The Association between Demographic Factors and Health Literacy Among Post-Treatment Recovery of Pulmonary Tuberculosis Patients

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Abstract

Introduction: Health literacy on successful pulmonary tuberculosis treatment is a intricate problem and is influenced by factors such as demographic factors. This research aimed to analyze the association between demographic factors and health literacy among post-treatment recovery of pulmonary tuberculosis patients.

Methods: This retrospective study analyzed the association between demographic factors and health literacy levels of 128 among post-recovery treatment of pulmonary tuberculosis patients in four primary health care settings in Jember Regency from October-November 2022. The inclusion criteria in this research were as follows: 1) must be older or equal to 18 years of age, 2) declared cured of tuberculosis in the of the treatment in 2021, 3) Indonesia citizens, and 4) able to speak, write and read the Indonesia language. This study used demographic questionnaire and health literacy questionnaire for data collection. The chi-square test was used to analyze all of the variables with significance level of 95% ($\alpha = 0.05$).

Results: This research found that the demographic factors that had an association with health literacy level were age (p=0.04), educational level (p<0.01), income (p<0.01), and living area (p<0.01). While, the demographic factors that were unassociated with health literacy level were gender (p=0.67), occupation (p=0.33) and marital status (p=0.41).

Conclusions: To make the TB medication program more successful, healthcare providers and the government should pay attention to demographic characteristics that influence health literacy and drug adherence.

Keywords: demographic factors, health literacy, tuberculosis

Introduction

Tuberculosis (TB) is a severe infection that is a primary cause of illness and death globally. TB is a serious public health problem, along with HIV and COVID-19, the leading cause of mortality from infectious diseases globally (World Health Organization, 2021). In 2021, more than 10.6 million patients suffered from tuberculosis (World Health Organization, 2022). The majority of tuberculosis cases geographically in 2020 (43%) occurred in South-East Asia and Africa. The 30 nations with the highest incidence of TB accounted for 86% of all estimated incident cases worldwide, with eight of these countries accounting for two-thirds of the global total. Eighty-five percents of tuberculosis deaths were in Africa and South-East Asia

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(World Health Organization, 2021). Indonesia is one of the countries that contributes the most significant incidence of tuberculosis. The incidence of tuberculosis in Indonesia in 2020 was 301 per 100,000 (World Health Organization, 2021). In 2021, East Java province had one of the highest tuberculosis incidence rates with 107 per 100,000 population. Jember Regency is East Java Province's second-largest city with an incident rate of 139 per 100.000 population (Dinkes Jawa Timur, 2022).

A common problem that occurs in tuberculosis patients is low health literacy regarding tuberculosis treatment and care (Edyawati et al., 2021). Health literacy is the ability to access, understand, and appraise health information to make appropriate health decisions (Sorensen, 2013). Finding reliable information such as media and understanding the information that has been received about the disease will influence the patient's decision about how the treatment process should be carried out. The more patients had a high health literacy, the more patients had the motivation to comply with the medication and they had successful recovery (Edyawati et al., 2021; Maulina, 2015; Oladunjoye et al., 2013). Participants with greater levels of health literacy had higher compliance rates (average: 14%) than patients with low levels of health literacy (Miller, 2016).

Health literacy on adherence to tuberculosis medication and treatment is a complex issue and is influenced by multiple factors or determinants (Qomariyah et al., 2022). However, some of the factors had some different result from previous studies. For example, gender can be a factor related to lower health literacy. In a study by Yang et al. (2020), men reported poorer health literacy than women among pulmonary TB patients. Other studies from Shiferaw et al. (2020) showed no statistically significant difference between men and females, in contrast to research that found men are better internet users. It is unclear how gender differences in health literacy affect men and women (Stewart et al., 2013). Another example from other studies found that showed that employed participants had a better health literacy level than jobless ones (Lohrasbi et al., 2021; Shiferaw et al., 2020). However, a study in Iran showed that respondents' occupation and marital status were not associated with health literacy (Ansari et al., 2016). Hence, this research aimed to analyze the association between demographic factors and health literacy among post-treatment recovery of pulmonary tuberculosis patients in four primary health care in Jember Regency

Methods

This retrospective study analyzed the association between demographic factors and health literacy levels of 128 among post-recovery treatment of pulmonary tuberculosis patient

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in four primary health care settings in Jember Regency. The inclusion criteria in this research were as follows: 1) must be older or equal to 18 years of age, 2) declared cured of tuberculosis in the of the treatment in 2021, 3) Indonesia citizens, and 4) able to speak, write and read the Indonesia language. The exclusion criteria were: 1) "transfer-out patient" to another regency/city, and 2) TB patients who died during the treatment. This study used demographic questionnaire and health literacy questionnaire for data collection. The demographic questionnaire includes age, gender, educational level, income, occupation, marital status, and living area. The health literacy questionnaire is modified from The European Health Literacy Survey Questionnaire (HLS-EU-Q47) and a literature review about pulmonary tuberculosis. This questionnaire has 46 questions and uses the four domains from Integrated Health Literacy Model by Sorensen (2012); access domain (12 items), understand domain (10 items), appraise domain (10 items), and apply domain (14 items). The result for Cronbach's alpha value of this queationnaire was 0.978. The bivariate analysis was using Chi-square test on SPSS-24 with the significance level of 95% ($\alpha = 0.05$). Clinical Ethical permission for the study was obtained under record reference number HE652156. Data collection held from October-November 2022.

Results

Table 1. Demographic Characteristics among Post-Treatment Recovery of Pulmonary Tuberculosis Patients

Variables	N	%
age		
<25	33	25.8
26-40	35	27.3
41-60	44	34.4
>60	16	12.5
Mean ± SD		40.32 ± 16.0
Median (Min-Max)		39.00(18-87)
gender		
male	69	53.9
female	59	46.1
education level		
no school	13	10.2
elementary school	36	28.1
junior school	17	13.3
high school	45	35.1
bachelor/higher	17	13.3
income		
enough, have some saved	43	33.6
enough, no saving	53	41.4
not enough, but not borrow	26	20.3
not enough and debt	6	4.7
occupation		
unemployed	58	45.3

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Variables	N	%
employed	70	54.7
marital status		
married	84	65.6
unmarried	35	27.3
divorced/widowed	9	7.1
living area		
Urban area	60	46.9
Rural area	68	53.1

This study found that of 128 participants, most of them were in the 41-60 years old group (34.4%). There was a higher percentage of males than females (53.9% and 46.1%). Regarding education, most of the participants (35.1%) were at high school level. Most of the participants were employed (54.7%) and had enough and no saving income (41.4%). Among the respondents, were 65.6% married, 27.3% unmarried, 7.1% divorced/widowed. And most of the participants lived in the rural area (53.1%) (Table 1).

Table 2. Health Literacy Level among Post-Treatment Recovery of Pulmonary Tuberculosis Patients

Variables	N	%
health literacy level		
inadequate	14	10.9
problematic	18	14.1
sufficient	62	48.4
excellent	34	26.6

This study showed that the overall health literacy level among tuberculosis patients was sufficient (48.4%), followed by excellent 26.6%, problematic 14.1%, and inadequate 10.9%. The finding showed that most tuberculosis patients in Jember Regency have sufficient or good health literacy levels regarding tuberculosis (Table 2).

Table 3. The Association between Demographic Factors and Health Literacy Among Post-Treatment Recovery of Pulmonary Tuberculosis Patients

Determinants	n (%)	Inadequate n= 14 (10.9%)	Problematic n=18 (14.1%)	Sufficient n=62 (48.4%)	Excellent n=34 (26.6%)	p-value
age group						.04*
<25	33 (25.8%)	6 (42.9%)	1 (5.6%)	15 (24.2%)	11 (32.4%)	
26-40	35 (27.3%)	1 (7.1%)	4 (22.2%)	20 (32.3%)	10 (29.4%)	
41-60	44 (34.4%)	4 (28.6%)	9 (50.0%)	24 (38.7%)	7 (20.6%)	
>60	16 (12.5%)	3 (21.4%)	4 (22.2%)	3 (4.8%)	6 (17.6%)	
gender						.67
male	69 (53.9%)	8 (57.1%)	11 (61.1%)	30 (48.4%)	20 (58.8%)	
female	59 (46.1%)	6 (42.9%)	7 (38.9%)	32 (51.6%)	14 (41.2%)	
education level						<.01*
no school	13 (10.2%)	8 (57.2%)	4 (22.2%)	0 (0.0%)	1 (2.9%)	
elementary school	36 (28.1%)	4 (28.6%)	8 (44.4%)	19 (30.7%)	5 (14.7%)	
junior school	17 (13.3%)	1 (7.1%)	4 (22.2%)	11 (17.7%)	1 (2.9%)	

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Determinants	n (%)	Health Literacy Level				p-value
		Inadequate n= 14 (10.9%)	Problematic n=18 (14.1%)	Sufficient n=62 (48.4%)	Excellent n=34 (26.6%)	
high school	45 (35.1%)	1 (7.1%)	2 (11.2%)	24 (38.7%)	18 (52.9%)	
bachelor/higher	17 (13.3%)	0 (0.0%)	0 (0.0%)	8 (12.9%)	9 (26.6%)	
income						<.01*
enough, have some saved	43 (33.6%)	0 (0.0%)	5 (27.8%)	21 (33.9%)	17 (50.0%)	
enough, no saving	53 (41.4%)	3 (21.4%)	7 (38.9%)	29 (46.8%)	14 (41.2%)	
not enough, but not borrow	26 (20.3%)	9 (64.3%)	6 (33.3%)	9 (14.5%)	2 (5.9%)	
not enough and debt	6 (4.7%)	2 (14.3%)	0 (0.0%)	3 (4.8%)	1 (2.9%)	
occupation						.33
unemployed	58 (45.3%)	9 (64.3%)	8 (44.4%)	24 (38.7%)	17 (50.0%)	
employee	70 (54.7%)	5 (35.7%)	10 (55.6%)	38 (61.3%)	17 (50.0%)	
marital status						.41
married	84 (65.6%)	6 (42.9%)	13 (72.2%)	44 (71.0%)	21 (61.8%)	
umarried	35 (27.3%)	6 (42.9%)	3 (16.7%)	15 (24.2%)	11 (32.4%)	
divorced/widowed	9 (7.1%)	2 (14.2%)	2 (11.1%)	3 (4.8%)	2 (5.8%)	
living area						<.01*
urban area	60 (46.9%)	2 (14.3%)	6 (33.3%)	24 (38.7%)	28 (82.4%)	
rural area	68 (53.1%)	12 (85.7%)	12 (66.7%)	38 (61.3%)	6 (17.6%)	

*p-value <0.05 = Significant

This research found that the demographic factors that had an association with health literacy level were age (p=0.04), educational level (p<0.01), income (p<0.01), and living area (p<0.01). While, the demographic factors that were unassociated with health literacy level were gender (p=0.67), occupation (p=0.33) and marital status (p=0.41) (Table 3).

Discussion

In this study, age was associated with health literacy level. Four previous studies found that age can impact health literacy level. The majority of patients with poor health literacy were over 45 years old or elderly (Heijmans et al., 2015; Lor et al., 2019; Saeed et al., 2018; Yang et al., 2020). Younger patients have better levels of health literacy than older patients because they can obtain information more easily (Shiferaw et al., 2020). Another study found that prior knowledge and health literacy increase slightly in earlier age groups but drastically decrease with aging in older age groups (Sun et al., 2013). Because of the age associated in knowledge and health literacy, health communication and education must be strengthened.

Educational level was significantly associated with health literacy. Participants who did not have education (57.3%) and elementary school level (28.6%) had inadequate health literacy levels, while participants with high school level (52.9%) had an excellent level of health literacy. People with a greater level of education have higher levels of health literacy than those with a lower level of education. Education influences an individual's understanding and can improve their ability to deal with health issues (Santosa & Pratomo, 2021). Another study discovered that

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respondents with the lowest educational level had significantly lower health literacy scores than those with the highest educational level, indicating that respondents with lower educational levels faced more substantial obstacles (Van Der Heide et al., 2013). It is reasonable to conclude that education raises health literacy levels. Health liiteracy influences a person's ability to obtain information, cognitive and language abilities, and behavior regulation.

Income was significantly associated with health literacy level. Fifty percents of participants with enough and some saved got excellent health literacy, and 46.8% sufficient level of participants with enough and no savings. Participants who had a strong economy have good health literacy because they can access additional TB information. According to one lower educational levels or income groups made it harder to evaluate and apply health information, which are more complicated competences connected to critical health literacy (Van Der Heide et al., 2013). Furthermore, additional research found that most patients with higher socioeconomic levels believed that accessing digital medical content via smartphones and tablets improved their health literacy (Saeed et al., 2018).

There was a significant association between the living area and health literacy level. This study found that participants who lived in the urban area had excellent health literacy levels (82.4%), while 85.7% had inadequate health literacy levels on participants who lived in the rural area. A recent study that assessed health literacy among adult patients who visited primary health care in rural and urban locations in Pandalungan Region, Indonesia, discovered that adult patients in urban settings had significantly higher health literacy than those in rural settings. Rural populations have inadequate health literacy as compared to urban areas with adequate health literacy (Nurdiansyah et al., 2022). Another study found that rural participants were 1.94 times more likely than urban participants to have poor and problematic health literacy (Go, 2018). Urban areas may have better access to health information, more education, and better socioeconomic conditions than rural places.

This study contributes to the understanding of the demographic characteristics that influence health literacy levels in pulmonary TB patients. This study's limitation was only conducted in four primary healthcare settings. As a result, the results may not be representative of all tuberculosis patients' features on health literacy level from various healthcare settings.

Conclusion

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Age, educational level, income, and living area were the demographic characteristics associated with health literacy level. To make the TB medication program more successful, healthcare providers and the government should pay attention to demographic characteristics that influence health literacy and drug adherence. Policymakers should consider increasing the accessibility of tuberculosis information through technology or offline education (poster, health education, booklet), particularly among low socioeconomic people in rural areas, to improve their understanding and access to health information and services.

Conflict of Interest

The authors have reported no conflicts of interest.

Data Availability Statement

The data that support the findings of this research are available by an appropriate request to the corresponding author.

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