

KNOWLEDGE INFLUENCE IN THE COMPLIANCE RATE OF TAKING DRUGS TUBERCULOSIS

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Received: 11/06/2023 , Revised: 16/08/2023 , Accepted: 16/08/2023, Published: 31/08/2023

ABSTRAK

Kepatuhan minum obat bagi pasien tuberkulosis merupakan salah satu penentu keberhasilan terapi selain efektivitas antibiotik. Tujuan penelitian ini adalah untuk mengetahui factor yang mempengaruhi keberhasilan suatu terapi khususnya dalam penggunaan antibiotik tuberkulosis dalam jangka panjang. Kami menggunakan kuesioner yang kami buat dan telah kami validasi dalam mewawancarai dan dapat digunakan untuk mengukur secara langsung tingkat kepatuhan terhadap terapi yang dijalani pasien. Metode penelitian ini adalah *observasional study* dengan desain *cross-sectional* dan pengumpulan data retrospektif. Responden adalah pasien tuberkulosis, baik yang baru maupun yang kambuh. Sampel penelitian terdiri dari 30 responden dengan pemilihan pengambilan sampel berturut-turut dan dasar untuk wawancara dengan pasien. Analisis yang digunakan adalah *Bivariat Chi-square* antara variabel riwayat tuberkulosis dengan lama diagnosis selama terapi yang menunjukkan adanya hubungan antara pendidikan dengan keterlibatan keluarga dalam membantu pengobatan terutama pada pasien laki-laki dengan nilai $P < 0,05$. Analisis multivariat menunjukkan bahwa laki-laki yang tidak pernah mengenyam pendidikan meskipun masih dalam usia produktif memiliki tingkat kepatuhan yang rendah. Hasil wawancara menunjukkan bahwa pasien yang patuh minum obat hanya mencapai 30% dengan score mencapai nilai 8. Hal ini akibat dari banyaknya jumlah obat yang diminum, sehingga resiko keberhasilan terapi sangat besar. Penelitian ini menunjukkan bahwa tingkat pendidikan, informasi, dan lingkungan keluarga dapat mendukung kepatuhan minum obat pasien. Selain itu, semakin banyak jumlah obat yang diminum, semakin rendah kepatuhan pasien.

Kata kunci: Pendidikan, Kepatuhan, Pengetahuan, Tuberkulosis, Lingkungan Keluarga.

ABSTRACT

Compliance with medication for tuberculosis patients is one of the determinants of the success of therapy in addition to the effectiveness of antibiotics. The aim of this study is to identify the factors that influence the success of a therapy, in the long-term use of antibiotics for tuberculosis. We use questionnaires that we have created and validated in interviews and can be used to directly measure the level of compliance with the therapy experienced by the patient. This research method is an observational study with cross-sectional design and retrospective data collection. Respondents were patients with tuberculosis, both new and recurrent. The study sample consisted of 30 respondents with sequential sampling selection and the basis for patient interviews. The analysis used is a Chi-square binary between a variable in the history of tuberculosis with a long diagnosis during therapy that shows a relationship between education

and family involvement in helping treatment especially in male patients with a P value $<0,05$. Multivariate analysis showed that men who never completed education even though they were still in a productive age had a low level of compliance. The results of the interviews showed that patients who obeyed the drug only reached 30% with scores reaching a score of 8. This is due to the large amount of medication taken, so the risk of success of therapy is very large. This research shows that the level of education, information, and family environment can support patient medication compliance. In addition, the more the amount of medication taken, the lower the patient's compliance.

Keywords: Education, Adherence, Knowledge, Tuberculosis, Family Environment.

INTRODUCTION

Tuberculosis is an infectious disease caused by the bacterium species *Mycobacterium tuberculosis* and not only infects the organs of the respiratory system but can also infect other organs. This disease spreads through the air due to coughing and the spread of droplets with a percentage above 5% which can be infected with tuberculosis (Karuniawati et al., 2019). The prevalence of tuberculosis among close contacts of infected patients can be approximately 2.5 times higher than in the general population (Tola et al., 2019; Zegeye et al., 2019). If tuberculosis is detected early and fully treated, the patient has the potential to not transmit the infection and eventually recover (Gube 2017).

WHO globally reports that poor treatment has resulted in the evolution of *Mycobacterium tuberculosis* that are insensitive to treatment with basic first-line antituberculosis drug combinations and resulted in the emergence of multidrug-

resistant Tuberculosis in almost every country in the world (Karuniawati et al., 2019). One of the special concerns and the biggest challenge faced by most tuberculosis programs is that patients do not complete antituberculosis treatment for several reasons, including because the treatment is quite long (Gube, 2017).

Medication non-adherence is considered one of the biggest modifiable health risks in the United States. Nearly half of all Americans who are prescribed prescription medication do not adhere to it. The presence of non-adherence to prescription medication leads to poor health-related outcomes. Non-adherence has been shown to increase the likelihood of developing disease, leading to higher utilization of health facility services, increasing costs of care, and leading to higher mortality rates. There are many factors that have been associated with increased rates of non-compliance (Benzekri et al., 2019; Frijters et al., 2020).

Poor adherence to tuberculosis treatment has been identified as one of the most serious remaining problems in tuberculosis infection control. Adherence to treatment and knowledge of tuberculosis were assessed by *Morisky-Green-Levine, Batalla tests*, and a factor adherence questionnaire specially prepared for this study. Non-adherence regarding habits with various factors and has an impact on behavior in undergoing treatment and can have adverse effects or medication errors related to side effects and also social factors (Nunn et al., 2019; Tweed et al., 2019).

There are several things that will certainly bias adherence data, namely patients who are still smoking during tuberculosis treatment so that it will greatly affect the success of therapy (Hanlon et al., 2018; Khachadourian et al., 2020; Puchalski Ritchie et al., 2020). Researchers will find it difficult to analyze whether relapse or failure of therapy occurs due to non-compliance with taking medication or due to smoking habits that have not been abandoned. So the researchers included this as an exclusion factor in this study.

In helping to increase patient therapy awareness, the role of supervisor taking medication from patients will greatly help to reduce the level of non-adherence. But with

this research, patients will be helped to show where the fault lies in patient non-compliance and can increase the success of healing tuberculosis in terms of adherence. Even so, this research will not have a dynamic impact as a whole, but the research data can certainly be a reference for special pharmaceutical health workers and health offices who play a role in the national tuberculosis program to see the level of patient compliance.

MATERIALS AND METHOD

Research observational with design cross sectional. In this study, we choice included patient, the patients newly diagnosed with Tuberculosis (TB) or the group of patients with relapse/long time diagnosis of Tuberculosis. Both were chosen because of their long-standing differences in antibiotic use and contact with their family. This research has been registered in the Universitas Muslim Indonesia Ethics Committee with registration no. UMI011812627. The number of patients is 30 respondents and to determine the level of patient drug adherence will be given the interview questionnaire adherence. The compliance questionnaire we made ourselves refers to the Morisky questionnaire that we have

independently validated for tuberculosis adherence version. The results will then be compared between the two. In this study only looked at the compliance of newly diagnosed Tuberculosis patients with patients with recurrent/old Tuberculosis. In this case, we will look at several variables that can determine, namely the level of education, age, gender, family environment, provision of information, occupation, and history of illness. If respondent are not have about data, they will be excluded from sample. Data collection was carried out retrospectively with the consecutive. Furthermore, data collection and statistical analysis bivariate Chi-square test and multivariate test analysis were carried out.

RESULT AND DISCUSSION

Patient compliance is an important factor in the success of tuberculosis therapy due to long-term use of antibiotics. This research is important to approach the respondents because the openness of information from patients is a basis for minimizing bias in research. Personal information that requires special interviews with respondents in conducting research.

Bivariate test, *Chi-Square* history of Tuberculosis or the patient's length of diagnosis were patients undergoing the

intensive therapy phase (the first 2 months), namely patients who were newly diagnosed with Tuberculosis and patients with the advanced therapy phase (6 months after initial therapy), namely patients who had been diagnosed for a long time. Tuberculosis includes relapse patients. The data obtained was taken from 30 respondents who were willing as follows **Tabel 1.**

The analysis carried out shows that the patient variable value by gender shows a p-value <0.001 so that men are more at risk of tuberculosis and have some difficulty during therapy to achieve maximum recovery rates. This may have something to do with smoking habits carried out by male patients compared to women. In addition, the level of education below high school shows a p-value <0.001 , which means that there is a significant relationship between education level and therapy success and adherence. Patients in this category are more difficult to achieve successful therapy.

Table 1. Variable analysis age, gender, information, occupation, education, family support using bivariate test (n=30)

Variable	Frequency (%)	Mean	CI 95%	P Value
Age		0.42	0.41-0.43	1.143
Adult	53%			
Geriatric	47%			
Gender		1.0	1.0-1.0	<0.001
Male	70%			
Female	30%			
Information		1.0	1.0-1.0	<0.001
Getting	88%			
Not Getting	12%			
Occupation		0.12	0.009-0.14	7.14
Working active	58%			
Not Working (Student)	42%			
History of Tuberculosis		0.42	0.41-0.43	1.14
Newly patient	44%			
Relapse patient	56%			
Ever received education		0.17	0.16-0.18	0.1
Bachelor or more	85%			
Undergraduate or less	15%			
Family supports therapy		0.12	0.009-0.14	0.008
Supporting	95%			
Not supporting	5%			

Description:

Age: age range of respondent

Gender: Male/Female

Information: Provision of drugs information for respondent

Occupation: Respondent activity

History of Tuberculosis: Tuberculosis disease history

Ever received education: Responden education level

Family support: Family environment system

Another interesting thing is shown by the family support variable in the success of therapy which shows a significant relationship with a p-value of 0.008. This shows that the success of patient therapy is largely determined by family support, both in reminding therapy and also accompanying during therapy. This may have a psychological relationship to the patient which certainly requires further research. Apart from that, male patients also find it difficult to comply with taking

medication, especially those with an educational background below a bachelor's degree. The multivariate analysis is carried out to see the relationship of all variables directly. The analysis is presented in the **Table 2.**

Table 2. Variable analysis of length of tuberculosis diagnosis vs age, gender, information, occupation, education, family support in the multivariate test (n=30)

Variable	Mean	CI 95%	P Value
Age	1.29	-1.97 – 3.9	<0.001
Gender	0.33	-0.77 – 0.77	<0.001
Information	0.28	-0.05 – 1.25	0.62
Occupation	0.4	-1.73 – 0.13	0.58
Ever received education	0.35	-0.81 – 0.81	<0.001
Family supports therapy	0.38	-0.68 – 1.08	0.14

Description:

Age: age range of respondent

Gender: Male/Female

Information: Provision of drugs information for respondent

Occupation: Respondent activity

History of Tuberculosis: Tuberculosis disease history

Ever received education: Responden education level

Family support: Family environment system

In the multivariate analysis, it turned out that the relationship that was very significant and significant was male gender, which was more prone to adherence problems than women, as indicated by a p-value <0.001.

Age under 65 years, apparently also has problems in adherence, may also have a significant relationship with a p-value <0.001. In addition, the importance of the information provided was significant in patient medication adherence. This can be seen from the information variable with a p-value <0.001 where patients do not receive education so that patient compliance is also influential or disobedient. What is very interesting from the two analyzes is that the patient's age <65 years, male sex, with high school education, without any education

shows a very low level of adherence. Patients who have never received education about their medication have a high risk of failing therapy, even though these patients are still in their productive age. This suggests that memory, which is usually associated with old age because it is considered a barrier in adherence to taking medication, is not too influential. It is proven that education is the main thing in increasing compliance. This may be related to the patient's understanding of processing information based on their educational background.

The results showed that the majority of patients were still not compliant due to a lack of understanding about the use of antibiotics and family support in implementing therapy. In addition, it is the

level of education that is also an obstacle to increasing patient awareness of taking medication. In addition, there are 2 patients who have suffered for a long time with a vulnerability of >6 months who are at risk

of experiencing MDR (Multi Drugs Resistant) so that it will complicate treatment later. The interview respondent adherence questionnaire depicted in the **Table 3.**

Table 3. Result adherence questionnaire data (n = 30)

Number of Patients	Score	Category
9	8	Compliant
6	6	Less compliant
15	4	Not compliant

Description:

8 or more point: High compliance

6 to 7 point: Less compliance

<6 point: Non-compliance

It shows that the level of adherence is still 30% of what it should be, so there is a risk of recurrence, failure of therapy, or resistance to the use of antibiotics. Apart from these data, this study also looked at *pill count*, where researchers looked at the number of drugs taken by patients whether they were suitable for their therapy. In theory, the basic use of antibiotics is rifampicin, pyrazinamide, isoniazid, and ethambutol. From the research, it was found that patients with complications of cardiovascular disease had more drugs taken, so this turned out to have an effect on remembering the number of drugs that had to be taken (Ruan et al., 2021). The more the number of drugs that must be taken by the patient, the lower the patient's adherence to taking medication so that the risk of

therapy failure, recurrence of tuberculosis, and resistance will be greater.

Non-compliance with taking medication for tuberculosis patients is caused by the long period of taking antibiotics which affects the psychology of the patient. Another thing that might have an effect is other co-morbidities suffered so that it requires taking other drugs. The results of patient interviews showed a low level of adherence starting from the feeling that it had improved after 2 months of therapy, so that the patient no longer wanted to continue the therapy. The side effects of antibiotics experienced by patients are one of the reasons for the lack of adherence in taking patient medication (Morawski, 2018).

The family acts as a supervisor for taking medication and as a *support system* that is needed to increase patient adherence

in using the drug. The family plays a role starting from the intensive stage to minimize the occurrence of resistance to all tuberculosis antibiotics. Whereas in the advanced stages it is important because it will prevent recurrence or failure of therapy later (Dayer, 2017; Htun et al., 2018).

The interview tool with greater sensitivity than a four-item scale that is considered the most commonly used self-reporting method for determining adherence and is designed to prevent positive response bias from patient questions asked by healthcare professionals by reversing the behavior-related responses. compliance interviewees (Morawsky et al, 2018). Thus, each item will measure patient compliance behavior.

The level of compliance was determined according to a score resulting from the sum of all correct answers; high compliance (8 points or more), less compliance (6 to 7 points) and non-compliance (<6 points). In this study, patients were showed adherent (Haramiova et al., 2017).

The difficulty in this study was the long processing of ethical clearance, which made it difficult for researchers to obtain permits at the hospital and provincial government permits. Limitations during interviews with

patients were a particular obstacle when collecting data because they had to apply protocols for infectious disease.

CONCLUSION

The conclusion of this study shows that male patients with low education level, no family support, and no information have a high chance of influencing adherence level. In addition, the amount of drug used will affect adherence.

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