The Open Public Health Journal
DOI: 10.2174/0118749445146626052011054 2, 2026, 19, e187494451466

ISSN: 1874-9445
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RESEARCH ARTICLE **OPEN ACCESS**

HIV Status and Psychological Resilience among Tuberculosis Patients in VCT Services in Gorontalo City, Indonesia: A Cross-Sectional Study

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Abstract:

Introduction: HIV/AIDS and Tuberculosis (TB) cases in Indonesia, including Gorontalo City, have shown a continued increase and present multifaceted health challenges that extend beyond medical issues to psychological aspects. TB patients living with HIV are particularly vulnerable to mental distress due to long-term illness and persistent social stigma. In this context, resilience plays an important role in supporting treatment adherence and overall well-being.

Methods: An analytical survey with a cross-sectional design was employed, involving 70 respondents. Respondents were recruited using a total sampling technique. Data were collected using structured questionnaires and analyzed using the Chi-Square test. The analysis revealed a statistically significant relationship between HIV/AIDS status and resilience levels (p = 0.025).

Results: Interestingly, the findings indicate that TB patients with HIV-positive status tend to demonstrate higher levels of resilience compared to those who are HIV-negative, suggesting the presence of adaptive psychological mechanisms developed through prolonged engagement with healthcare services. The analysis revealed a statistically significant relationship between HIV/AIDS status and resilience levels (p = 0.025).

Discussion: These findings suggest that HIV-positive TB patients may benefit from stronger psychosocial support systems, including counseling and continuous interaction with health workers during the VCT process.

Conclusion: TB patients with HIV-positive status appear to exhibit better psychological adaptability and resilience, which may be influenced by family support, healthcare assistance, and counseling services. Therefore, VCT programs should be strengthened not only in terms of clinical care but also through comprehensive psychosocial interventions aimed at enhancing patient resilience.

Keywords: HIV/AIDS, Resilience, Tuberculosis, Mental health, VCT services, HIV-negative, Psychological aspects.

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Cite as: Irwan , Katili D, Una M, Popalo T. HIV Status and Psychological Resilience among Tuberculosis Patients in VCT Services in Gorontalo City, Indonesia: A Cross-Sectional Study. Open Public Health J, 2026; 19: e187494451466.
http://dx.doi.org/10.2174/0118749445146626052011054

Received: November 13, 2025
Revised: March 11, 2026
Accepted: April 15, 2026
Published: August 27, 2026

1. INTRODUCTION

The Human Immunodeficiency Virus (HIV) remains a critical pathogen that systematically undermines the host's immune integrity [1]. potentially progressing into Acquired Immunodeficiency Syndrome (AIDS) as its clinical zenith if left unmanaged [2, 3]. HIV attacks the body's white blood cells, weakening immune defenses. As a result, people become more susceptible to infectious diseases such as Tuberculosis (TB), opportunistic infections, and some cancers [4, 5]. HIV is transmitted through the bodily fluids of an infected person. These fluids include blood, breast milk, semen, and vaginal fluids. HIV is not transmitted through kissing, hugging, or sharing food. Mother-to-child transmission is also possible. Importantly, HIV can be prevented and treated with Antiretroviral Therapy (ART) [6, 7].

In 2024, an estimated 503,261 people in Indonesia will be living with HIV/AIDS. Of these, 351,378 are aware of their HIV status. A total of 217,482 (62%) are receiving Antiretroviral Therapy (ARV). Meanwhile, 99,463 people (46%) have undergone viral load testing. 91,662 (42%) achieved viral suppression. National HIV case detection increased from 2021 to 2023. This increase followed the rise in testing. Most people living with HIV (PLWHA) are aged 25–49 years (69.5%). The positivity rate remained stable at 0.9–1.1% [8].

Data released by the Gorontalo AIDS Commission (KPA) indicate a rising trend in HIV/AIDS cases in Gorontalo Province, with 991 cases recorded as of September 2023, an increase compared to 2021. The highest number of cases was found in Gorontalo Regency (284), followed closely by Gorontalo City (281). Other areas, including Pohuwato (125), Bone Bolango (120), Boalemo (98), and North Gorontalo (83), also contributed to the overall case burden.

According to the Gorontalo Provincial Health Office, a total of 4,681 Tuberculosis (TB) cases had been recorded as of November 11, 2024. However, the case detection and treatment coverage reached only 67%, which remains substantially below the national TB notification target of 90%. Despite this limitation, progress in early detection has been observed, as 72% of suspected TB cases in 2024 were examined using the GeneXpert (TCM) method. Individuals living with HIV/AIDS face a significantly higher risk of developing TB due to impaired immune function, and TB continues to be one of the leading causes of death among this population [6, 7, 9].

Voluntary Counseling and Testing (VCT) plays an important role in influencing the resilience of TB patients by improving their awareness and understanding of their health condition. Through the counseling process, patients receive emotional support and learn coping strategies that help them manage stress related to illness. In addition, VCT facilitates the early detection of TB and HIV, enabling timely and appropriate treatment. By strengthening patients' understanding of the importance of therapy and providing access to social support, VCT may also contribute to better treatment adherence [10]. Resilience is generally defined as an individual's capacity to adapt to and recover from challenges, stress, or adversity. Beyond enabling individuals to endure difficult situations, resilience allows for psychological growth and positive adjustment in the face of ongoing health problems [11, 12]. Higher levels of resilience have been associated with reduced stress, greater self-confidence, improved emotional regulation, and enhanced problem-solving and critical thinking abilities [12].

TB patients who demonstrate higher levels of resilience tend to cope more effectively with health-related challenges, including anxiety and stress associated with long-term treatment. This psychological capacity is often reflected in better adherence to therapy and an improved quality of life. In Gorontalo City, Voluntary Counseling and Testing (VCT) services were implemented across six priority groups, namely pregnant women (397 individuals), men who have sex with men (213), transgender individuals (15), female sex workers (18), TB patients (70), and individuals diagnosed with sexually transmitted infections (7). In addition, VCT services were voluntarily accessed by prospective brides and grooms as part of HIV testing efforts.

In Gorontalo City, a total of 720 individuals participated in Voluntary Counseling and Testing (VCT) services. As part of this process, individual resilience was assessed prior to the counseling session to evaluate participants' ability to accept and adapt to their HIV test results. Resilience is influenced by various factors, including self-awareness, social support, social environment, and an individual's level of knowledge regarding HIV/AIDS. In addition, counselors play a critical role in supporting this process by helping individuals gain self-understanding and address personal challenges encountered during VCT [13, 14].

Resilience in chronic illness has been widely explained through the protective factors model and stress-adaptation theory, which suggest that individuals develop psychological strength through exposure to adversity and the availability of supportive resources. In the context of chronic infectious diseases such as HIV/AIDS and tuberculosis, resilience may be shaped by continuous interaction with healthcare systems, counseling services, social support, and personal coping strategies. Individuals living with HIV often experience prolonged engagement with healthcare providers and psychosocial programs, which may gradually strengthen adaptive coping mechanisms and psychological resilience.

This research is considered scientifically important in light of the persistently high number of HIV/AIDS and TB cases in Gorontalo, which continue to pose challenges for the integration of health services, particularly in addressing patients' psychological needs. Understanding the relationship between HIV/AIDS status and resilience among TB patients is therefore essential, as it may inform interventions that go beyond clinical management and incorporate psychosocial support to improve treatment adherence and overall quality of life. The findings of this study are expected to provide a foundation for the

development of more comprehensive VCT and counseling services with a stronger emphasis on resilience-building. To date, this study represents the first investigation conducted in Gorontalo City to demonstrate that resilience among TB patients may be strongly influenced by family support. Patients who reported stronger family support tended to exhibit higher levels of resilience, which helped them cope more effectively with difficult health-related situations. These observations formed the basis and motivation for conducting the present study.

This study was conducted to examine the relationship between HIV/AIDS status and resilience levels among Tuberculosis (TB) patients undergoing Voluntary Counseling and Testing (VCT) services in Gorontalo City. In addition, the study sought to identify potential differences in resilience between TB patients with HIV-positive status and those who are HIV-negative. Based on these objectives, it was hypothesized that HIV/AIDS status is significantly associated with resilience levels and that TB patients with HIV-positive status demonstrate higher resilience than their HIV-negative counterparts.

An analytical survey design with a cross-sectional approach was employed to assess this relationship at a single point in time. The study involved 70 TB patients who accessed VCT services in Gorontalo City. Data were collected using a structured questionnaire and subsequently analyzed using the Chi-Square test to examine the association between the independent and dependent variables. This design was selected to provide a clear overview of the relationship between HIV/AIDS status and resilience within the study population.

2. METHOD

The study was conducted in healthcare facilities providing VCT services for TB patients in Gorontalo City, Indonesia. Participant recruitment took place from June to July 2025 and was carried out during routine visits of TB patients undergoing VCT. All patients who met the inclusion criteria during the study period were enrolled using a total sampling technique.

Criteria for inclusion covering TB patients aged ≥18 years who are undergoing VCT services and willing to follow the study with signed informed consent. Criteria for exclusion include patients who do not complete the VCT process, are unable to complete the questionnaire, or have an incomplete questionnaire. The research design used is a survey analysis with an approach cut at the latitude. The population comprises all TB patients who underwent VCT in Gorontalo City, and through total sampling, 70 respondents were selected as the study sample. The sample consisted of all TB patients who accessed VCT services during the study period. A total sampling approach was applied to minimize selection bias and ensure that all eligible participants were included.

Data collected using a questionnaire structured on a one-point time scale, without action carried out over a term length. Data were analyzed in SPSS using univariate analysis and the Chi-Square test to evaluate the association between HIV/AIDS status and resilience level, with a significance level of $p < 0.05$. This research has received a research ethics recommendation from the Health Research Ethics Commission of Gorontalo State University with number 224/UN47.B7/KE/2025.

Data sources include official VCT test results for determining HIV/AIDS status, as well as a resilience questionnaire that has been categorized into high, medium, and low based on scoring guidelines. Demographic data on age, type, gender, education, and social support were collected directly through questions. All method measurements were implemented in a uniform way in the HIV- positive group and HIV the HIV-negative group to ensure data. Variable exposure is HIV/AIDS status (positive/negative), whereas variable external is the level of resilience (high currently/ low). Potential confounding factors, such as age, type, gender, and participation in social support, are considered. Bias control efforts are made through total sampling to reduce selection bias, use instrument-consistent measurement to prevent information bias, and verify HIV status through official VCT data to avoid misclassification. Participants' confidentiality was strictly guarded to minimize answer bias. This study has received the committee's ethics institutions' agreement, and all respondents have given their agreement based on the information. In this research, quantitative variables such as age are recorded numerically, then grouped into categories to facilitate analysis and comparison.

Age grouping was based on the age ranges commonly used in health studies: young, adult, and elderly. Resilience was measured using the Connor–Davidson Resilience Scale (CD-RISC), a widely used instrument for assessing psychological resilience. The scale consists of items evaluating adaptability, emotional regulation, and the ability to cope with adversity. The instrument has demonstrated good reliability in previous studies, with reported Cronbach’s alpha values above 0.80. In this study, the questionnaire was administered in Indonesian and categorized into low, moderate, and high resilience based on the established scoring guidelines. This study employed an analytical cross-sectional design to examine the association between HIV/AIDS status and resilience among tuberculosis patients undergoing VCT services. Grouping is done to allow analysis connection using the Chi-Square test. HIV/AIDS status is categorized as HIV-positive and HIV- negative in accordance with VCT results. All grouping variables are quantitative to ensure suitability with the design analysis, and bivariate analyses are used with categorical data.

3. RESULTS AND DISCUSSION

During the study period, a total of 70 Tuberculosis (TB) patients who accessed Voluntary Counseling and Testing (VCT) services were identified as the study population. All identified patients fulfilled the inclusion criteria and were therefore included in the analysis. Given the cross-sectional nature of the study, follow-up assessments were not performed. No cases of non-participation were recorded, as all eligible TB patients agreed to participate

and completed the study questionnaire. Additionally, no patients were excluded due to incomplete VCT procedures or inability to complete the questionnaire at the time of data collection.

Of the total 70 respondents analyzed, the characteristics were demographic, clinical, and social, as described in the sample research. Characteristics: This also includes information on exposure and potential confounders used in the analysis. The main characteristics reported include: age (average and range), type of gender, level of education, employment status, support family (yes/no), duration of TB treatment, and HIV status (positive/negative). Resilience scores are also presented in three categories (resilience high, medium, and low) according to the instrument's scoring guidelines. All data collected were used in a structured questionnaire, and VCT medical and measurement methods were implemented consistently for every respondent, enabling comparison of inter-group validity. All 70 questionnaires were complete and valid for analysis; there is no missing data on the main variable.

3.1. Results

Based on Table **1**, the respondents' characteristics indicate that most are aged 18–65 years, namely 60 people (85.7%). Seven respondents (10.0%) were aged 66–79 years, while three respondents (4.3%) were aged 0–17 years. The distribution of HIV/AIDS status showed that 64 respondents (91.4%) were HIV-negative, while six respondents (8.6%) were HIV-positive.

The resilience level of TB patients undergoing VCT in Gorontalo City was categorized into three groups: high resilience (33 respondents, 47.1%), moderate resilience (21 respondents, 30.0%), and low resilience (16 respondents, 22.9%). The distribution of respondent characteristics is presented in Table **1**. Furthermore, the association between HIV/AIDS status and resilience levels among TB patients is presented in Table **2**.

As shown in Table **2**, all respondents with HIV-positive status (100%) were categorized as having high resilience, whereas HIV-negative respondents showed more varied resilience levels, including low (25.0%), moderate (32.8%), and high (42.2%). Statistical analysis using the Chi-Square test indicated a significant association between HIV/AIDS status and resilience levels (p = 0.025).

Table 1. Distribution of demographic and clinical characteristics of tuberculosis patients undergoing VCT services in Gorontalo city (n = 70).

Variable	Amount	
	n	%
Age		
0-17	3	4.3
18-65	60	85.7
66-79	7	10.0
Total	**70**	**100.0**
HIV/AIDS status		
Positive	6	8.6
Negative	64	91.4
Total	**70**	**100.0**
Resilience		
Low	16	22.9
Currently	21	30.0
Tall	33	47.1
Total	**70**	**100.0**

The level of resilience of patients with Tuberculosis (TB) undergoing VCT services in Gorontalo City is classified into three categories, namely high, medium, and low. In the results analysis of 70 respondents, it was found that a large number of patients show high resilience, namely 33 respondents (47.1%). Resilience was currently recorded in 21 respondents (30.0%), while low resilience was found in 16 respondents (22.%).9%).

Distribution level resilience according to HIV status shows a striking pattern. All respondents with HIV-positive status (6 respondents; 100.0%) were in category resilience high, and none of whom are included in category resilience currently and low. On the other hand, of the 64 respondents with HIV-negative status, 27 (42.2%) had resilience high, 21 (32.8%) were in the resilience moderate category, and 16 (25.0%) indicated resilience low.

Table 2. Association between HIV/AIDS status and categorized resilience levels among tuberculosis patients undergoing VCT services.

Variables	Resilience				Total				*p*-value
	Low		Currently		Tall		-		
	n	%	n	%	n	%	n	%	-
HIV status	-	-	-	-	-	-	-	-	-
Low	0	0.0	0	0.0	6	100.0	6	100.0	0.025
Tall	16	25.0	21	32.8	27	42.2	64	100.0	
Total	**16**	**22.9**	**21**	**30.0**	**33**	**47.1**	**70**	**100**	-

Note: Chi-Square test was applied to assess the association between variables; $p < 0.05$ indicates statistical significance.

The results of this study indicate a significant relationship between HIV/AIDS status and resilience levels in tuberculosis patients undergoing VCT services in Gorontalo City (p = 0.025). In accordance with the study's objectives, it was found that all HIV-positive TB patients were in the high resilience category, while variations in resilience levels were more common in HIV-negative patients. These findings support the hypothesis that HIV/AIDS status is associated with resilience levels and indicate a tendency for HIV-positive TB patients to have higher resilience levels than HIV-negative TB patients. No additional analyses, such as subgroup, interaction, or sensitivity analyses, were conducted in this study. The analysis was limited to examining the primary association between HIV/AIDS status and resilience levels among tuberculosis patients within the cross-sectional study design.

The relationship between tuberculosis and HIV/AIDS is widely recognized as both close and complex. Individuals living with HIV/AIDS face a substantially higher risk of developing TB due to compromised immune function. Consequently, TB remains one of the leading causes of death among people with HIV/AIDS, as the disease often progresses more rapidly and presents with greater severity in those with HIV infection [15, 16].

Individuals differ in their ability to adapt to life stressors, which is influenced by factors such as age, personal experiences, and the availability of social support. This variation is also evident among people living with HIV/AIDS, who often face substantial psychological challenges related to stigma, discrimination, and the burden of chronic illness [17, 18]. Despite these difficulties, many HIV-positive individuals develop strong resilience through a combination of internal coping strategies and external support from family, social networks, and spiritual practices. Such support appears to strengthen their motivation to regulate emotions, maintain psychological stability, and actively utilize available social and spiritual resources in daily life.

In contrast, HIV-negative respondents in this study were more often categorized as having moderate to low levels of resilience. This finding indicates that resilience is not determined by a single factor, but rather develops through the combined influence of psychological, social, and environmental conditions [17, 19].

These results are consistent with the findings reported by Folayan (2022), who noted that anxiety, fear of stigma, and concerns about social discrimination frequently lead individuals living with HIV/AIDS to withdraw from their social surroundings. Psychological distress may also encourage individuals to conceal their HIV status due to fear of judgment or social exclusion. From a cognitive perspective, some individuals initially perceive their condition as a barrier to productivity or social contribution, which can negatively affect their psychological well-being. Nevertheless, with adequate social and emotional support, many individuals gradually develop stronger resilience over time [17].

3.2. Resilience

The level of resilience among TB patients undergoing Voluntary Counseling and Testing (VCT) in Gorontalo City showed considerable variation. Based on the Connor–Davidson Resilience Scale (CD-RISC), 47.1% of respondents (33 individuals) were classified as having high resilience, while 30.0% (21 individuals) demonstrated moderate resilience, and 22.9% (16 individuals) were categorized as having low resilience. The CD-RISC assesses several dimensions of resilience, including self-confidence, emotional regulation, the ability to recover from adversity, and perceived social support.

Nearly half of the TB patients exhibited high levels of resilience, indicating a strong capacity to adapt to psychological challenges encountered during the VCT process. This higher resilience was commonly reflected in positive attitudes, adequate social support, and effective stress management when responding to the possibility of HIV/AIDS test results. These findings are consistent with those reported by Pitaloka (2024), who emphasized that resilience should be viewed not as a fixed personal trait, but as a dynamic process shaped by the interaction between internal strengths and external resources. Through this process, individuals gradually develop the ability to recover from negative experiences and adapt to demanding life circumstances [20, 21].

3.3. The Relationship between HIV/AIDS Status and Resilience

The analysis revealed a clear difference in resilience levels based on HIV/AIDS status among TB patients undergoing Voluntary Counseling and Testing (VCT) in Gorontalo City. All respondents with HIV-positive status (n = 6) were classified as having high resilience, with none falling into the moderate or low resilience categories. In contrast, resilience levels among HIV-negative respondents (n = 64) were more varied, with 16 individuals (25.0%) classified as having low resilience, 21 individuals (32.8%) demonstrating moderate resilience, and 27 individuals (42.2%) categorized as having high resilience. Statistical analysis using the Chi-Square test yielded a p-value of 0.025, indicating a significant association between HIV/AIDS status and resilience levels in TB patients.

These findings suggest that individuals living with HIV/AIDS may develop stronger psychological adaptation and higher resilience compared to those without the infection. This pattern is likely influenced by the emotional, instrumental, and social support received from family members, the surrounding community, and healthcare providers. Such support appears to play a crucial role in helping individuals manage stress, cope with psychological distress, and maintain emotional stability throughout the treatment process.

The results further indicate that HIV-positive respondents may have undergone a more intensive psychological adjustment process, which in turn supports better self-acceptance and the development of effective

coping strategies [22, 23]. Counseling and educational components delivered during the VCT process appear to contribute to this adaptation by helping individuals understand their condition, regulate emotions, and foster a more positive outlook, ultimately supporting improvements in quality of life [24].

In contrast, HIV-negative respondents classified within the low and moderate resilience categories may not experience a comparable level of psychological adjustment. They may also have fewer opportunities to develop coping strategies or to access targeted emotional and informational support, which can limit their ability to build resilience. Limited access to psychosocial resources may therefore contribute to the lower resilience observed in this group.

Overall, these findings highlight the important role of counseling, continuous health education, and psychosocial support in strengthening resilience among TB patients, regardless of HIV status. Enhancing these services may help improve psychological well-being and, ultimately, health outcomes. Nevertheless, the findings of this study should be interpreted with caution. The use of a total sampling approach within a specific population of TB patients undergoing VCT in Gorontalo City limits the generalizability of the results. In addition, the relatively small sample size, particularly the limited number of HIV-positive participants and the uneven distribution of HIV status, restricts the extrapolation of these findings to broader TB populations. Despite these limitations, the observed association offers preliminary insight and may serve as a reference for future studies conducted in different settings or with larger sample sizes to improve external validity.

One potential factor contributing to high resilience among HIV-positive respondents is receiving ongoing counseling, healthcare support, and psychosocial support. HIV-positive patients frequently communicate with healthcare providers for monitoring and treatment, providing emotional support and up-to-date information. Over time, this can strengthen psychosocial adaptation to chronic illness.

4. LIMITATIONS

This study has several limitations. First, the limited cross-sectional study design limits the ability to determine the association, connection, and causality between HIV/AIDS status and resilience. Second, the small sample size, particularly the number of HIV-positive respondents, may reduce the power of the analysis and the generalizability of the results. Third, the use of self-administered questionnaires may introduce information bias, even when the instrument is administered consistently to all respondents. The potential for misclassification of HIV status is very small but remains possible. Furthermore, several confounding factors were not analyzed multivariately, leaving residual bias that may influence the results. Therefore, the results should be interpreted with caution. Although demographic variables such as age, gender, and family support were collected, multivariable regression analysis was not conducted due to the limited number of HIV-positive participants, which could reduce statistical stability. Therefore, the analysis focused on bivariate associations.

CONCLUSION

Individuals living with HIV/AIDS demonstrated better psychological adaptation and greater resilience, supported by support from family, healthcare professionals, and counseling received during the VCT process. These findings highlight the importance of strengthening resilience as a key component in improving the quality of life and treatment success of Tuberculosis (TB) and HIV/AIDS patients. This study showed that all HIV-positive respondents demonstrated high resilience, while HIV-negative respondents were more prevalent in the moderate and low resilience categories. Therefore, it can be concluded that there is a significant relationship between HIV/AIDS status and resilience levels in TB patients undergoing VCT in Gorontalo City.

AUTHORS' CONTRIBUTIONS

The authors confirm contribution to the paper as follows: I.R. and D.K.: Contributed to the conceptualization and design of the study; T.N.: was responsible for data collection. Data analysis and interpretation were performed by I.R., D.K., and T.N., I.R. and D.K.: Drafted the manuscript, while T.N.: Critically revised it for important intellectual content. All authors reviewed the results, contributed to the discussion, and approved the final version of the manuscript.

LIST OF ABBREVIATIONS

TB	=	Tuberculosis
HIV	=	Human Immunodeficiency Virus
AIDS	=	Acquired Immunodeficiency Syndrome
ART	=	Antiretroviral Therapy
VCT	=	Voluntary Counseling and Testing
CD-RISC	=	Connor–Davidson Resilience Scale

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This research has received a research ethics recommendation from the Health Research Ethics Commission of Gorontalo State University, Indonesia with number 224/UN47.B7/KE/2025.

HUMAN AND ANIMAL RIGHTS

All human research procedures followed were in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013.

CONSENT FOR PUBLICATION

Signed informed consent was obtained from all participants.

AVAILABILITY OF DATA AND MATERIALS

All the data and supporting material are available within the article.

FUNDING

This study did not receive financial support from any external sources. All aspects of the research, including study design, data collection, analysis, and reporting, were conducted independently by the investigators.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

ACKNOWLEDGEMENTS

The authors express their deepest gratitude to the Gorontalo City Health Office for their permission and support throughout the research process. They also express their gratitude to all tuberculosis patients who participated in the VCT activities, as well as to the health workers. health and counselors who help with field data collection.

We extend our deepest gratitude to the Department of Public Health, Faculty of Sports and Health, Gorontalo State University, for the guidance, facilities, and academic support provided during the preparation of this research. It is hoped that the findings of this study will contribute positively to improving health services and strengthening the psychological well-being of HIV/AIDS and tuberculosis patients in Gorontalo.

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