The Relationship Between Anthelmintic Therapy Compliance and The Health Status and Quality of Life of Young Adults

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Abstract

Helminth infection remains a significant public health concern that may affect the health status and quality of life of young adults living in high-risk areas. However, this productive age group is often under-represented in soil-transmitted helminth (STH) research. This study aims to examine the relationship between adherence to anthelmintic therapy and both health status and quality of life among young adults in the working area of UPT Puskesmas Stabat. An analytic cross-sectional design was employed. A total of 47 young adults (aged 18–25 years) with a history of anthelmintic therapy in the previous 6–12 months were recruited through purposive sampling. Adherence was assessed using the modified 8-item Morisky Medication Adherence Scale (MMAS-8), health status with a validated complaints questionnaire combined with objective Body Mass Index (BMI) measurement, and quality of life with the WHO Quality of Life-BREF (WHOQOL-BREF) instrument covering the physical, psychological, social, and environmental domains. Data were analyzed using the chi-square test (with Yates correction or Fisher's exact test where appropriate) on collapsed 2×2 tables, complemented by odds ratios (ORs) with 95% confidence intervals (CIs) and the phi coefficients. Most respondents were female (57.4%), aged 22–25 years (51.1%), students (55.3%), and had a normal BMI (68.1%). Adherence was high in 68.1% and moderate in 31.9% of respondents; 61.7% had good health status and 72.3% reported high quality of life. Adherence was not significantly associated with health status ($\chi^2 = 2.11$; $p = 0.147$; OR = 2.51, 95% CI 0.71–8.86; $\varphi = 0.21$). In contrast, adherence was strongly and significantly associated with quality of life (Fisher's exact $p < 0.001$; $\varphi = 0.90$). Within the limitations of a cross-sectional design, higher adherence to anthelmintic therapy was associated with better quality of life but not with measurable health status. Strengthening adherence through education and health-promotion efforts may therefore enhance the quality of life of young adults

Keywords: Anthelmintic Therapy Adherence; Health Status; Quality of Life; Young Adults; Soil-Transmitted Helminth

INTRODUCTION

Soil-transmitted helminth (STH) infections remain among the most widespread parasitic diseases globally, particularly in low- and middle-income countries where poor sanitation and limited access to clean water persist (Agrawal et al., 2024). The World Health Organization estimates that approximately 1.5 billion people are infected worldwide. Periodic preventive chemotherapy with albendazole or mebendazole, combined with improved sanitation and health education, continues to be the cornerstone of control strategies, although the efficacy of

benzimidazoles varies accross helminth species (Bekele et al., 2024; Lubis et al., 2025; Sisay et al., 2024) . A recent Global Burden of Disease analysis confirmed that, despite decades of intervention, STH infections still accounted for an estimated 642.7 million cases and 1.38 million disability-adjusted life-years (DALYs) in 2021 (Chen et al., 2024).

In Indonesia, the prevalence of soil-transmitted helminth (STH) infections varies considerably across regions. Although mass drug administration has substantially reduced infection levels in several North Sumatran communities, ongoing transmission and pockets of higher prevalence continue to be reported (Ipa et al., 2024; Purba et al., 2023). The risk of infection is closely associated with sanitation, access to clean water, and clean-and-healthy living behavior (Perilaku Hidup Bersih dan Sehat, PHBS), such as handwashing with soap and the use of footwear. Poor personal hygiene and open defecation remain consistently correlated with STH incidence in local communities (Ipa et al., 2024; Rachmawati et al., 2025).

Biologically, chronic helminth infection is far from trivial. Hookworm causes chronic intestinal blood loss and iron-deficiency anemia, while *Ascaris lumbricoides* and *Trichuris trichiura* impair the absorption of protein, vitamins, and minerals, contributing to malnutrition, fatigue, and reduced physical and cognitive capacity (Furtado et al., 2024; Reddy et al., 2025; Servián et al., 2024). Helminths also modulate host immunity and are associated with low-grade inflammation, which may increase susceptibility to other diseases and metabolic risk factors (Maizels & Gause, 2023; Pham et al., 2023). These mechanisms provide a plausible pathway linking infection, and its treatment, to both objective health outcomes and subjective well-being.

Individual adherence to anthelmintic therapy is a decisive factor in infection control. High adherence during mass drug administration significantly increases the likelihood of interrupting transmission, whereas non-adherence sustains reinfection and undermines control programs (Maddren et al., 2023, 2024). From a behavioral perspective, adherence among young adults can be explained through the Health Belief Model and the Theory of Planned Behavior, in which perceived susceptibility, attitudes, subjective norms, and perceived control shape compliance intentions (Suh, 2021; Unni & Bae, 2022). Because young adults often perceive low personal risk and experience few symptoms, their adherence tends to be suboptimal.

Despite their contribution to community transmission, young adults considered a productive age group are rarely focus of STH research, which has traditionally targeted school-aged children. This creates a clear gap: little is known about how adherence to therapy relates not only to objective health outcomes but also to the subjective quality of life of young adults

in high-risk Indonesian settings. To address this gap, the present study analyzed the relationship between adherence to anthelmintic therapy and both health status and quality of life among young adults in the working area of UPT Puskesmas Stabat, North Sumatra.

METHODS

This study employed a quantitative observational analytical design with a cross-sectional approach. It was conducted at the Stabat Community Health Center (UPT Puskesmas Stabat) in Langkat Regency, North Sumatra Province, from January to March 2026. The source population consisted of young adult patients aged 18–25 years who were registered at the health center and had received anthelmintic therapy within the past 6–12 months. During the study period, all eligible young adults visiting the health center were consecutively invited to participate until the target sample size was achieved.

The minimum sample size was calculated using the Lemeshow formula for cross-sectional studies ($Z = 1.96$; $p = 0.5$; $d = 0.15$), yielding 43 respondents. To account for potential dropouts, 10% was added, resulting in a final target of 47 participants. Respondents were selected through purposive sequential sampling. Inclusion criteria were: age 18–25 years old, a history of anthelmintic use, and willingness to provide written consent. Exclusion criteria included severe chronic disease, cognitive impairment, or incomplete questionnaire data. A total of 47 respondents met all criteria and were included in the analysis.

Three instruments were used.

(1) Adherence to anthelmintic therapy was measured using a modified Morisky Medication Adherence Scale (MMAS-8), a widely validated self-report tool for medication-taking behavior (Nguyen et al., 2014; Lam & Fresco, 2015). Total scores were categorized as High (score of 8), Moderate (6–7), and Low (≤5).

(2) Health status was assessed by combining a validated health complaints questionnaire combined with an objective Body Mass Index (BMI) measurement (weight in kg divided by height in m^2). Health status was categorized as Good (high questionnaire score and normal BMI), Fair (one of the two suboptimal), and Poor (low score and/or abnormal BMI).

(3) Quality of life was measured using the WHOQOL-BREF, which evaluates physical, psychological, social, and environmental domains. Total scores (0–100) were categorized as High (≥75), Moderate (60–74), and Low (<60) (World Health Organization Quality of Life Group, 2012; Young et al., 2020).

Instrument validity was tested using Pearson's product-moment correlation, and reliability was assessed with Cronbach's alpha in the study sample ($n = 47$). With $df = n - 2 =$

45 and $\alpha = 0.05$ (two-tailed), the critical r value is 0.288. All items in the adherence (B1–B5), health status (C1–C5), and quality of life (D1–D8) questionnaires exceeded this threshold (lowest r = 0.541), confirming validity. All subscales demonstrated acceptable reliability (Cronbach's alpha > 0.70).

Data were analyzed using IBM SPSS Statistics version 26. Univariate analysis described respondent characteristics. For bivariate analysis, because no respondents fell into the Low adherence category and some contingency table cells had low frequencies, categories were collapsed into a 2×2 format: adherence (High vs. Moderate), health status (Good vs. Suboptimal [Fair + Poor]), and quality of life (High vs. Low [Moderate + Low]). Associations were tested using the chi-square test, with Yates' continuity correction or Fisher's exact test applied when expected cell counts were <5. The strength of associations was reported using odds ratios (OR) with 95% confidence intervals (CI) and the phi coefficient. Statistical significance was set at p-value < 0.05.

All respondents received an explanation of the study objectives and provided written informed consent prior to participation. Participation was voluntary, and data were kept confidential and anonymized. The research protocol was reviewed and approved by the Health Research Ethics Committee of Prima Indonesia University, in accordance with the principles of the Declaration of Helsinki.

RESULTS

Table 1. Characteristics of Respondents

Variables	F	%
Gender		
Female	27	57.4
Male	20	42.6
Age		
18-21 years	23	48.9
22-25 years	24	51.1
Employment Status		
Student	26	55.3
Employed	21	44.7
BMI		
Normal	32	68.1
Abnormal	15	31.9
Anthelmintic Therapy Compliance		
High	32	68.1
Moderate	15	31.9
Low	0	0
Health Status		
Good	29	61.7
Fair	17	36.2
Poor	1	2.1
Quality of Life		
High	34	72.3
Medium	10	21.3
Low	3	6.4
Total	**47**	**100.0**

Of the 47 respondents, most were female (57.4%), aged 22–25 years (51.1%), students (55.3%), and had a normal BMI (68.1%). Adherence to anthelmintic therapy was high in 32 respondents (68.1%) and moderate in 15 (31.9%); none had low adherence. Overall, most respondents demonstrated good health status (61.7%) and a high quality of life (72.3%).

Table 2. The Association between Anthelmintic Therapy Adherence and Health Status

Adherence	Good	Suboptimal*	Total	p / OR (95% CI)
High	22 (68.8%)	10 (31.2%)	32 (100%)	p = 0.147
Moderate	7 (46.7%)	8 (53.3%)	15 (100%)	OR 2.51
Total	**29 (61.7%)**	**18 (38.3%)**	**47 (100%)**	(0.71–8.86)

**Suboptimal = Fair + Poor. $\chi^2 = 2.11$, df = 1, p = 0.147 (Fisher's exact p = 0.202); φ = 0.21.*

Among the 32 respondents with high adherence, 22 (68.8%) had good health status, compared with 7 of 15 (46.7%) among those with moderate adherence. Although high adherence was descriptively associated with better health status (OR = 2.51), the association was not statistically significant ($\chi^2 = 2.11$; p = 0.147), and the 95% confidence interval for the OR included1.0. The phi coefficient (0.21) indicated a weak association.

Table 3. The Association between Anthelmintic Therapy Adherence And Quality Of Life

Adherence	High QoL	Lower QoL**	Total	p / φ
High	32 (100%)	0 (0%)	32 (100%)	Fisher's
Moderate	2 (13.3%)	13 (86.7%)	15 (100%)	p < 0.001
Total	**34 (72.3%)**	**13 (27.7%)**	**47 (100%)**	φ = 0.90

***Lower QoL = Medium + Low. Fisher's exact test used because one expected count was <5; φ = 0.90 indicates a very strong association.*

All 32 respondents with high adherence reported high quality of life (100%), whereas among those with moderate adherence only 2 (13.3%) reported high quality of life and 13 (86.7%) reported lower quality of life. The association was strong and statistically significant (Fisher's exact p < 0.001; φ = 0.90). Because the high-adherence group contained no respondents with lower quality of life (an empty cell), the odds ratio could not be estimated reliably. The very high phi coefficient should therefore be interpreted as evidence of a strong association rather than a precise effect size.

DISCUSSION

Adherence to anthelmintic therapy and health status

Adherence to anthelmintic therapy was not significantly associated with health status (p = 0.147). One possible explanation is that health status in young adults is influenced by multiple factors beyond deworming, such as nutrition, diet, physical activity, sanitation, and socioeconomic conditions, whose combined effects may outweigh the impact of therapy alone.

This interpretation is consistent with findings from a systematic review, reporting that changes in general health parameters following anthelmintic treatment are often inconsistent, particularly among individuals who are already relatively healthy (Pham et al., 2023).

The non-significant result may also reflect the distribution of the data. Most respondents had high adherence and good health status, while only one respondent fell into the poor health category. This imbalance reduced statistical power and limited the ability to detect a true association. The descriptive trend toward better health among adherent respondents (OR = 2.51) is consistent with findings in chronic-disease populations, where non-adherence is linked to poorer self-rated health (Cruz et al., 2024). However, because anthelmintic therapy is short-term and worm-related symptoms in young adults are often mild or absent, its impact on measurable health status is less pronounced.

Adherence to anthelmintic therapy and quality of life

In contrast, adherence was strongly associated with quality of life ($p < 0.001$). Quality of life reflects an individual's subjective perception of physical, psychological, social, and environmental well-being. Regular therapy may alleviate symptoms such as fatigue, digestive discomfort, and reduced appetite, thereby enhancing perceived well-being (World Health Organization Quality of Life Group, 2012). This finding aligns with evidence that medication adherence is closely linked to improved quality of life across age groups and conditions (Cruz et al., 2024).

The finding is also consistent with research in younger populations. A meta-analysis of children, adolescents, and young adults reported that interventions enhancing medication adherence significantly improved well-being and quality of life (Mcgrady et al., 2025). Similarly, a mixed-method study in Indonesia found that lower adherence was associated with poorer quality of life, including activity limitations and reduced social functioning (Munira et al., 2025). These studies support the plausibility of the association observed here. It must be emphasized, however, that the cross-sectional design precludes any causal inference: the data demonstrate that adherence and quality of life co-occur, but do not establish that adherence improves quality of life.

Limitations

Several limitations should be considered. First, the cross-sectional design captures associations at a single time point and cannot establish causality or temporal sequence. Second, the sample was small (n = 47), drawn from a single health center, and unevenly distributed across outcome categories, which reduced statistical power for the health-status analysis. Third, for the quality-of-life analysis the high-adherence group contained no respondents with lower

quality of life (quasi-complete separation); this produces an unusually "perfect" pattern and an unstable odds ratio, so the strength of the association may be overstated and requires confirmation in larger samples. Fourth, adherence was measured by self-report (MMAS-8), which is subject to recall and social-desirability bias, and infection status was not confirmed parasitologically. Finally, potential confounders such as socioeconomic status, diet, and environmental sanitation were not controlled. These limitations mean the results should be interpreted with caution and regarded as hypothesis-generating.

Implications

Within these constraints, the findings suggest that strengthening adherence to anthelmintic therapy may be a useful focus for programs aimed at supporting the quality of life of young adults. Practical strategies include individual counseling, medication reminders, and campus- or community-based education delivered through digital and interactive media, to which young adults tend to respond well. Because adherence alone was not associated with measurable health status, efforts to improve health should remain comprehensive, combining therapy with better nutrition, hygiene, sanitation, physical activity, and reinfection prevention.

CONCLUSIONS

Among young adults at UPT Puskesmas Stabat, adherence to anthelmintic therapy was not significantly associated with health status but was strongly associated with quality of life. Given the cross-sectional design and the small, imbalanced sample, these associations should be interpreted cautiously and not as causal effects. The results nonetheless support continued health promotion and education on the importance of treatment adherence and clean-and-healthy living behavior through diverse channels, including social media and campus seminars. Future studies with larger, more balanced samples, multiple sites, parasitological confirmation, and adjustment for socioeconomic, dietary, and environmental factors are needed to clarify the determinants of health status and quality of life in this productive age group.

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