 0.36 (Strong GoF)	0.571	Fit

Source: Processed by Researchers, 2026

Based on Table 9, the results of the model fit test indicate that this research model is considered good. The SRMR value of 0.072 is below the 0.10 limit, indicating that the model fits the data. The NFI value of 0.755, although not yet reaching the ideal value of 0.90, is still considered good and acceptable. Meanwhile, the GoF value of 0.571 is above the 0.36 limit, indicating that the model has a strong level of fit. Overall, these results indicate that the model used is appropriate and good enough to explain the relationships between variables in this study. Thus, this model can be used to answer the research problem formulation more convincingly.

Discussion

The Influence of Perceived Usefulness (PU) on the Readiness of Health Workers at Community Health Centers in Yahukimo Regency in Implementing Telemedicine

The results of the study indicate that the Perceived Usefulness (PU) variable has a significant effect on the readiness of health workers at Community Health Centers in Yahukimo Regency to implement telemedicine. This is evidenced by the regression coefficient value of 0.407 with a p-value of 0.000 (<0.05), which indicates that the higher the health workers' perception of the benefits of telemedicine, the higher their readiness to implement the service. Among all the independent variables studied, Perceived Usefulness is the variable with the greatest influence, so it can be said to be the dominant factor in determining the readiness to implement telemedicine at Community Health Centers. Within the Technology Acceptance Model (TAM) framework, Perceived Usefulness is defined as a person's level of belief that the use of a particular technology can improve their job performance. In this study, health workers assessed that telemedicine provides real benefits for the implementation of health service tasks, especially in dealing with limited geographic access in Yahukimo Regency. This region faces challenges such

as mountainous terrain, weather that often hinders transportation, and long distances between service areas, so the presence of telemedicine is seen as a solution to reach patients more quickly and efficiently (Mohammadzadeh et al., 2023; Serchen et al., 2025).

The effectiveness of healthcare workers is one of the main reasons for the high perceived benefits of telemedicine. Research by Alexandra et al. (2021) shows that medical personnel in healthcare facilities feel telemedicine helps expedite the service process, particularly during remote consultations, which were previously difficult. These findings align with conditions in Yahukimo, where limited transportation access often hinders face-to-face services. With telemedicine, healthcare workers can continue to provide services to patients in districts far from the central health center (Puskesmas) without having to wait for patients to arrive in person. This benefit is also evident in reduced patient waiting times and increased service capacity without the need for additional healthcare workers.

In addition to effectiveness, service efficiency is also a crucial aspect in shaping the perceived usefulness of telemedicine. Research by Mohtar et al. (2025) confirms that Perceived Usefulness increases when healthcare workers perceive efficiency in the use of technology, such as digital documentation that reduces manual administrative work or the ability to triage patients online. In the context of the Yahukimo Community Health Center (Puskesmas), this efficiency is crucial because the number of healthcare workers is limited and the service load is quite high. With telemedicine, coordination between healthcare workers, patient data recording, and service follow-up can be carried out more quickly, allowing for optimal utilization of existing resources.

Another aspect that contributes to the perception of benefits is telemedicine's support for clinical decision-making. Research by Indria et al. (2020) reports that telemedicine systems help medical personnel gain faster access to patient information and medical guidance, thereby improving the quality of decision-making. This is particularly relevant for Yahukimo Regency, which has limited access to referral hospitals and specialist doctors. Telemedicine allows general practitioners or nurses at community health centers (Puskesmas) to consult with medical personnel at more comprehensive referral facilities, allowing for faster and more accurate diagnoses and treatments. This demonstrates that telemedicine is viewed not only as a means of communication but also as a clinical instrument that supports the quality of healthcare services. The findings of this study align with the TAM theory developed by Fred Davis, which states that perceived usefulness is a key determinant of technology acceptance. When healthcare personnel perceive that telemedicine can improve work effectiveness, service efficiency, and the quality of clinical decision-making, they are more likely to accept and implement the technology. A high perception of usefulness also encourages healthcare personnel to be more adaptive to potential barriers, emerge, such as limited internet network, lack of supporting devices, and the need for technical training. Thus, the results of this study confirm that Perceived Usefulness is a key factor influencing the readiness of health workers at Community Health Centers in Yahukimo Regency to implement telemedicine. The greater the perceived benefits in supporting work effectiveness, service efficiency, and clinical decision-making, the greater the readiness of health workers to adopt telemedicine as part of the transformation of health services in remote areas (Schürmann et al., 2025; Cheah et al., 2025; Kruszyńska-Fischbach et al., 2022).

The Influence of Perceived Ease of Use (PEOU) on the Readiness of Health Workers at Community Health Centers in Yahukimo Regency in Implementing Telemedicine

The results of the study indicate that the Perceived Ease of Use (PEOU) variable has a significant effect on the readiness of health workers at Community Health Centers in Yahukimo Regency in implementing telemedicine. This is evidenced by a regression coefficient value of 0.193 and a p-value of 0.037 (<0.05), which means that the perceived ease of use of telemedicine has a significant effect on the readiness of health workers, although its effect is the smallest compared to other variables in this study. This finding indicates that the easier the telemedicine system is to understand and use, the higher the readiness of health workers to implement it in daily health services.

Within the Technology Acceptance Model (TAM) framework, Perceived Ease of Use is defined as a person's level of confidence that a technology can be used without requiring significant effort. In the context of Community Health Centers in Yahukimo Regency, perceived ease of use is a crucial factor due to the limited technical and infrastructure conditions in mountainous areas. Barriers such as unstable internet connections and the availability of limited devices, as well as variations in technology usage capabilities among the workforce. Walczak et al. (2022) said that, healthcare providers consider ease of use a primary requirement for accepting telemedicine. If a telemedicine system is perceived as simple, accessible, and free of complicated procedures, healthcare workers will be more willing to use it without feeling overwhelmed.

One important aspect of Perceived Ease of Use is the ease of learning the system (learnability). Research by Darmawan (2024) explains that the ability of healthcare workers to quickly understand how an application works is a key factor in assessing the usability of a system. Telemedicine applications with simple interfaces are easier to learn without requiring repeated training. This is particularly relevant in Yahukimo Regency, where formal training opportunities are still limited due to geographic constraints and transportation access. Therefore, easy-to-learn telemedicine can reduce resistance to change and increase healthcare workers' readiness to utilize it in routine services.

This finding is supported by research by Mohtar et al. (2025), which states that when an application can be understood quickly, the perceived ease of use (P2U) perception increases significantly. This relates not only to technical aspects but also to the workload of healthcare workers. In community health centers (Puskesmas), healthcare workers often face large patient volumes and complex administrative tasks. If a telemedicine application is perceived as complicated, the technology is perceived as adding to the workload. Conversely, a simple system will be viewed as a tool that supports services, thus increasing readiness for use.

In addition to ease of learning the system, user interface design also significantly influences perceived ease of use. Research by Indria et al. (2020) showed that a simple, clear, and easy-to-navigate application interface increases healthcare workers' confidence in using it. Good design can reduce data input errors, speed up menu access, and make the consultation process more convenient. In the context of the Yahukimo Community Health Center, this is especially important given that some healthcare workers have varying levels of digital literacy. A system with an overly complex interface can reduce adoption, while a user-friendly interface can enhance positive experiences and encourage continued use.

Another aspect that contributes to Perceived Ease of Use is the lack of technical barriers. Research by Suwandi and Chandra (2025) found that healthcare workers tend to be reluctant to use applications if the system frequently experiences disruptions, such as crashes, server errors, or requires high-spec devices. These technical barriers not only slow down work processes but also reduce user motivation by causing frustration. In the Yahukimo context, this indicator is particularly relevant because internet connectivity in mountainous areas is often unstable. If a telemedicine system is unable to function properly on a limited network, healthcare workers will perceive the technology as difficult to use and unsuitable for field conditions.

Although the coefficient value for Perceived Ease of Use in this study was smaller than the other variables, this result does not mean this factor is less important. In fact, perceived ease of use is the first step before healthcare workers are willing to use telemedicine. When an application is perceived as easy to learn, has a simple interface, and does not present many technical barriers, healthcare workers will be more open to adopting the system. Perceived ease of use can also shape positive initial experiences, which ultimately influence attitudes and intentions to use telemedicine.

Thus, the results of this study indicate that Perceived Ease of Use has a significant influence on the readiness of health workers at Community Health Centers in Yahukimo Regency in implementing telemedicine. The higher the perception of health workers that *telemedicine* The

easier it is to learn, the easier it is to operate, the simpler the interface, and the fewer technical barriers, the higher their readiness to adopt telemedicine as part of health services in remote areas.

The Influence of Attitude Toward Using (ATU) on the Readiness of Health Workers at Community Health Centers in Yahukimo Regency in Implementing Telemedicine

The results of the study indicate that the Attitude Toward Using (ATU) variable significantly influences the readiness of health workers at Community Health Centers in Yahukimo Regency to implement telemedicine. This is evidenced by a regression coefficient of 0.289 and a p-value of 0.001 (<0.05), indicating that health workers' attitudes toward telemedicine significantly influence their readiness to implement the service. This means that the more positive the health workers' attitudes toward telemedicine, the higher their readiness to implement the system in their daily health services.

Within the Technology Acceptance Model (TAM), Attitude Toward Using describes a person's positive or negative attitude toward the use of a technology. This attitude reflects the extent to which healthcare workers feel comfortable, accept, and view telemedicine as beneficial to their work practices. In the context of Yahukimo Regency, which faces geographical challenges such as mountainous terrain, limited transportation access, and uneven distribution of healthcare facilities, a positive attitude toward telemedicine is crucial. Healthcare workers who perceive telemedicine as a practical solution for remote consultations, digital referrals, and patient monitoring will be better prepared to integrate the technology into the Community Health Center (Puskesmas) workflow.

Healthcare workers' attitudes toward telemedicine are strongly influenced by their user experience. Research by Praba (2025) explains that healthcare workers who enjoy using new systems tend to be more open to technological innovation. This enjoyment typically arises when they perceive that the technology genuinely helps their work and does not add to the burden. In the Yahukimo context, where healthcare workers often face high workloads with limited facilities, positive initial experiences are crucial. If telemedicine is perceived as helping to expedite services and simplify coordination, a more positive attitude will develop. Conversely, negative initial experiences can create resistance and hinder adoption.

Besides experience, internal motivation is also a factor that strengthens healthcare workers' attitudes toward telemedicine. Research by Nugroho et al. (2024) found that healthcare workers' motivation to try digital systems is influenced by curiosity, organizational support, and belief in the technology's benefits. This motivation can be a driver of change, as motivated healthcare workers tend to be early adopters who then influence their colleagues. In the Yahukimo context, motivation is crucial because healthcare workers must navigate various infrastructure limitations. When motivation is high, they tend to be more creative in overcoming technical obstacles such as unstable internet connections or limited devices. Conversely, if motivation is low, telemedicine risks being viewed merely as a formal program without sustained implementation.

Positive attitudes are also related to long-term acceptance of technology. Research by Ma et al. (2022) shows that healthcare workers who believe in the safety, effectiveness, and reliability of telemedicine tend to have positive attitudes toward using the technology. This attitude is important because it will influence consistency of use. In community health centers, telemedicine requires not only acceptance of individuals, but also changes in work culture (Taylor et al., 2015; Sagaro et al., 2020). Health workers who have a positive attitude will make it easier to accept innovation and make telemedicine a part of routine service practice, not only used when there are instructions from superiors or certain programs. In the context of the Yahukimo Community Health Center (Puskesmas), the positive attitudes of healthcare workers reflect the organization's cultural readiness to embrace new technology. Areas with limited access, such as Yahukimo, require adaptive and innovative service systems. Therefore, healthcare workers who find telemedicine beneficial, convenient, and relevant to service needs in remote areas will be better

prepared to support its implementation. This positive attitude also provides an emotional foundation that strengthens the commitment to try, use, and maintain telemedicine as a healthcare solution.

Thus, the results of this study confirm that Attitude Toward Using has a significant influence on the readiness of health workers at Community Health Centers in Yahukimo Regency to implement telemedicine. The more positive the health workers' attitudes toward telemedicine, whether due to good user experience, strong internal motivation, or belief in the technology's effectiveness, the higher their readiness to adopt telemedicine as part of the transformation of health services in remote areas.

The Influence of Behavioral Intention to Use (BIU) on the Readiness of Health Workers at Community Health Centers in Yahukimo Regency in Implementing Telemedicine

The results of the study show that the Behavioral Intention to Use (BIU) variable significantly influences the readiness of health workers at Community Health Centers in Yahukimo Regency to implement telemedicine. This is evidenced by a regression coefficient of 0.297 and a p-value of 0.000 (<0.05), indicating that health workers' intention to use telemedicine is a strong factor in driving readiness to implement the service. This means that the higher the intention and desire of health workers to use telemedicine, the higher their readiness to implement it effectively in health services at Community Health Centers.

Within the Technology Acceptance Model (TAM) framework, Behavioral Intention to Use (BI) describes a person's desire or commitment to use a particular technology now or in the future. In this study, this intention reflects the psychological readiness of healthcare workers to accept telemedicine as part of the service system. In the context of Yahukimo Regency, the intention to use is highly relevant because this region has a wide geographic scope, limited transportation access, and mountainous conditions that complicate the mobility of both patients and healthcare workers. These conditions make telemedicine a potential solution to support remote healthcare services, so healthcare workers with strong intentions tend to be more ready to learn, try, and implement this technology.

Immediate use intention is an important predictor of actual behavior in technology adoption. Research by Suwandi and Chandra (2025) showed that healthcare workers with high levels of Perceived Usefulness and Perceived Ease of Use were more likely to immediately try telemedicine. This suggests that when healthcare workers perceive telemedicine as useful and easy to use, psychological readiness is formed that encourages initial implementation. In the context of the Yahukimo Community Health Center (Puskesmas), this is crucial because some healthcare workers are not yet accustomed to using digital systems routinely. Positive initial intention will determine whether telemedicine is actually implemented or simply stalls at the planning stage.

In addition to short-term intentions, the sustainability of telemedicine use is also influenced by long-term intentions. Research by Maharani et al. (2024) confirms that the success of telemedicine is largely determined by users' willingness to maintain long-term use of the technology. Healthcare workers who perceive telemedicine as relevant to their service needs are more likely to continue using it even if external support decreases. Conversely, if long-term intentions are not established, telemedicine risks becoming merely a temporary innovation used during trials or during specific program implementations. In the Yahukimo context, this is crucial because implementing telemedicine requires continuous adaptation amidst limited facilities and infrastructure.

Usage intention is also influenced by social factors in the workplace. Research by Alexandra, et al. (2021) found that healthcare workers who are satisfied with their experiences using telemedicine are more likely to recommend the technology to colleagues. This process fosters collective acceptance within the workplace, where support among healthcare workers can strengthen technology adoption. In Yahukimo Regency, this dynamic is particularly relevant

because healthcare workers at the Community Health Center (Puskesmas) work in small teams and are interdependent in delivering services. When one healthcare worker demonstrates positive intentions and experiences with telemedicine, this can influence other colleagues to also try it, creating a work culture that is more open to digital innovation.

In the context of this research, Behavioral Intention to Use reflects not only individual readiness but also institutional readiness. A strong intention among healthcare workers to use telemedicine will encourage them to participate in training, adjust their workflows, and adapt to new systems in their services. The greater the individual's commitment to using telemedicine, the greater the likelihood that this system will be consistently integrated into community health center services, such as remote consultations, patient monitoring, and digital referral systems. Thus, the results of this study confirm that Behavioral Intention to Use has a significant influence on the readiness of health workers at Community Health Centers in Yahukimo Regency to implement telemedicine. The higher the intention of health workers to try, use, and maintain telemedicine, whether due to service needs, perceived benefits, or social influences in the workplace, the higher their readiness to adopt telemedicine as part of the transformation of health services in remote areas.

CONCLUSION

This study shows that the readiness of health workers at Community Health Centers (Puskesmas) in Yahukimo Regency in implementing telemedicine is significantly influenced by all constructs in the Technology Acceptance Model (TAM), namely Perceived Usefulness, Perceived Ease of Use, Attitude Toward Using, and Behavioral Intention to Use. Among the four variables, Perceived Usefulness is the most dominant factor in increasing the readiness of health workers, followed by Behavioral Intention to Use, Attitude Toward Using, and Perceived Ease of Use. These results indicate that health workers will be more ready to adopt telemedicine if they believe that the technology can improve service effectiveness, facilitate access to health consultations, support clinical decision-making, and help overcome geographical limitations which are the main challenges in Yahukimo Regency. In addition, the research model has adequate predictive ability in explaining the readiness of health workers towards the implementation of telemedicine.

SUGGESTION

However, this study has several limitations. The study was conducted in only three community health centers (Puskesmas) with a relatively limited number of respondents, so generalizing the results to the entire Papua Highlands region and other 3T (outermost) areas requires caution. Furthermore, the variables used focused on the TAM construct, thus failing to account for other factors such as organizational support, digital infrastructure quality, technological competence, and government policies that could potentially influence readiness for telemedicine implementation. Therefore, further research is recommended to involve a wider region, use a larger sample size, and integrate the TAM model with organizational and environmental variables to obtain a more comprehensive understanding. Practically, the results of this study can serve as a basis for local governments, the Health Office, and community health center managers in designing programs to increase the capacity of health workers, provide adequate digital infrastructure, and strengthen telemedicine outreach and training to support the successful transformation of health services in remote areas.

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