INTERNATIONAL CONFERENCE
ON LIFESTYLE DISEASES AND NATURAL MEDICINE (ICOLIFEMED)
Nomor ISSN: 3124-1115

Family Physician Counseling, Family Support, and Medication Adherence Among Tuberculosis Patients

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ABSTRACT
Tuberculosis (TB) remains a major global health threat, where treatment success is critically dependent on long-term medication adherence. Non-adherence contributes to treatment failure, drug resistance, and continued community transmission. This study aimed to analyze the impact of family physician counseling and family support on treatment adherence among TB patients in Medan Marelan, an area with a high TB burden in Indonesia. A cross-sectional study was conducted with 55 TB patients selected through total sampling. Data on the quality of family physician counseling, level of family support, and treatment adherence were collected using validated questionnaires. The relationship between variables was analyzed using the Chi-Square test. The majority of patients received good quality counseling (72.7%) and were adherent to their treatment (76.4%). A highly significant association was found between the quality of family physician counseling and treatment adherence (p=0.000). Patients who received "good" counseling had an adherence rate of 95.0%, which dropped to 0% for those receiving "poor" counseling. Family support also showed a significant association with adherence (p=0.037), with 75.0% of patients with "good" support being adherent. In conclusion, quality of family physician counseling is a powerful determinant of medication adherence among TB patients, with family support also playing a significant role. Integrating structured, high-quality counseling into standard TB care is essential for improving treatment outcomes and advancing public health goals for TB elimination.

Keywords: *tuberculosis, treatment adherence, family physician counseling*

INTRODUCTION
Tuberculosis (TB) remains a significant global public health challenge. According to the 2024 Global Tuberculosis Report, an estimated 10.8 million new TB cases occurred worldwide in 2023, accompanied by 1.25 million deaths, reaffirming TB as one of the deadliest infectious diseases (World Health Organization, 2024). Indonesia ranks second globally in TB burden, with approximately 1.06 million reported cases and 134,000 deaths in 2023, as documented by the Indonesian Ministry of Health (Ministry of Health, Indonesia, 2023). These data underscore the urgency of addressing TB at the national level. The 2023 TB Control Report estimates the TB incidence in Indonesia at 387 per 100,000 population—equivalent to 1,090,000 new cases—with a mortality rate of 44 per 100,000 population (Ministry of Health, Indonesia, 2024). This figure indicates a persistently high trend compared to the 2018 Riskesdas survey, which estimated an incidence rate of 316 per 100,000 population (Adytia et al., 2022). In response, the global End TB strategy was developed around three main pillars: (1) integrated, patient-centered care and prevention; (2) robust policies and supportive systems; and (3) intensive research and innovation aimed at accelerating TB elimination by 2030 (Singh et al., 2020; WHO, 2024).

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Medication adherence constitutes a critical determinant for achieving cure, preventing relapse, and reducing drug resistance. However, the extended duration of therapy—lasting a minimum of six months—poses a significant challenge for patients (Ministry of Health, Indonesia, 2023; Ridho et al., 2022). Various factors influence adherence, including limited patient knowledge, social stigma, adverse drug effects, geographic and financial barriers such as distance to healthcare facilities and potential income loss, as well as insufficient social and family support (Berhimpong, 2021; Pradipta et al., 2021).

Multiple interventions have been developed to address these challenges. Evidence shows that patient education, healthcare worker support, and the use of digital reminder technologies significantly improve treatment outcomes (Liu et al., 2023). Specifically, digital adherence technologies (DATs) have demonstrated positive effects on TB patient adherence (Jerene et al., 2025). Additionally, family support—encompassing emotional, social, and financial assistance—plays a crucial role in motivating patients to complete therapy (Dachi et al., 2024; Gurusinga et al., 2024). In this context, the role of the family can be optimized through the concept of family support, wherein families not only function as passive medication observers but are actively equipped with knowledge, skills, and confidence to provide comprehensive support. This includes emotional support, management of side effects, and ensuring adequate nutrition to foster a maximally supportive environment. Counseling provided by healthcare professionals has also been shown to effectively enhance adherence through education and sustained support (Astuti et al., 2022).

Among these interventions, counseling by family physicians exhibits significant potential due to its comprehensive approach, which integrates education, emotional support, and monitoring to address socio-economic barriers (Maynard et al., 2023). Studies indicate that structured counseling interventions can improve adherence and reduce treatment default rates (Religioni et al., 2025). Nevertheless, research specifically and systematically evaluating the effectiveness of family physician counseling on TB medication adherence, particularly in resource-limited and disadvantaged settings, remains scarce (Burhan, 2024; Efendi et al., 2022). This research gap is particularly relevant in local contexts such as Medan Marelan District, one of the areas with a high notification rate of new TB cases in Medan City, where the Rengas Pulau Public Health Center reported 689 cases as of July 2024. Therefore, this study aims to analyze the impact of family physician counseling and family support on TB medication adherence in this region, intending to bridge the scientific evidence gap and strengthen the role of family physicians in the national TB control program.

METHODS

This study was designed as an observational analytical study employing a cross-sectional approach. The study was conducted in Medan Marelan Subdistrict, under Medan Marelan District, Medan City. The entire research process, including data collection and preliminary analysis, was scheduled over a four-month period from April to July 2025. The target population consisted of all patients diagnosed with active tuberculosis residing in Medan Marelan Subdistrict. Given the relatively small and accessible target population of 55 individuals, purposive sampling was employed. Thus, all eligible individuals within the population were included as study participants, resulting in a sample size of 55 respondents.

Inclusion criteria encompassed patients confirmed positive for TB via sputum smear results (BTA 1, 2, or 3) who consented to receive counseling sessions from family doctors. Additionally, patients and their family members were required to communicate effectively in the language used during the study. Patients with comorbid chronic illnesses potentially confounding the study results, such as severe cardiovascular diseases or cancer, were excluded. Exclusion criteria included subjects experiencing serious complications (such as

Nomor ISSN: 3124-1115

amputations, end-stage renal failure, or severe visual impairments) that could impede participation. Further exclusions applied to patients with severe comorbid conditions (e.g., significant cardiac disease or mental disorders affecting self-care capacity), pregnancy, notable cognitive impairments, severe mobility limitations, or inability to communicate effectively in Indonesian. Non-cooperative patients or families unwilling to comply with all study procedures were also excluded.

This research involved two independent variables and one dependent variable. The independent variables were family doctor counseling. The dependent variable was TB treatment adherence. Family doctor counseling defined as the interaction between the family physician and the TB patient involving the provision of information, education, emotional support, motivation, and guidance concerning treatment. This variable was measured using a questionnaire developed to assess these aspects. Scores were classified on an ordinal scale: Good (≥ 75%), Moderate (56–74%), and Poor (≤ 55%). Family support defined as the active efforts made by the family to support the patient, including monitoring medication intake, providing motivation and emotional support, assisting in nutritional fulfillment, and involvement in health-related decision-making. This variable was measured via a questionnaire with relevant indicators, presented on an ordinal scale: High (≥ 75%), Moderate (56–74%), and Low (≤ 55%). TB Treatment Adherence refers to the extent to which patients follow the prescribed Anti-Tuberculosis Medication (OAT) regimen concerning dosage, schedule, and duration, as well as attendance at routine follow-ups. This variable was measured using the validated Morisky Medication Adherence Scale (MMAS-8). Scores were categorized into two ordinal groups: Adherent (> 6) and Non-adherent (≤ 6).

Data collection commenced after obtaining administrative approvals. The researchers submitted a research permit request to the educational institution (UNPRI), which forwarded the permission letter to the authorities in Medan Marelan Subdistrict. Upon receiving approval, eligible respondents were identified from existing TB patient registries and screened according to the inclusion and exclusion criteria. Each eligible respondent received a detailed explanation regarding the study's objectives, benefits, risks, and procedures. After obtaining informed consent, primary data were collected using several instruments. The main instrument was a structured questionnaire administered to participants to assess family doctor counseling, family support, and treatment adherence variables. To enrich understanding, structured interviews were also conducted with patients and their families to explore experiences and challenges encountered. Additionally, direct observations of counseling sessions at local health facilities were performed, and secondary data were gathered from medical records to supplement information.

Following data collection, the dataset underwent systematic processing. Initial steps included data editing to verify completeness and consistency, coding to assign numerical values to responses, and entry into SPSS statistical software. The cleaned data were tabulated to present frequency distributions and percentages for ease of interpretation.

Statistical analysis proceeded in stages: univariate analysis described respondents' demographic characteristics and variable distributions. Bivariate analysis was then conducted to test hypotheses concerning relationships between independent and dependent variables. Due to the ordinal nature of the data, appropriate statistical tests included Spearman's rank correlation or Chi-square tests, chosen according to specific analytical objectives. The

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significance threshold was set at $\alpha = 0.05$. If warranted, multivariate analysis using logistic regression was available as an optional step to identify the most influential independent variables affecting TB treatment adherence.

This study adhered strictly to ethical principles in health research to safeguard participants' rights and welfare. The principle of autonomy (respect for persons) was upheld by providing comprehensive information through informed consent and allowing voluntary participation without coercion. Beneficence was ensured by aiming for findings that could enhance healthcare service quality. Non-maleficence was maintained by guaranteeing study procedures posed no physical or psychological harm to participants. Justice was observed by treating all participants fairly and equitably without discrimination. Finally, confidentiality was preserved by anonymizing participants' identities in research instruments and reporting data only in aggregate form to protect individual privacy.

RESULTS

Based on Table 1, data collected from 55 tuberculosis (TB) patients revealed various demographic characteristics and study variables. Regarding gender, the majority of respondents were male (n = 34; 61.8%), while females accounted for 21 individuals (38.2%). The age distribution indicated that TB predominantly affects the productive age groups, with the 26–35 years category being the largest (n = 22; 40.0%), followed by the 15–25 years group (n = 15; 27.3%). Conversely, the oldest age group (>45 years) was the smallest, comprising only 7 patients (12.7%). In terms of educational attainment, most respondents had a high school education background (SMA), totaling 36 individuals (65.5%), suggesting that TB patients tend to come from populations with a secondary education level.

Table 1. TB patient characteristics (n=55)

Variable	n	%
Gender		
Male	34	61,8
Female	21	38,2
Age Group (years)		
15-25	15	27,3
26-35	22	40,0
36-45	11	20,0
>45	7	12,7
Highest Level of Education		
Elementary school	5	9,1
Junior high school	10	18,2
Senior high school	36	65,5
Higher education	4	7,3
Quality of Family Doctor Counseling		
Good	40	72,7
Fair	10	18,2
Poor	5	9,1
Family Support		
Good	16	32,0
Fair	15	30,0
Poor	19	38,0
Adherence Level		
Adherent	42	76,4

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Non-adherent	13	23,6

Regarding the quality of counseling by family doctors, the majority of respondents (n = 40; 72.7%) rated the counseling as good. Only a small proportion (n = 5; 9.1%) perceived the counseling as inadequate. Family support levels showed more variability: although 19 respondents (38.0%) reported receiving insufficient family support, a notable number (n = 16; 32.0%) perceived their family support as good. Finally, among the 55 patients, most demonstrated a high level of treatment adherence. Specifically, 42 individuals (76.4%) were compliant with their treatment regimen, whereas 13 patients (23.6%) were non-adherent. These data provide an overview of the TB patient population characteristics and related variables, which will be analyzed further.

Table 2. Relationship between the quality of family doctor counseling and family support with tuberculosis treatment adherence

Variable	Adherence Level		Total	p
	Adherent	Non-adherent		
Quality of family doctor counseling				
Good	38 (95,0%)	2 (5,0%)	40 (100%)	0,000
Fair	4 (40,0%)	6 (60,0%)	10 (100%)	
Poor	0 (0,0%)	5 (100,0%)	5 (100%)	
Family support				
Good	12 (75,0%)	4 (25,0%)	16 (100%)	0,037
Fair	8 (53,3%)	7 (46,7%)	15 (100%)	
Poor	5 (100,0%)	0 (0,0%)	5 (100%)	

Table 2 presents the association between the quality of counseling by family doctors, family support, and TB treatment adherence. Bivariate analysis assessing the relationship between independent variables (quality of counseling by family doctors and family support) and the dependent variable (treatment adherence) revealed statistically significant associations, as shown in Table 2. Analysis of the quality of counseling variable demonstrated a strong relationship with patient adherence. Among the 40 respondents who received good quality counseling, the vast majority (n = 38; 95.0%) adhered to treatment. In contrast, adherence decreased markedly in the group receiving moderate counseling, with only 4 out of 10 patients (40.0%) complying. A more pronounced effect was observed in the group receiving poor-quality counseling, where none of the respondents (0%) were adherent. Statistical testing confirmed a highly significant association between the quality of counseling by family doctors and treatment adherence ($p = 0.000$, $p < 0.05$).

Furthermore, family support was also found to be significantly associated with treatment adherence. In the group reporting good family support, adherence was 75.0% (12/16 respondents). The adherence rate was somewhat lower in the moderate support group at 53.3% (8/15 respondents). Interestingly, in the group reporting poor family support, all respondents (100%) were adherent to treatment. This association between family support and adherence was statistically significant ($p = 0.037$, $p < 0.05$).

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DISCUSSION

This study aimed to analyze the relationship between the quality of family doctor counseling, family support, and treatment adherence among tuberculosis patients in Medan. The findings highlight several key points for discussion, particularly regarding the powerful influence of clinician-patient communication and the nuanced role of family dynamics in TB care.

The demographic profile of the respondents—predominantly males (61.8%) in their productive years (ages 26-35) with a high school education (65.5%)—is largely consistent with national and global TB epidemiology. These groups often face higher risks of exposure due to social mobility, workforce participation, and potential lifestyle factors, underscoring that the study sample is representative of a typical high-burden population.

The central finding of this research is the exceptionally strong and statistically significant relationship between the quality of family doctor counseling and treatment adherence ($p = 0.000$). The data shows a clear dose-response effect: as the perceived quality of counseling improved, the likelihood of adherence increased dramatically, from 0% in the "poor" counseling group to 95% in the "good" counseling group. This powerfully underscores the pivotal role of the family doctor not just as a prescriber of medicine, but as a crucial enabler of treatment success. Effective counseling likely enhances patient understanding of the disease, builds trust, helps in managing medication side effects, and motivates patients to complete the long treatment journey. This aligns with the first pillar of the global End TB strategy, which emphasizes integrated, patient-centered care.

The relationship between family support and adherence was also statistically significant ($p = 0.037$), though the results were more complex. As expected, patients with "good" support showed high adherence (75.0%). However, the finding that 100% of patients (n=5) reporting "poor" family support were adherent is counterintuitive and requires cautious interpretation. This is most likely a statistical anomaly resulting from the very small number of respondents in that specific subgroup. With only five individuals, the result is highly susceptible to chance and cannot be generalized. It is also possible that patients who perceive a lack of external support may develop a stronger sense of self-reliance and personal responsibility for their health. Nevertheless, the overall significant p-value, supported by the higher adherence in the "good" support group compared to the "fair" support group, confirms that family support is, on the whole, a vital factor in promoting treatment adherence, a finding well-supported by existing literature (Dachi et al., 2024; Gurusinga et al., 2024).

The findings from this study have significant practical implications for TB control programs, particularly in urban settings like Medan. The most direct implication is the need to invest in training and capacity building for family doctors and healthcare workers. 🩺 Training should focus on patient-centered communication techniques, empathy, and providing clear, actionable information about TB and its treatment, as improving counseling quality appears to be one of the most effective levers for boosting treatment adherence. Furthermore, interventions must be designed to actively engage and educate families. Instead of assuming support will be present, health programs should provide families with the knowledge and tools

Nomor ISSN: 3124-1115

to become effective partners in care. This includes information on the importance of adherence, how to manage side effects, and providing emotional encouragement.

It is important to acknowledge the limitations of this research. A primary limitation is the small sample size (n=55), especially within subgroups like the "poor" family support category, which restricts the generalizability of the findings and may lead to statistical anomalies. Another consideration is the cross-sectional design, which establishes an association between the variables but cannot prove causation; it is unclear whether good counseling causes adherence or if adherent patients are more likely to perceive their counseling experience positively. Finally, the data on counseling quality and family support were based on patient self-reports, which can be influenced by recall bias or a desire to provide socially desirable answers.

CONCLUSION

In conclusion, this study powerfully demonstrates that the quality of communication and counseling from family doctors is a primary determinant of treatment adherence among TB patients. While family support is also a significant factor, the direct influence of the healthcare provider appears paramount. Based on these findings, it is recommended that future public health initiatives prioritize improving the quality of clinical counseling as a core strategy for TB control. Future research should utilize a larger, prospective cohort design to confirm these findings, establish causality, and explore the specific components of counseling that are most effective.

ACKNOWLEDGEMENT

We sincerely thank all participants for their contributions, which were pivotal to the successful completion of this study.

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