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Analysis of Characteristics, Technical and Perceptions on the Willingness to Use Tuberculosis (TB) Control Applications in Indonesia

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Authors' contributions

This work was carried out in collaboration with all authors. Author AK conceived and designed the study, wrote the protocol and the first draft of the manuscript. Authors EW and IP managed the questionaire during research. Authors EW, AK and IP managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background and Objectives: Indonesia has launched the Wifi TB application that serves as a monitoring and control tuberculosis (TB) cases since September 2018. This research aims to identify characteristics, perceptions, and technicalities on the willingness to use the Wifi TB application.
Methodology: This research was conducted by collecting data from 129 doctors in Semarang city, then carried out the descriptive analysis, factor analysis & logistics as data analysis techniques.
Results: The results showed that respondents with age> 45 years, DPM agencies, length of work> 10 years, perception benefit high, perception ease high, getting training and good technical implementation will be more chance to use the Wifi TB application, while gender and technical obstacle have a low impact on the use of the Wifi TB application. The use of the Wifi TB application is influenced by dominant factors, which is the perception of benefit, perception of ease, technical implementation, and training at 69%.
Conclusions: To increase users' Wifi TB application, there needs to be retraining and technical implementation of the Wifi TB application, also strengthening the perception of benefit and ease of respondents on the Wifi TB application.

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Keywords: Wifi TB application; TB control; characteristics; perception; technical.

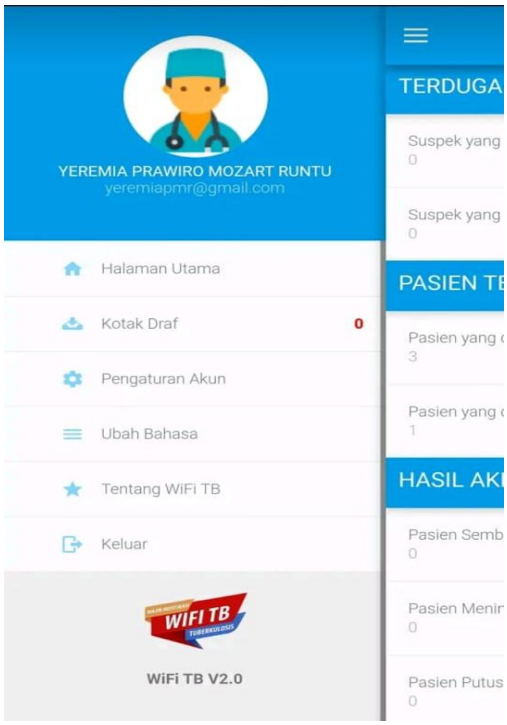
1. INTRODUCTION

Indonesia ranks 3rd out of 8 countries with the highest TB load, namely India (27%), China (8%), Indonesia (8%). In 2018 there were 566,623 cases of tuberculosis in Indonesia, an increase of 99,891 cases compared to 2017. The highest number of cases occurred in the provinces of West Java, East Java and Central Java with a total percentage of the three provinces being 44% of the total TB cases in Indonesia [1].

Following the Regulation of the Minister of Health No 67/2016 on Tuberculosis Control, every health care facility must record and report cases of TB encountered or treated [2]. The mandatory tuberculosis notification system (Wifi TB) is based on an android application that can be accessed via smartphone. The introduction of the mandatory TB notification application with the workshop continued with socialization to TB program managers, independent practice doctors (DPM), and primary clinic doctor (DKP). Furthermore, monitoring and evaluation are carried out on the implementation of mandatory TB notification in each region. Wifi TB is expected to add new TB case discovery data and treated TB cases followed by a successful recovery rate to accelerate the elimination of TB cases in Indonesia.

Users need to register an account then there is a plus (+) sign on the main page, click the sign to add a new patient with TB. A complete technical guide to using the Wifi TB application can be downloaded http://www.ljj-kesehatan.kemkes.go.id/. Here is the interface of the Wifi TB application created by the government.

Several factors can affect the willingness of users to use the application, namely user characteristics, user technicalities and perceptions of application usage [3]. User characteristics on the wifi application are divided into several characteristics, i.e. the user is reviewed from age, gender, work agency and length of work. The user perception that most affects the use of the application is the perception of the benefits and ease of the application [4]. Perceptions of benefit about the benefits of using the application and ease of use of the application will affect the willingness to use the application.



In terms of technicalities of use is divided into 3 which are the technical obstacle in terms of access and signals faced by users in using the application, the technical application of application use is carried out properly or otherwise and technical training has been received or not [5]. By analyzing the characteristics, perceptions and technicalities of using the application, it will be easier to socialize the use of the Wifi TB application following government regulations.

In Kurniadi's research, 2019 on Wifi TB application only discusses the impact of perceptions on the implementation of the Wifi TB application specifically for application users but does not discuss the main factors that affect all respondents, both users and non-users, to be willing to use the Wifi TB application [6]. In this study, the main factors of the use of the Wifi TB application will be analyzed, both users and non-users of the application so that information or strategies can be obtained to increase the use of the Wifi TB application. The purpose of this study is to analyze the characteristics, perceptions and technicalities on the willingness to use the Wifi TB application in Indonesia using factor analysis and logistics.

2. METHODOLOGY

The type of research used is quantitative research, i.e. descriptive quantitative analysis, and inferential quantitative analysis. Research variables are characteristics, perceptions, technical use of the Wifi TB application. Where characteristics consist of age, gender, type of institution, and length of work, on perception consists of benefit and on technical consist of obstacle, implementation and training of the Wifi TB application. The population used in this study were independent practice doctors (DPM) and primary clinic doctors (DKP) of Semarang City Health Office. The number of respondents was 129 respondents, the sample was all data from the total population.

The research instrument used was a questionnaire about the use of the Wifi TB application. Descriptive analysis was carried out on the questionnaire data, i.e. the variable characteristics, perspectives, technicalities and use of the Wifi TB application. Furthermore, factor analysis was carried out on the research variables to obtain the dominant factors that affect the willingness to use the Wifi TB application. The last phase is a logistical analysis of the influence of all research factors and the dominant factors of research on the use of the Wifi TB application. To clarify the data analysis flow is shown in the following Fig. 1.

3. RESULTS

The results of the descriptive analysis are presented in the following Table.

From Table 1 it is known that a total of 129 doctors at the Semarang Community Health Center participated, only 40% used the Wifi TB application and 60% did not use the Wifi TB application. Of the characteristics known that 70% of doctors are <= 45 years old, means that most doctors are productive age and 67% are female. On the characteristics of the length of work, it is known that 59% of doctors work <= 10 years and 74% of DKP agencies. Most doctors are in productive age but the use of the Wifi TB application is only 40%.

From the perception known the perception of benefit is quite high that 81% of respondents stated that the application of WiFi TB is beneficial with a perception score of benefit 3.5. Respondents agree that the Wifi TB application is useful for controlling and reporting TB cases. The ease perception score is quite high which is 3.4 out of a scale of 5 and 81% of respondents stated that the Wifi TB application is easy to use. The perception of ease and benefit is felt by many respondents but the use of TB wifi application is only 40%.

Technically it is known that the problem score is 2.8, with 51% of people finding it difficult to access the app due to the specifications and signal of its smartphone. The technical implementation scores of 3.2 and 71% can use or implement the Wifi TB application well. From technical training known only 47% of doctors have trained the Wifi TB application. Next we will analyze the main causes or main factors for using the Wifi TB application using factor analysis. The following are the results of factor analysis using SPSS software shown in Table 2 and Table 3.

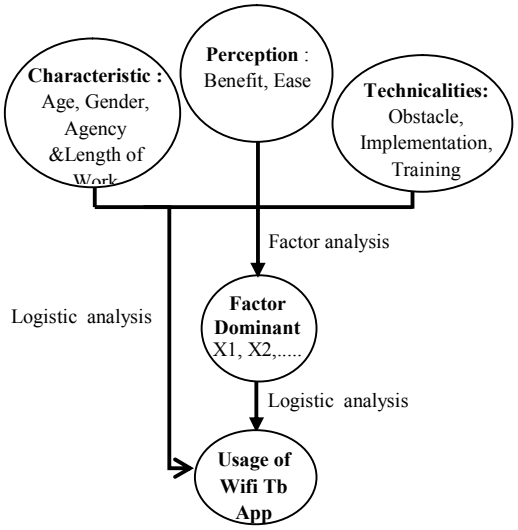


Fig. 1. The flow of data analysis

From Table 2 anti-image it is known that all factors related to anti-image get a score of > 0.5 so all factors are potentially the main factor in the use of Wifi TB application. The analysis was continued by conducting tests to explain the variance. From Table 3 of the variants described, it is known that only 3 components get more than 1 eigenvalue i.e. components 1-3 with all three components able to explain 61.1% variants.

Component 1 has a variant of 29.5%, component 2 has a variant of 17.6% and component 3 has a variant of 14%. From the Table of rotate matrix components, it is known that the gender characteristics correlate with component 1 of -8.2, gender is correlated with component 2 by 26.5%, and gender is correlated with component

3 as much as 61.2%, because the correlation to component 3 is greater than components 1 and 2, the gender characteristics go into component 3. Then it can be concluded that the perception of benefit, perception of ease, technical implementation and technical training entered on component 1 with a variant 29.5%. The age characteristics factors, the characteristics of the type of institution, the characteristics of the length of work enter on component 2 with variant 17.6%. Gender characteristic factors and technical obstacle entry in component 3 with variant 14%.

Table 1. Results of descriptive analysis

Factor	Criteria/ AVG	Nb	%
Characteristic age	> 45 y	39	30%
	<= 45 y	90	70%
Characteristic gender	L	42	33%
	P	87	67%
Characteristic agency	DPM	33	26%
	DKP	96	74%
Characteristic length of work	> 10 y	53	41%
	<= 10 y	76	59%
Perception benefit	3.5		
	>=3.0	104	81%
	<3.0	25	19%
Perception ease	3.4		
	>=3.0	105	81%
	<3.0	24	19%
Technicalities obstacle	2.8		
	>=3.0	63	49%
	<3.0	66	51%
Technicalities implementation	3.2		
	>=3.0	91	71%
	<3.0	38	29%
Technicalities training	Yes	61	47%
	No	68	53%
Use wifi TB application	Yes	52	40%
	No	77	60%

From the analysis, it is known that component 1 has the most influence on the use of the Wifi TB application. The high correlation in component 1 is the perception of ease 91.2%, perception of benefit 91%, technical implementation of 60.6% and technical training of 42.1%. From the information obtained that the dominant factor of the use of TB wifi application is the perception of ease, perception of benefit, technical implementation and technical of training [7]. Furthermore, an analysis of the influence is carried out with a logistical model of the factors that affect the use of the Wifi TB application in Table 4. From Table 4.Hosmer and Lemeshow test on all factors obtained sig 0.000 (<0.05) so that logistic model on all factors cannot be used [8]. From the R square, it is known that perception of ease, perception of benefit, technical implementation and technical training affect 79.3% on the use of the Wifi TB application.

From the Hosmer and Lemeshow tests on benefits, ease, implementation and training obtained sig 0.252 (> 0.05) so that the logistic model on these four factors can be used. From the R square it is known that perception of ease, perception of benefit, technical implementation and technical training affect 69.4% of the use of the Wifi TB application. The difference in the influence of all factors and four factors on the use of the Wifi TB application is only slightly 9.9%, so it can be concluded that four factors are quite high in affecting the use of the Wifi TBapplication. The results of R square, sig and variance are displayed in the flow of data analysis shown in Fig. 2

From Table 4 Exp (B) the dominant factor is known that people who have a perception of good benefits will have a 2126x greater chance of using the Wifi TB application compared to the perception of low benefit [9]. People who have a good perception of ease will have a 1378x greater chance of using the Wifi TB application compared to the perception of low ease. People who have a good technical implementation will have a 1170x greater chance to use Wifi TB application compared to people with low technical implementation. People who get training will have a 44274x greater chance of using the Wifi TB application compared to people who don't do the training. This means that the most influential factor in the use of TB wifi applications is technical training.

In Table 4 Exp (B) all factors are known that respondents with the age of > 45 years have a 1767x greater chance of using TB wifi application compared to respondents aged <= 45 years. Respondents with DPM agencies had a 0.655x greater chance of using TB wifi applications compared to respondents at DKP agencies. Respondents with a length of work> 10 years had a 0.658x greater chance of using the Wifi TB application compared to respondents who have worked <= 10 years. Meanwhile, gender factors and technical constraints have the lowest influence on the use of wifi TB applications i.e. entry on the third component (see Table 3).

Table 2. Anti-image matrix results

Anti- image correlation	c_gender	c_age	c_agency	c_lengthofwork	p_benefit	p_ease	t_obstacle	t_implementation	t_training
c_gender	0,59*	-0,14	-0,07	0,04	0,10	-0,09	-0,05	0,03	0,12
c_age	-0,14	0,60*	0,03	-0,37	-0,03	-0,01	0,04	-0,00	0,00
c_agency	-0,07	0,03	0,65*	-0,27	0,04	0,03	0,01	-0,08	-0,08
c_lengthofwork	0,04	-0,37	-0,27	0,57*	0,17	-0,14	-0,04	0,01	-0,25
p_benefit	0,10	-0,03	0,04	0,17	0,62*	-0,68	-0,03	-0,14	-0,16
p_ease	-0,09	-0,01	0,03	-0,14	-0,68	0,62*	-0,16	-0,16	-0,13
t_obstacle	-0,05	0,04	0,01	-0,04	-0,03	-0,16	0,54*	0,18	0,45
t_implementation	0,03	-0,00	-0,08	0,01	-0,14	-0,16	0,18	0,85*	-0,03
t_training	0,12	0,00	-0,08	-0,25	-0,16	-0,13	0,45	-0,03	0,70*

**Measures of Sampling Adequacy(MSA)*

Table 3. Result of variance explained and component rotate matrix

		Variance explained								
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	Eigenvalue	2,66	1,59	1,27	0,88	0,86	0,66	0,51	0,37	0,22
	% Variance	29,5	17,7	14,1	9,7	9,5	7,3	5,7	4,1	2,4
component rotate matrix	c_gender	-.082	.265	.610						
	c_age	.122	.700	.177						
	c_agency	-.060	.599	-.144						
	c_lengthofwork	.085	.803	-.104						
	p_benefit	.910	-.049	-.047						
	p_ease	.912	.088	.051						
	t_obstacle	.007	-.203	.786						
	t_implementation	.606	.079	-.289						
	t_training	.421	.360	-.618						

Table 4. Effect of dominant factors and all factors on application usage

	Dominant Factor			All Factor		
	Exp (B)	**Hosmer & Lomeshow test**	**R square**	**Exp(B)**	**Hosmer & Lomeshow test**	**R square**
Constant	.001	0.252	0.694	.005	0.000	0,793
p_benefit	2.126			2.582		
p_easy	1.378			2.026		
t_implementation	1.170			1.243		
t_training	44.274			28.816		
t_obstacle				.246		
c_gender				1.698		
c_age				1.767		
c_agency				.655		
c_lengthofwork				.658		

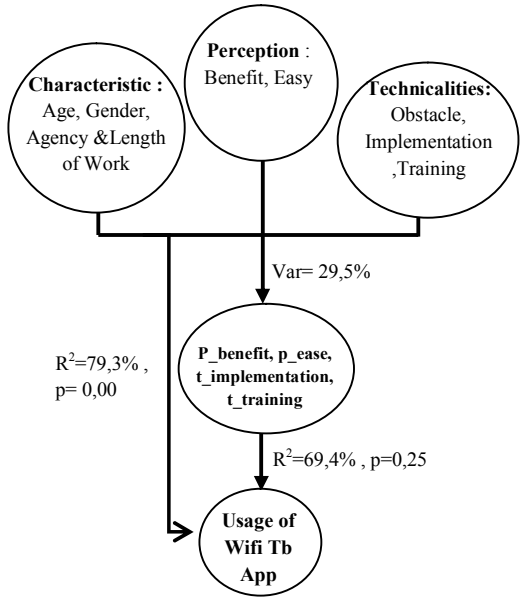


Fig. 2. Results of R square, sig and variance in the flow of data analysis

4. DISCUSSION

From the results of the descriptive analysis it is known that 70% of doctors at the age <= 45 years old, 59% of the length of work is <=10 years and the use of the Wifi TB application is only 40%. In terms of the perception of benefit and ease, it is known that 81% of respondents agree that the application provides benefit and ease. In terms of technically known 51% of people find it difficult to access the app due to its smartphone specifications and signals, 71% can use wifi TB applications properly and only 47% of doctors who take wifi TB application training. Although doctors are still in their productive age, the perception of benefit and ease are also high, but only 40% of doctors use the Wifi TB application.

To find out the main causes or factors that affect doctors willing to use Wifi TB application, the results of the analysis of factors with the results there are 4 dominant factors namely perception of ease, perception of benefit, technical

implementation and technical training. This is in line with the results of previous research which states that mention that the perception of ease and benefit affects users willing to use the application [10]. The results of the study also show that attending training affects the willingness to use the application [11].

The dominant factor influences the use of the Wifi TB application by 69%, only 10% different from the influence of all factors on the Wifi TBapplication. So the main factors that affect the willingness to use the Wifi TB application are the perception of benefit, ease, technical implementation and getting training. Furthermore, in the results of the logistical analysis of all factors it is known that in terms of characteristics, respondents with an age> 45 years, DPM agencies and a length of work> 10 years will be more chance to use the Wifi TB application. From these results it is known that doctors with a mature age and a length of work> 10 years are faster responses in using the application.
From the logistical analysis of the dominant factor of perception, it is known that respondents who feel the benefit and ease will have more opportunities to use the Wifi TB application. From technical factors, respondents with technical training and implementation will have more opportunities to use the Wifi TB application. It is also following the results of previous studies that mention that perception of ease and benefit affects the use of applications [12].

5. CONCLUSION

From the characteristic factors, respondents with age> 45 years, DPM agencies and length of work> 10 years will be more chance to use the Wifi TB application. From the perception factor, respondents who feel the benefit and convenience will have more opportunities to use the Wifi TB application. From technical factors, respondents with technical training and implementation will have more opportunities to use the Wifi TB application.

The use of the Wifi TB application is influenced by the perception of usefulness, ease, technical implementation and getting training by 69%. Meanwhile, all factors in the characteristics, technical and perception affect the willingness to use the Wifi TB application by 79%. The influence of dominant factors and all factors on TB wifi applications only 10% different.

From these results can be concluded that to improve user of TB wifi application, the need for retraining and implementation of TB wifi application also strengthens the perception of benefit and ease. For further research, it would be nice if it can complement the user satisfaction of the Wifi TB application so that the results of the research are more complete for the promotion of the use of the Wifi TB application.

CONSENT

Participants were informed of the objectives and purpose of the study, and written informed consent obtained before completing the questionnaire. Participants were assured of confidentiality of their responses and discussions.

ETHICAL APPROVAL

Ethical approval to conduct the study was obtained from the Department of Health Semarang Muhammadiyah University Research and Ethics committee and administrative permission obtained from the Semarang City Health Office.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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