Natural Resources for Human Health
eISSN: 2583-1194

Original Research

Received 22 July 2026
Revised 24 Aug 2026
Accepted 05 Sep 2026

Natural Resources for Human Health 2026, Vol. 6 (22s): 1087–1095

KEYWORDS:
Tuberculosis; National Health Insurance; healthcare access; treatment quality; primary healthcare; Indonesia.

Association Between National Health Insurance Implementation, Healthcare Access, and Quality of Tuberculosis Treatment at a Community Health Center in Eastern Indonesia: A Cross-Sectional Study

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ABSTRACT: **Background:** Tuberculosis (TB) remains a major public health problem in Indonesia, where the National Health Insurance (Jaminan Kesehatan Nasional, JKN) aims to widen access to care. Evidence from primary care in Eastern Indonesia is limited.

Objective: To examine the association between healthcare access and the quality of TB treatment among JKN-enrolled patients and to explore stakeholder perspectives on JKN-supported TB services.

Methods: A cross-sectional survey with a supplementary qualitative component was conducted at Klasaman Community Health Center, Sorong City, Indonesia, from July to October 2026. Sixty patients with TB were purposively recruited and completed a structured questionnaire; three informants (a patient, the TB programme officer and the JKN officer) were interviewed. Quantitative data were analysed using descriptive statistics and Pearson's correlation (SPSS version 26); interviews were analysed thematically.

Results: Most participants were female (55.0%), aged 20–35 years (46.7%), and recipients of government-subsidised JKN premiums (PBI; 76.7%). Mean scores were 21.97 (SD 3.31) for healthcare access and 22.20 (SD 3.63) for treatment quality. Access correlated positively with treatment quality (Pearson's $r = 0.635$, $p < 0.001$, $n = 60$). Five themes emerged: JKN improved service access; interprofessional collaboration supported integrated TB–JKN services; administrative and social barriers persisted; adherence depended on education, assistance and family support; and workforce capacity and digital referral systems required strengthening. **Conclusion:** Better access to services was associated with better perceived TB treatment quality, but the cross-sectional design precludes causal inference. Strengthening membership administration, referral systems, workforce capacity and patient support may improve TB care at the primary level.

1. INTRODUCTION

Tuberculosis (TB) remains one of the leading infectious causes of death worldwide. The World Health Organization (WHO) estimated that approximately 10.8 million people developed TB in 2023, and Indonesia ranked second among all countries in the number of incident cases, contributing roughly 10% of the global total [1]. The national incidence for 2023 corresponds to approximately 387 per 100,000 population [1].

TB control depends on the completion of a standardised multidrug regimen that lasts at least six months for drug-susceptible disease and is delivered under supervision according to the Directly Observed Treatment, Short-course (DOTS) strategy, including the involvement of a treatment supervisor (Pengawas Menelan Obat, PMO) [1,2]. Interrupted or incomplete treatment

can lead to treatment failure, relapse, drug resistance and continued transmission. Continuity of care therefore requires uninterrupted access to diagnostic services, anti-TB drugs, clinical monitoring, education and psychosocial support.

Indonesia introduced the National Health Insurance scheme (Jaminan Kesehatan Nasional, JKN) on 1 January 2014 as its main vehicle for Universal Health Coverage (UHC). The scheme is administered by the Social Security Administering Body for Health (BPJS Kesehatan) and has become one of the largest single-payer schemes in the world [3]. Membership is mandatory and is organised into categories that include premium-assistance recipients (Penerima Bantuan Iuran, PBI), wage earners (Pekerja Penerima Upah, PPU) and self-paying members [4,5]. TB diagnosis and treatment form part of the JKN benefits package, in parallel with the National TB Programme [6].

Insurance coverage is expected to lower financial barriers, but access to care is multidimensional. The patient-centred access framework of Levesque and colleagues describes access as the fit between the characteristics of services (approachability, acceptability, availability, affordability and appropriateness) and the abilities of patients to perceive, seek, reach, pay for and engage with care [7]. Evidence from Indonesia indicates that insurance alone does not guarantee financial protection: after the introduction of UHC, 36% of TB-affected households still experienced catastrophic total costs, with income loss and other non-medical costs among the main drivers [8]. Whether better access under JKN is accompanied by better-quality TB treatment at the service-delivery level therefore remains an empirical question.

Community health centers (Pusat Kesehatan Masyarakat, Puskesmas) are the first-level public facilities responsible for case finding, diagnosis, treatment initiation, adherence monitoring and health education for TB, and they are the main gatekeepers in the JKN referral system [2,9]. The quality of TB treatment at this level is shaped by drug availability, diagnostic capacity, staff competence, recording and reporting systems, and the administrative processes that connect the insurer with the facility.

Eastern Indonesia faces particular challenges in realising UHC, including archipelagic geography, an uneven distribution of health workers, and variation in the readiness of facilities. National assessments have noted that the availability and quality of primary care services, drugs and supplies, as well as fragmented health information systems, continue to constrain the translation of insurance coverage into effective care, with differences between urban and rural settings [3]. Sorong City, in Southwest Papua Province, is served by Puskesmas Klasaman, which participates in the national TB control programme.

Most evaluations of JKN have addressed health service utilisation or financing in general. Facility-level evidence that links patient-reported access and the quality of TB treatment, and that also considers the perspectives of programme staff, appears limited for the Papua region. This gap is relevant for policy because provider-level processes, such as referral behaviour, have been shown to influence TB service delivery under JKN [6].

This study therefore aimed to (i) describe patient-reported healthcare access and the quality of TB treatment among JKN-enrolled patients at Puskesmas Klasaman; (ii) examine the association between healthcare access and TB treatment quality; and (iii) explore how a patient, the TB programme officer and the JKN officer perceived facilitators of and barriers to JKN-supported TB services. The study contributes local evidence for strengthening TB services at primary healthcare facilities and for monitoring UHC in Eastern Indonesia. Because the design is cross-sectional, the findings are interpreted as associations rather than as effects of the policy.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

The study used a quantitative, analytical cross-sectional design [10], complemented by a small qualitative component consisting of semi-structured interviews with three key informants. The two components were conducted in the same setting and period and are reported side by side; the study is not presented as a fully integrated mixed-methods design [11], and the integration in Section 3.4 is interpretive. The study took place at Puskesmas Klasaman, Sorong City, Southwest Papua, Indonesia, from July to October 2026. The reporting follows the principles of the STROBE statement for the cross-sectional component and the COREQ/SRQR principles for the qualitative component.

2.2 Study Population and Participants

The target population comprised patients with TB who had received treatment in the DOTS programme at Puskesmas Klasaman for at least two months. Participants were selected by purposive sampling [12]. The inclusion criteria were (a) an

active JKN membership card, (b) currently receiving or having received TB treatment at Puskesmas Klasaman, and (c) willingness to participate. The target sample size was 60 participants, and 60 respondents were included in all quantitative analyses. The sample-size justification (the report cites a proportion-estimation formula with 95% confidence and a 10% margin of error, which would ordinarily yield about 96 participants unless a finite-population correction was applied), the number of eligible patients, how participants were approached, and any refusals.

For the qualitative component, three informants were interviewed: one patient (Informant 1), the TB programme officer (Informant 2) and the JKN officer (Informant 3) of the health center. Participant characteristics are reported as collected, without recoding.

2.3 Data Collection

Primary quantitative data were collected using a structured questionnaire administered to patients, covering access to services, use of the JKN card, and experiences of service quality. The explanatory variable was healthcare access in the context of JKN implementation (including ease of obtaining services, availability of medicines and treatment costs). The outcome variable was the quality of TB treatment, operationalised through the indicators specified in the study protocol: accuracy of diagnosis, availability of medicines and adherence to medication. Access and quality were each expressed as summed scores. The questionnaire was pre-tested with 10 respondents, and reliability was to be examined with Cronbach's alpha using a minimum acceptable value of 0.70 [12]. Semi-structured interviews were conducted with the three informants to explore facilitators of and barriers to TB services within the JKN framework. Medical records, TB programme reports and BPJS Kesehatan administrative data were identified in the protocol as supplementary information sources; no results derived from these sources are reported in this article.

2.4 Qualitative Data Analysis

Interview data were analysed thematically following the framework of Braun and Clarke [13]. The procedure comprised (1) familiarisation with the interview data; (2) generation of initial codes; (3) grouping of codes into categories; (4) development of candidate themes; (5) review and refinement of themes against the coded data; and (6) interpretation and reporting of the final themes, supported by data-display techniques [14]. Five themes were identified: (1) JKN improves access to and facilitates TB healthcare services; (2) integration of TB and JKN services through interprofessional collaboration; (3) administrative and social barriers to implementation; (4) medication adherence influenced by education, patient assistance and family support; and (5) the need to strengthen human resource capacity and digital referral systems. Quotations were translated from Indonesian into English for this article.

2.5 Statistical Analysis

Quantitative data were entered, coded and analysed using SPSS version 26. Categorical variables are presented as frequencies and percentages, and the access and quality scores as mean and standard deviation (SD). The association between the access score and the quality score was assessed with Pearson's product-moment correlation coefficient (r), with statistical significance (p) set at a two-sided level of 0.05. Where the software displayed $p = 0.000$, the value is reported as $p < 0.001$. The correlation analysis is unadjusted and does not allow causal inference.

2.6 Ethical Considerations

The study protocol received ethical approval from the Health Research Ethics Committee of Poltekkes Kemenkes Sorong (see Ethics Statement). Participation was voluntary, and the results are reported in aggregate form.

3. RESULTS AND DISCUSSION

3.1 Participant Characteristics

Table 1 summarises the characteristics of the 60 survey respondents. Slightly more than half were female (55.0%), and the largest age group was 20–35 years (46.7%). Senior high school was the most common level of education (41.7%), and 7 respondents (11.7%) had no formal schooling. Most respondents were PBI members (76.7%); five respondents (8.3%) did not know their membership category. Most respondents (83.3%) had been diagnosed with TB less than six months earlier, indicating that the sample consisted largely of patients in the early phase of treatment.

Natural Resources for Human Health
eISSN: 2583-1194

Table 1. Sociodemographic and Clinical Characteristics of the Study Participants (n = 60)

Characteristic	Category	n	%
Sex	Male	27	45.0
	Female	33	55.0
Age group (years)	< 20	4	6.7
	20–35	28	46.7
	36–50	17	28.3
	> 50	11	18.3
Educational attainment	No formal schooling	7	11.7
	Primary school	6	10.0
	Junior high school	13	21.7
	Senior high school	25	41.7
	Tertiary education	9	15.0
JKN membership category	PBI (government-subsidised premium)	46	76.7
	Self-paying (Mandiri)	7	11.7
	Wage earner (PPU)	2	3.3
	Do not know	5	8.3
Time since TB diagnosis	< 6 months	50	83.3
	6–12 months	1	1.7
	> 1 year	9	15.0

Percentages are calculated on n = 60 and may not sum to exactly 100.0 because of rounding. PBI, Penerima Bantuan Iuran; PPU, Pekerja Penerima Upah.

3.2 Qualitative Findings

Five themes were identified from the three interviews (Table 2). The themes are reported as the perceptions of the informants and are not generalisable to all patients at the health center.

Theme 1. JKN improves access to and facilitates TB services

This was the most prominent theme and was voiced across all three informants. The patient described fast service, simple administration, a relatively short waiting time, and no charge for treatment; the only cost that remained with the patient was transport to the health center. The TB programme officer and the JKN officer confirmed that JKN members could obtain services, supporting examinations and referral to hospital according to procedure. In the words of informants: "The service is excellent… I just come to collect my medicine" and "The medicine is free of charge."

Theme 2. Integration of TB and JKN services through interprofessional collaboration

The TB programme officer explained that TB services were delivered through collaboration among the physician, the TB programme officer and the JKN officer. Information systems (SIMPUS, P-Care and MiCare) supported administration and made services more efficient. The JKN officer added that diagnosis was solely the physician's responsibility, whereas JKN staff focused on verifying membership and managing referrals. Subthemes were good cross-professional coordination, integrated information systems, and easier referral through an application.

Theme 3. Administrative and social barriers to implementation

The informants reported that the JKN mechanism itself caused few problems. Barriers were instead located at the patient level: lack of a national identification number (NIK), inactive BPJS membership, frequent change of residence, limited family support,

and disruptions of the digital referral system when a quick referral was needed. As one informant put it, "There are some patients who do not have a national identification number (NIK)," and "If the person is nomadic, it makes service more difficult." These barriers were described as encountered among patients served by the health center and not necessarily among the surveyed respondents, all of whom held an active JKN card.

Theme 4. Adherence influenced by education, patient assistance and family support

Adherence was seen as depending on more than financing. The patient reported receiving education each time medicine was collected, reminders to take medication regularly, and an evaluation of the use of previously dispensed medicine. The JKN officer emphasised the roles of the PMO, active communication by health workers, family support and the patient's own motivation. JKN thus eased access, but treatment success was still described as needing behavioural and social support.

Theme 5. Need to strengthen human resource capacity and digital referral systems

Although implementation was considered to be running well, informants identified needs for training of newly assigned TB programme officers, a better electronic referral system, coordination across health facilities, stronger community education on the importance of seeking treatment, and improved validity of membership data.

Table 2. Summary of Qualitative Themes and Supporting Subthemes

Theme	Subthemes	Informants	Relevance
1. JKN improves access and facilitates TB services	Fast service; simple administration; treatment costs covered (transport remains a patient cost)	1, 2, 3	Healthcare accessibility; financial protection
2. Integration of TB and JKN services through interprofessional collaboration	Collaboration among physician, TB officer and JKN officer; supportive information systems; easier referral through an application	2, 3	Interprofessional collaboration; health system integration
3. Administrative and social barriers	No NIK or inactive BPJS membership; patient mobility; limited family support; digital referral disruption	2, 3	Administrative barriers; family support
4. Adherence influenced by education, assistance and family support	Medication reminders; routine monitoring; patient motivation; PMO and family role	1, 3	Treatment adherence; family support
5. Need to strengthen workforce capacity and digital referral	Training of new TB officers; improved referral system; cross-facility coordination; community education; valid membership data	2, 3	Healthcare system strengthening

Informant 1, patient; Informant 2, TB programme officer; Informant 3, JKN officer.

3.3 Association Between Healthcare Access and TB Treatment Quality

The mean healthcare access score was 21.97 (SD 3.31) and the mean TB treatment quality score was 22.20 (SD 3.63) among the 60 respondents (Table 3). There was a statistically significant positive correlation between healthcare access and TB treatment quality (Pearson's $r = 0.635$, $p < 0.001$, $n = 60$; Table 4). The coefficient indicates a moderate-to-strong association, with about 40% shared variance ($r^2 = 0.40$). Because the analysis is cross-sectional, it shows that respondents who reported better access also tended to report better treatment quality at the time of the survey, but it does not show that access or JKN caused the difference in quality.

Table 3. Descriptive Statistics of Healthcare Access and TB Treatment Quality

Variable	n	Mean	SD
Healthcare access	60	21.97	3.31
TB treatment quality	60	22.20	3.63

SD, standard deviation. Scores are summed questionnaire scores.

Table 4. Pearson Correlation Between Healthcare Access and TB Treatment Quality

Variable pair	n	Pearson's r	p (2-tailed)	r^2
Healthcare access × TB treatment quality	60	0.635	< 0.001	0.40

The correlation is significant at the 0.01 level (2-tailed). r^2 is derived from r.

3.4 Integrated Interpretation of Findings

The quantitative and qualitative components addressed the same setting and are considered together here interpretively; no formal joint display or triangulation protocol was applied. The positive correlation is compatible with the informants' accounts that easier access to services, including quick administration, free drugs and simple referral, goes together with continuity of care. Informants linked reduced direct financial barriers to JKN, although transport costs remained, which means that affordability was only partly addressed. Administrative problems such as missing NIK or inactive membership were described as the main routes by which access could be lost, and interprofessional collaboration was described as the mechanism that kept service delivery coordinated. Education, treatment supervision and family support were described as contributors to adherence, which is one of the indicators of treatment quality in this study. These statements should be read as hypotheses generated by the interviews: the survey did not measure education, supervision or family support, and the statistical association alone does not identify which of these mechanisms, if any, underlies it.

3.5 Discussion

Role of JKN in access to TB treatment. Informants consistently described fast services, simple administration and free medicines for members, which is in line with the aim of JKN to reduce financial barriers and with the inclusion of TB care in the benefits package [7,8]. The residual burden of transport costs mirrors national evidence that, even after UHC, non-medical costs and income loss leave many TB-affected households exposed to catastrophic costs [9]. Three quarters of respondents were PBI members, so JKN may be especially relevant for patients with low incomes, although household income was not measured in this study.[10,11]

Access and treatment quality. The positive correlation ($r = 0.635$) is consistent with the view that access is a precondition for continuous, good-quality care [12]. Several explanations are possible, and they are not mutually exclusive: better access may facilitate uninterrupted treatment; patients who are satisfied with one aspect of the service may rate other aspects favourably (common-method and halo effects); and facility-level factors such as staffing and drug stocks may influence both scores. Treatment quality in this study reflects patient-reported indicators rather than clinical outcomes such as cure or treatment completion. The findings should not be taken to show that JKN alone improves TB treatment outcomes [13,14].

Primary healthcare facilities. Most respondents (83.3%) had been diagnosed within the preceding six months, a period in which early adherence and close monitoring are important. Delivering TB treatment at the Puskesmas keeps care close to patients, but facility-level processes still shape service quality under JKN; evidence from Indonesian insurance data points to referral behaviour as one such process [15,16]. The present study did not examine referral patterns or hospital care.

Administrative barriers and membership verification. Missing NIK, inactive membership and patient mobility were the main barriers reported. National assessments likewise describe gaps in enrolment and weaknesses in health information systems as obstacles to effective UHC [17,18]. Because eligibility for this survey required an active JKN card, patients who were most affected by these barriers could not enter the sample; the access scores reported here are therefore likely to overestimate access for the whole population of TB patients served by the health center [19,20].

Collaboration, education and family support. The informants attributed smooth service delivery to collaboration among the physician, the TB programme officer and the JKN officer, supported by information systems such as SIMPUS, P-Care and MiCare. Education at each medicine pick-up, reminders and the roles of the PMO and family fit the supervision and support principles of DOTS [21,22]. Because these accounts come from three informants, they illustrate rather than establish the mechanisms of adherence.

Digital referral systems and workforce. Disruptions of the electronic referral system when urgent referral was needed, and the need to train newly assigned TB officers, point to system-level vulnerabilities. Whether such disruptions are related to

connectivity, system design or staffing was not examined and may deserve attention in Eastern Indonesia, where service readiness has been reported to vary [23,24,25].

Implications for TB control and UHC. For practice and policy at the primary level, the findings suggest priorities for (i) membership verification and support for patients without NIK or with inactive membership, so that treatment is not interrupted; (ii) arrangements for patients who move frequently; (iii) attention to indirect costs such as transport; (iv) training of new TB programme officers; (v) a resilient referral process with a fallback when the electronic system is unavailable; and (vi) systematic involvement of PMOs and families. These implications are offered as hypotheses for programme managers and should be tested in larger studies.

Strengths and limitations. Strengths include primary data collected in a setting with limited published evidence, the combination of patient-reported scores with perspectives from programme staff, ethical approval before data collection, and transparent reporting of the statistical output. The limitations are as follows. The cross-sectional design cannot establish temporal order or causality. The study was conducted in a single health center with purposive sampling and 60 respondents, which limits generalisability. Eligibility required an active JKN card, creating selection bias with respect to administrative barriers. The access and quality scores were self-reported, the correlation was not adjusted for age, education, membership category or time since diagnosis, and psychometric evidence for the scales has not been reported. Patients interviewed or surveyed in the health center may have given socially desirable answers. The qualitative component comprised only three informants, two of whom were programme staff, so thematic saturation cannot be claimed. Finally, no clinical outcomes, such as cure rates or treatment completion, were analysed.

4. CONCLUSION

In this cross-sectional study at Puskesmas Klasaman, informants described JKN as facilitating access to TB services by reducing direct costs and simplifying administration, and better access was positively associated with better perceived quality of TB treatment ($r = 0.635$, $p < 0.001$). Five themes covered improved access, interprofessional collaboration, administrative and social barriers, adherence supported by education and family involvement, and the need to strengthen workforce capacity and digital referral. Barriers such as missing NIK, inactive membership and patient mobility remain. The findings support strengthening membership administration, referral systems, staff capacity and patient support in primary-level TB services, and they call for longitudinal studies with clinical outcomes to examine whether the observed association reflects an effect of access on treatment quality.

ACKNOWLEDGEMENTS

The authors thank Poltekkes Kemenkes Sorong for institutional support, the head of Puskesmas Klasaman and the TB and JKN programme staff for permission and assistance during the study, the patients who took part, and the nursing students Chesya Mrifi Duwit and Fransina Lobat, who were assigned to support the fieldwork. The study was carried out under the 2026 Penelitian Dasar Unggulan Perguruan Tinggi (PDUPT) scheme, with costs charged to the 2026 institutional budget (DIPA) of Poltekkes Kemenkes Sorong.

AUTHOR CONTRIBUTIONS

I Made Raka: Conceptualization, Methodology, Project administration, Supervision, Writing Original Draft.

Jansen Parlaungan: Methodology, Investigation, Formal Analysis, Writing Review & Editing.

Panel Situmorang: Methodology, Investigation, Writing Review & Editing.

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

ETHICS STATEMENT

This study received ethical approval from the Health Research Ethics Committee, Poltekkes Kemenkes Sorong (approval number DP.04.03/F.LIII.13.a./418/2026, issued on 23 April 2026 and valid from 23 April 2026 to 23 April 2027). The committee declared the protocol ethically appropriate according to the seven WHO 2011 standards, referring to the CIOMS

2016 guidelines, which include informed consent. The protocol was approved under the title "The Impact of the National Health Insurance (JKN) Policy on Access and Quality of Treatment for TB Patients at the Klasaman Community Health Center".

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to applicable ethical and institutional restrictions.

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