

ORIGINAL ARTICLE

The Relationship Between Family Social Support and Medication Adherence Among Tuberculosis Patients in Community Health Centers of Sleman Regency

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ABSTRACT

Introduction: The issue of patient adherence to tuberculosis (TB) is not only a clinical concern but also a significant global public health challenge. The level of social support from the family is one of the key factors that can influence medication adherence. The purpose of this study was to explore the relationship between family social support and medication adherence in TB patients. **Materials and Methods:** This cross-sectional study met inclusion and exclusion criteria for patients ≥ 18 years of age and being diagnosed with TB treatment in thirteen community health centers in the Sleman Regency area during the period of October–November 2023. We used the five-item Medication Adherence Report Scale (MARS-5) to collect medication adherence data and the six-item Social Support Questionnaire (SSQ-6) to collect family social support data. Descriptive analysis was used to describe the research subjects, and Spearman's rank correlation was conducted to examine the relationship between variables. **Results:** A total of 78 patients received Social Support Questionnaire Number (SSQN) with a mean value of 2.0917 and Social Support Questionnaire Satisfaction (SSQS) with a mean value of 5.3605. A correlation between SSQS and adherence was found to be statistically significant ($p = 0.025 < 0.10$; $r = 0.254$). Based on the results of the questionnaire adherence, TB patients demonstrated adherence to treatment which correlated with satisfaction with social support, but it did not correlate with the number of people providing the support. **Conclusion:** The satisfaction patients receive from their support providers can enhance adherence to TB treatment.

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INTRODUCTION

Tuberculosis (TB) remains a global public health issue caused by the bacterium *Mycobacterium tuberculosis*. It spreads through airborne droplets when an infected person coughs or sneezes. In 2022, the number of TB cases in Indonesia reached 677,464, an increase from 397,377 cases in 2021 (1). Thus, Indonesia ranks second after India as the country with the highest number of TB cases in the world (2). Indonesia has committed to reducing the number of TB cases by implementing control strategies during the 2020–2024 period to accelerate the elimination of TB by 2030 and end the epidemic by 2050 (3). Based on data released by the Yogyakarta City Health Office in 2021, there were 853 new TB cases. The TB treatment success rate in Yogyakarta City since

2010 is still below the national target 90%. The highest TB treatment success rate is in Bantul District at 91.5% and the lowest in Sleman District at 86.4% (4).

The success of TB treatment can be influenced by several factors such as age, gender, alcohol consumption, smoking, lack of sputum conversion at two months of treatment, and HIV status (5). In addition, stigma, discrimination, and the lack of support from both family and society can affect the success of treatment for TB patients, especially those with TB drug-resistant, leading them to discontinue the necessary treatment (6). TB patients who received psychological support from their families during TB therapy were less likely to skip doses and had better medication adherence if family members frequently supervised the medication, provided regular spiritual support, and had more knowledge about TB (7).

In order to enhance adherence with TB treatment, the WHO recommends the implementation of the DOTS

(Directly Observed Treatment Short-Course) program, which focuses on prevention, diagnosis, support, and care (8). In Indonesia this DOTS strategy has also been implemented with 5 main components as suggested by the WHO (9). To increase medication adherence, each patient must be accompanied by a PMO (Pengawas Minum Obat), who is responsible for directly monitoring medication intake, attending clinics to receive information about DOTS, and voluntarily supporting the TB patient throughout the treatment period, with this role potentially being fulfilled by family members (9,10). For instance, Chen (2020) found that regular family monitoring significantly improved adherence rates (11). Similarly, studies by Zhou (2012) and Nursasi (2022) demonstrated the impact of emotional and instrumental family support on adherence and treatment outcomes (12,13).

Social support can take the form of instrumental, emotional, appraisal, and informational assistance provided by family, friends, neighbors, coworkers, healthcare professionals, or fellow patients, playing a crucial role in helping individuals manage emotional stress, attain peace of mind, and adapt to social interactions (14). If TB patients do not receive proper care and supervision from their family and community, it may lead to non-compliance with TB treatment, potentially resulting in drug resistance, prolonged infectiousness, and even death (15).

Despite these findings, there is limited research on the influence of family social support in the Indonesian context, particularly in Sleman Regency. This study aims to fill this gap by exploring the relationship between family social support and medication adherence among TB patients in Sleman Regency

MATERIALS AND METHODS

Research Design

This study was an observational cross-sectional design conducted at thirteen at thirteen community health centers in the Sleman Regency, Yogyakarta-Indonesia. The data were collected from October to November 2023.

Study Population and sample

The target respondents who had been diagnosed with TB or undergoing treatment in primary health care centers in Sleman District and were older than 18 years old. The TB population in primary health care centers in Sleman District in 2023 were 300 people. Based on Slovin's formula for sample calculation, the minimum number of respondents involved in this study is 75, representing 25% of the total population with a confidence level of 90% and a margin of error of 10%. The selection of a 90% confidence level was based on the limited population size, ensuring that the sample remained representative without requiring an excessively large

sample size, which could have led to constraints in terms of time and resources.

Data collection

The sampling technique was done on a convenient basis. Data collection included socio-demographic characteristics, six questions from the Social Support Questionnaire (SSQ6), and five questions from the Medication Adherence Report Scale (MARS-5) questionnaire. The content validity of the questionnaire was ensured by consulting with experts in the relevant field. The experts were then asked to assess each questionnaire item using a Likert scale from 1 (not relevant) to 4 (highly relevant). Data were collected through an interviewer-administered questionnaire where questions were read out to the respondents and filled in by the researcher according to their answers. The data were collected by the first author (K) as an interviewer. Before the interview was conducted supervisors (AWW and CW) provided guidance to interviewers on the questionnaire administration procedures and interview techniques to ensure that all respondents received questions in a consistent manner. If patients did not understand the questions posed by the interviewer, the interviewer provided a brief explanation to ensure comprehension by the respondent. Moreover, interviews were scheduled at convenient times for the patients, and clear explanations were provided regarding the research objectives and the importance of their participation.

Instrument

The utilized measuring tool underwent a meticulous translation process from its original English version to Indonesian by a language expert from Faculty of Cultural Sciences, Universitas Gadjah Mada.

a. Family Social Support

In this study, the Six-Item Social Support Questionnaire (SSQ-6) developed by Sarason in 1987 was used for efficiency in field measurement due to its brief version. This questionnaire measures two aspects: Social Support Questionnaire Number (SSQN), which quantifies the number of sources of support up to a maximum of 9 subjects, and Social Support Questionnaire Satisfaction (SSQS), which measures satisfaction with support through a Likert scale from 1 (very dissatisfied) to 6 (very satisfied) (16).

b. Level of Adherence

The Medication Adherence Report Scale (MARS) was a questionnaire developed by Horn et al. MARS-5 consists of 5 items assessing non-adherence behaviors (forgetting, altering dosage, stopping medication, missing doses, and using medication differently from prescribed). Respondents' adherence levels were assessed by examining the frequency of responses to each question (always, often, sometimes, rarely, never), with scores ranging from always (1 point) to never (5

points). The total score from these 5 questions ranged from 5 to 25 points (17).

Study Ethics

This study was approved by the Ethics Committee of Universitas Gadjah Mada (Approval Number KE-FK-1580-EC-2023). Before data collection, participants were provided with comprehensive information about the study and asked to give their informed consent. After participating in the study, they received a souvenir as compensation.

Statistical Analysis

Univariate analysis was performed to descriptively summarize the research subjects. Bivariate analysis was conducted to examine the relationships between variables using Spearman's correlation test. Data analysis was carried out using IBM SPSS Statistics 25.0 software

RESULTS

Sociodemographic characteristics of TB patients

This study involved 78 TB patients spread across 13 primary health care centers in Sleman District. The respondents were mostly female (53.8%) with an average age between 18-64 years (82.1%), and married (69.2%). The majority had a low level of education (84.6%) and an income status below the regional minimum (89.7%). More than half were unemployed (53.8%). Most of the patients were in the advanced phase of treatment (64.1%) rather than the initial phase (35.9%), and their treatment duration was between 2 and 6 months (84.6%). However, some patients had to undergo treatment for 7–18 months (15.4%) due to persistent positive results of patient sputum examinations at the end of the 6th month of treatment, thus necessitating continued administration of anti TB drugs (OAT). Some patients also experienced multi-drug-resistant tuberculosis (MDR-TB), which required longer treatment. During TB treatment, patients primarily used anti-tubercular medications along with other therapeutic agents (70.8%), including vitamins and medications for conditions such as respiratory symptoms (e.g., cough suppressants), cardiovascular issues (e.g., antihypertensives), hypercholesterolemia (e.g., statins), gout (e.g., allopurinol), diabetes mellitus (e.g., insulin or oral hypoglycemic agents), HIV (e.g., antiretrovirals), and kidney disorders (e.g., nephroprotective agents) Table I.

Table I: Sociodemographic Characteristics of TB Patients

Sociodemographic Characteristics	F	%
1. Gender		
Male	36	46.2
Female	42	53.8
2. Age		
18-64 years	64	82.1
≥ 65 years	14	17.9
3. Education		
Low	66	84.6
High	12	15.4
4. Marital Status		
Married	54	69.2
Unmarried	24	30.8
5. Employment		
Employed	36	46.2
Unemployed	42	53.8
6. Monthly Income		
Below regional minimum	70	89.7
Above regional minimum	8	10.3
7. Treatment Phase		
Initensive Phase	28	35.9
Continous Phase	50	64.1
8. Treatment Duration		
2-6 months	66	84.6
7-18 months	12	15.4
9. Number of Medications Used		
TB medication only	23	29.5
TB medication along with other diseases	55	70.5

In Table II, the results indicate that the majority of TB patients live with families consisting of 1-4 members (71.7%). Additionally, some TB patients live alone or do not reside with their families (19.2%).

Table II: Number of family members living with TB patients

Number of family member	F	%
patient lives alone	15	19.2
1-4 people	56	71.7
5 or more people	7	8.9

Family and social support

According to the findings presented in Table III, the average score of the family Social Support Questionnaire (SSQN) indicates that individuals receive support from approximately two family members or other sources, with a mean value of 2.0917. As for family Social Support Satisfaction (SSQS), the results show a positive tendency towards feeling satisfied or very satisfied with the level of support received, with a mean value of 5.3605. Furthermore, the family Social Support Questionnaire (SSQN) shows a positive correlation with family Social Support Satisfaction (SSQS), with a p-value of 0.021 and a correlation coefficient (r) of 0.261, suggesting that the more support provided by the family, the higher the patient's level of satisfaction

Table III: Overview of the Quantity and Satisfaction of Family Social Support in TB Patients

Variables	Mean	SD	Min-Max	Spearman's rank correlation (r)	p value
Social Support Questionnaire Number (SSQN)	2,0917	1.05719	0,50-5,33	0.261	0.021*
Social Support Questionnaire Satisfaction (SSQS)	5,3605	0,51638	3-6		

Note: Spearman's rank correlation test;

In Table IV, most TB patients received support from their children (29.2%), but there were also 29.2% from parents and 14.2% from spouses (husband or wife). Patients also received support from friends (11.8%), neighbors (4.1%), and the community (1.7%). However, only 0.3% of patients received support from healthcare professionals.

Table IV: Sources of Family Social Support for TB Patients

No	Source of Family Support	F	%
1	Children	84	29.2
2	Mother / Father	48	16.7
3	Wife / Husband	41	14.2
4	Friend	34	11.8
5	Younger / Elder brother or sister	32	11.1
6	Sibling / daughter -in-law	12	4.1
7	Neighbor	12	4.1
8	Grandchild	6	2.0
9	Community health worker	5	1.7
10	Cousin / Nephew	5	1.7
11	Aunt / Uncle	4	1.3
12	Grandmother / Grandfather	3	1.0
13	Healthcare professionals	1	0.3

Medication Adherence

In Table V, the results indicate that the majority of TB patients adhere to their treatment regimen. For the item "forgetting to take medication," responses included "sometimes" (1.3%) and "rarely" (3.8%). Patients admitted to occasionally forgetting their medication due to being busy with work or studies and feeling tired or unmotivated during TB treatment. Regarding the item "stopping medication," responses included "often" (1.3%) and "rarely" (2.6%), attributed to patients feeling already healthy or experiencing excessive side effects.

Table V: Assessment of adherence based on each item of the MARS-5 questionnaire

Item	Always n (%)	Often n (%)	Sometimes n (%)	Rarely n (%)	Never n (%)	Mean $\pm$ SD
I forgot to take my medicine.	0 (0)	0 (0)	1 (1,3)	3 (3,8)	74 (94,9)	4,94 $\pm$ 0,295
I altered the dosage of my medication	0 (0)	0 (0)	0 (0)	0 (0)	78 (100)	5,00 $\pm$ 0,00
I stopped taking medication temporarily.	0 (0)	1 (1,3)	0 (0)	2 (2,6)	75 (96,2)	4,94 $\pm$ 0,372
I decided to skip one dose of medication	0 (0)	0 (0)	0 (0)	0 (0)	78 (100)	5,00 $\pm$ 0,00
I took less medication than prescribed	0 (0)	0 (0)	0 (0)	0 (0)	78 (100)	5,00 $\pm$ 0,00

Note: 1 = Always; 2 = Often; 3 = Sometimes; 4 = Rarely; 5 = Never

In Table VI, the results indicate that the number of family social support (SSQN) does not have a significant impact on adherence ($p=0.380 > 0.10$), the correlation coefficient (r) is 0.10 and the confidence level 90% . However, satisfaction with family social support (SSQS) exhibits a positive correlation with adherence ($p=0.025 < 0.10$), a correlation coefficient (r) of 0.2545 and the confidence level 90%, it falls within the weak category (0.1-0.3), indicating that higher levels of family support lead to increased adherence to TB treatment.

Table VI. Relationship between the number of family social support and adherence

Variables	Adherence	
	Spearman's rank correlation (r)	p value
Social Support Questionnaire Number (SSQN)	-0.101	0.380
Social Support Questionnaire Satisfaction (SSQS)	0.254	0.025*

Note: Spearman's rank correlation test;

DISCUSSION

Tuberculosis is still a major public health concern in Indonesia and globally, and is one of the Sustainable Development Goals (SDGs) in health development. Indonesia ranks second in the world for TB cases after India, with new cases accounting for 13% of the total worldwide cases (1). This study found that TB patients are mostly female, which is different from the global trend. According to WHO data (2023), TB cases in males (52%) are more than those in females (32%). The study also found that the prevalence of TB is higher among males compared to females. The rates were 607.9 (95% CI: 558.6–661.2) and 463.0 (95% CI: 414.2–517.3) per 100,000 population, respectively (18). This difference may be attributed to the higher likelihood of daily smoking among males (47.3%) compared to females (1.2%) (19). Females were independent predictors of extrapulmonary TB with active pulmonary TB (ratio 4.35, 95% CI: 1.78–10.63) (20). Gender-specific differences in TB incidence may be due to communication dynamics rather than diagnostic or reporting differences (21), although gender is only one of several factors involved (22). Cellular immunity, hormones, iron metabolism, loss of income, financial barriers, and stigma may all be linked to specific gender differences in TB incidence (23,24,25).

In this study, TB patients were on average aged 18–64 years (82.1%) and married (69.2%). The Ministry of Health of the Republic of Indonesia (2022) data revealed that the highest number of TB cases was found in the 45–54 age group (16.8%), followed by the 25–34 and 55–64 age groups, both at 15%. The highest percentage of extrapulmonary TB patients in China were aged between 15–24 and 25–34 years old. In older adults, TB is commonly caused by previously dormant TB bacteria that became reactivated (26). However, some older adults can contract TB without exhibiting symptoms (27). While some older adults who have been infected with TB may eventually recover and test negative, a weakened immune system due to aging can increase the risk of TB, which can significantly impact the entire body and brain (26). The study suggests that a vast majority of TB patients have low education levels

(84.6%) and income below the minimum, with over half being unemployed (53.8%). Several research studies have linked TB diagnosis with socioeconomic factors such as residence, income, wealth, education level, and employment (28,29,30).

The study shows that most patients with TB received advanced treatment (64.1%), lasting between 2–6 months (84.6%), while a smaller number underwent treatment for 7–18 months (15.4%). The typical TB treatment involves two phases: an initial 2-month phase to disable TB bacteria, followed by a 4-month advanced phase to eliminate it (31). For MDRT-TB treatment, a longer duration of 18 to 20 months is required, including a combination of several second-line drugs that are more expensive and toxic than first-line drugs (32). During their treatment, most patients (70.8%) take TB drugs with other therapeutic medications. Patients who only use TB medication refer to those who take the TB drug regimen in the form of a fixed-dose combinations (FDCs) without any additional therapy for other diseases. On the other hand, patients who use TB medication along with treatment for other diseases are those who take the TB drug regimen in the form of a fixed-dose combinations (FDCs) while also receiving additional therapy for other conditions they may have. For instance, a TB patient who also has diabetes may need to take medications to manage their diabetes such as insulin or metformin. An overwhelming majority of TB patients (87.59%) follow their doctor's advice and consume additional drugs, such as hepatinica (33). However, one-third of them consume only TB drugs or no other disease therapy, mainly because they feel uncomfortable taking multiple medications every day (34). Not taking additional drugs can increase the risk of unwanted drug reactions that affect adherence to TB treatment (35,36).

The majority of TB patients in this study showed adherence to TB treatment, particularly among females. This finding is consistent with global TB data, which indicates that among 26 high-burden countries reporting treatment data in 2021, the treatment success rate was higher for females (90%) compared to males (88%) (2). Additionally, national TB data for 2022 also reflects a similar trend, with a treatment success rate of 87.9% for females and 85.4% for males (37). Adherence to TB treatment is a complex issue that is influenced by several factors. These factors include forgetfulness, lack of knowledge about TB and its treatment, poor mental health conditions, medication side effects, TB-HIV co-infection, being in the advanced treatment phase, inability to access healthcare services, high costs, and long waits for medication. According to the most common reason for patients not to take TB drugs is forgetfulness (34%) (38). Some patients decided to stop taking drugs (3.6%) because they experienced side effects of TB drug consumption and felt they had already recovered (39).

In this study, patients received support from two family members or individuals reported feeling satisfied or very satisfied with the assistance received during their treatment and a positive correlation was observed between the number of support providers (SSQN) and support satisfaction (SSQS) ($p = 0.021 < 0.05$). From the interview results, patients reported that the forms of support provided by their family members (children, spouses, and parents) included encouragement during treatment, showing care or empathy, expressing love and affection, financing the treatment, reminding them of their medication schedule, assisting with mobility to healthcare facilities, helping with household chores, and providing for their daily needs. Additionally, patients feel they receive minimal support from healthcare professionals, primarily due to the high workload and limited time available for personal interactions. This situation reduces the quality of interaction between healthcare providers and patients, leaving patients feeling neglected or lacking emotional support. A study conducted in the Philippines by Baniqued (2020) found that emotional support, such as empathy, compassion, and attention from healthcare workers like nurses, can significantly enhance patients' understanding and motivation in managing their health conditions. Furthermore, it helps patients address treatment barriers and cope with the social stigma often associated with TB (40).

The impact of TB on patients social and mental health can be significant. Family and social networks can play a critical role in supporting patients during treatment and providing patient-centered care (41). Studies have shown that attention and support from family members, such as children or spouses, can motivate patients to complete drug-resistant TB treatment successfully (42). Lack of social support can adversely affect adherence to medication, so providing assistance such as financial aid for transportation costs, food, and medication reminders can help patients stay on track (38). The correlation between satisfaction with family social support (SSQS) and adherence to TB treatment shows statistical significance and the correlation coefficient is weak ($p = 0.025 < 0.10$; $r = 0.2545$; confidence level 90%). However, this relationship remains important as it indicates that satisfaction with family social support plays a role in promoting treatment adherence. Additionally, this finding suggest that the quantity of social support is less important than their level of satisfaction with the support they receive. Greater perceived social support is associated with higher satisfaction with life, while the lack of support can reduce satisfaction (43). Support from family and close friends is beneficial in coping with mental health issues and overcoming difficult situations, boosting confidence, achieving life goals, and overall life satisfaction (44). To ensure effective support, family members should establish appropriate and consistent communication during treatment, provide attention and closeness to reinforce supportive behavior (45)

Healthcare professionals must also consider family members' views on patients' treatment needs to provide the necessary level of care (46).

Overall, this study can provide valuable insights into how family social support influences TB patient adherence and assist in designing more effective strategies to improve TB treatment outcomes in Sleman Regency. These insights could encourage families and communities to be more actively involved in supporting patients. Additionally, the study could pave the way for further research to explore other factors that influence TB treatment adherence in greater depth.

As a follow-up to these implications, several specific strategies are needed to enhance family support based on the findings of this study. One such strategy is improving communication between patients, families, and healthcare providers through intensive counseling. Healthcare professionals also need to be more proactive in involving family members, such as by providing more detailed explanations about the treatment schedule and the importance of adherence. With these measures, it is anticipated that patient adherence to TB treatment will increase, ultimately leading to better treatment outcomes.

There are several limitations to our study. Firstly, the research design uses a cross-sectional design that cannot be used to determine cause-and-effect relationships because data collection was done at the same time, limiting the analyzed data to the variables studied based on the research objectives. Secondly, there is the potential for selection bias and response bias. Selection bias may occur if the sample chosen does not fully represent the general population, which means the research findings may not accurately reflect conditions across the entire region. Response bias could also arise if respondents provide answers they believe align with the researchers' expectations rather than their actual experiences. Both types of bias can affect the validity and generalizability of the study results and diminish the accuracy of findings related to TB treatment adherence. Moreover, the use of a 90% confidence level in this study increases the likelihood of Type I errors (false positives), which may influence the interpretation of the findings. Therefore, future studies with a higher confidence level (95%) are needed to validate the results of this study and enhance the generalizability of the findings in a broader context.

CONCLUSION

Our study indicates that family social support can influence adherence to TB treatment. Effective support is not simply a matter of quantity, but also of quality. This is reflected in the degree of satisfaction that patients feel with the support they receive. Adequate support, tailored to the needs of TB patients, can provide satisfaction in their treatment. The importance of family or community involvement in achieving success in

the prolonged treatment of TB cannot be overstated. Therefore, we recommend further research using a higher confidence level (95%) to validate these findings and enhance their reliability. This would provide a more solid foundation for their application in shaping future policies or interventions aimed at improving TB treatment adherence. The current study serves as a starting point, offering valuable preliminary data that highlight areas requiring further investigation

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