



Implementation of the “Semut Narsis” Educational Innovation for Reducing Tuberculosis Stigma and Improving the Community Social Productivity Index

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ABSTRACT

Tuberculosis (TB) remains a major public health problem in Indonesia, and the stigma attached to the disease continues to be a key barrier to case finding and to the socio-economic recovery of survivors and their families. Elevated stigma tends to reduce social participation, work motivation, and the self-confidence of TB-affected families, thereby suppressing the Community Social Productivity Index (CSPI) in high-burden areas. This community engagement activity aimed to evaluate the effectiveness of the “Semut Narsis” innovation, delivered through two educational modules, “Don’t Be Afraid to Have Your Sputum Checked” and “TB Patients and Families Have the Right to Remain Productive.” A pre-experimental one-group pre-test post-test design without a control group was applied to 206 families. Stigma was measured using an Indonesian-language adaptation of the Community Perspectives on Tuberculosis scale, while social productivity was assessed with the Community Social Productivity Index (CSPI) questionnaire. At baseline, 50.85% of families (n = 104) exhibited high stigma, 41.74% (n = 86) moderate stigma, and only 9.70% (n = 16) low stigma; this pattern paralleled a low social-productivity proportion of 48.05% (n = 99). Following structured education, the proportion with high stigma fell sharply to 4.36% (n = 9), while low stigma rose to 57.28% (n = 118); concurrently, high social productivity increased from 7.28% to 42.23% (n = 87) and low social productivity declined to 11.16% (n = 23). Wilcoxon signed-rank tests confirmed statistically significant pre–post differences for both stigma ($Z = -4.519$, $p < 0.001$) and CSPI ($Z = -3.109$, $p < 0.001$). Structured education substantially reduced TB-related stigma and concurrently promoted the recovery of community social productivity, indicating that the intervention is a viable candidate for replication and integration into routine TB-control programs.



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INTRIDUCTION

Tuberculosis (TB) continues to rank among the public health problems of highest burden in Indonesia. Beyond its clinical and epidemiological dimensions, a social dimension of TB that is frequently overlooked is the stigma attached to survivors and their families. TB-related stigma is a complex social phenomenon that arises when the status of being a TB patient or a close contact becomes associated with negative attributes within the household, workplace, or wider community; it constitutes a major obstacle to TB control because it contributes to diagnostic delay and poor treatment adherence (Chen et al., 2021).

A 2022 study by the Stop TB Partnership Indonesia reported that many TB patients experienced stigma rooted in limited community knowledge of how the disease is transmitted (Stop TB Partnership Indonesia, 2022). Stigma may be internalized, manifesting as shame and guilt that discourage patients from disclosing their health status beyond the immediate family, or externally imposed, most often by neighbours who fear transmission despite the fact that TB is actually transmitted through respiratory droplets rather than casual contact (Athosra & Maisyarah, 2026). The consequences of stigma extend well beyond the psychological domain: TB survivors and their families commonly experience diminished self-confidence, social withdrawal, and lost opportunities for productive participation in community life owing to shame and fear of discrimination (Aryani, Manglapy, & Nurmandhani, 2021).

Gunung Tabur sub-district is one of the administrative areas of Berau District, East Kalimantan Province, characterised by a relatively large territory and a population dispersed across ten villages (kampung) and one urban ward. At the district level, Berau continues to face challenges in accelerating TB elimination: data from the East Kalimantan Provincial Statistics Agency indicate that the TB case-detection rate in Berau District in 2025 reached only approximately 47.5%, comparatively low relative to other districts in East Kalimantan (Dinas Kesehatan Kabupaten Berau, 2026). Nevertheless, Berau District has already established a TB Control Acceleration Team, as mandated by Presidential Regulation No. 67 of 2021 and formalised through Berau Regent's Decree No. 329 of 2026. This context indicates that, in addition to strengthening screening and treatment services, reducing community stigma and reinforcing social support for TB-affected families constitutes an indispensable component of the district's TB-control strategy.

Community social productivity reflects the extent to which individuals and families are able to participate actively in social, economic, and civic life. Among families with a history of TB, social productivity is particularly vulnerable to decline because stigma restricts their social space - ranging from reluctance to interact openly with neighbours, to loss of confidence to work or trade, to avoidance of communal activities such as mutual-cooperation work (gotong royong) and neighbourhood meetings (Nurjannah et al., 2022). Reducing TB stigma can therefore be regarded as a strategic pathway for restoring and enhancing the Community Social Productivity Index (CSPI), while simultaneously supporting treatment continuation and transmission prevention at the family and community level (Aryani et al., 2021).

In response to this problem, the community engagement team of Universitas Muhammadiyah Berau, in collaboration with the Berau District Health Office, designed a structured educational innovation branded "Semut Narsis" - an Indonesian acronym for "Semarak Temukan Terduga dan Kasus Tuberkulosis" ("Enthusiastically Finding Presumptive and Confirmed TB Cases") - embodying the aspiration for families and communities that are free of stigma, active, welcoming, mentally and socially healthy, inclusive, and prosperous. The innovation comprises two core educational modules: "Don't Be Afraid to Have Your Sputum Checked," which focuses on literacy regarding TB symptoms, transmission routes, and the importance of early detection through sputum examination without fear or shame; and "TB Patients and Families Have the Right to Remain Productive," which emphasises the right of survivors and their families to continue working, attending school, and participating socially while undergoing standard treatment. This activity aimed to determine the effectiveness of the structured "Semut Narsis" education in reducing TB stigma and improving the Community Social Productivity Index among families in Gunung Tabur sub-district, with a view to establishing a replicable community-based intervention model for areas with similar characteristics.

METHODS

Design and Participants

This community engagement activity employed a pre-experimental one-group pretest-posttest design without a control group. The target population comprised 206 families residing in Gunung Tabur sub-district, Berau District, selected to ensure representation across villages/wards and logistical feasibility of the educational sessions.

Measurement Instruments

Community stigma toward TB was measured using the Community Perspectives on Tuberculosis instrument, adapted from the scale validated in the study "Validity and Reliability of the Tuberculosis-Related Stigma Scale Version for Brazilian Portuguese." The original instrument, first validated in Thailand, has since been cross-culturally adapted into multiple languages with satisfactory internal consistency (de Almeida Crispim et al., 2017). For this activity, the instrument was translated into Indonesian through a cross-cultural adaptation procedure and subsequently re-tested on 30 respondents outside the main sample. Validity testing showed that all items achieved a corrected item-total correlation coefficient above 0.364 and were therefore considered valid, while reliability testing yielded a Cronbach's alpha of 0.83, indicating high internal consistency. The stigma score was computed as the sum of all item scores.

Community social productivity was assessed using the Community Social Productivity Index (CSPI) questionnaire, which encompasses the dimensions of social participation,

economic/occupational activity, and involvement in communal activities. Scores were categorised into low, moderate, and high social productivity.

Procedure

The activity was implemented from January to June 2026. It began with a pretest administered using both instruments to the 206 target families. The team then delivered the structured “Semut Narsis” education through the two core modules - “Don’t Be Afraid to Have Your Sputum Checked” and “TB Patients and Families Have the Right to Remain Productive” - face-to-face at the village/ward level, using interactive lectures, group discussions, illustrated educational media/flip charts, and question-and-answer sessions with health cadres and local community leaders. Upon completion of the educational sessions, a posttest using the same instruments was administered to the same cohort to evaluate change in stigma and social productivity.

Data Analysis

Pretest and posttest data were summarised descriptively as frequency distributions and percentages for each stigma and social-productivity category. Because the design lacked a control group and involved paired, ordinal-level outcome data, within-group pre–post differences were tested using the Wilcoxon signed-rank test, with statistical significance set at $p < 0.05$.

RESULTS AND DISCUSSION

The “Semut Narsis” educational program to reduce tuberculosis stigma and improve the Community Social Productivity Index was preceded by a cross-sector coordination meeting involving the sub-district government, village governments across Gunung Tabur sub-district, health cadres, academics from Universitas Muhammadiyah Berau, health-centre (Puskesmas) practitioners, and the leading sector from the Berau District Health Office, aimed at finalising the implementation schedule and methodology.



Figure 1. Cross-sector coordination meeting prior to the implementation of the “Semut Narsis” innovation.

A total of 206 families across Gunung Tabur sub-district participated in the structured “Semut Narsis” education. All participants completed the full sequence of pretest measurement, educational sessions, and posttest measurement, and no data were lost to follow-up at final evaluation:

Community Stigma toward TB Before and After Education

At baseline, more than half of the target families — 104 families (50.85%) — were classified as having high stigma, followed by 86 families (41.74%) with moderate stigma, while only 16 families (9.70%) exhibited low stigma. This distribution confirms that, prior to the intervention, community understanding of and attitudes toward TB were still dominated by negative perceptions, exaggerated fear of transmission, and social distancing from survivors and their families.

Table 1. Tuberculosis stigma before and after implementation of the “Semut Narsis” innovation in Gunung Tabur sub-district (n = 206)

Stigma Category	Pre-Test		Post-Test		Z	Sig
	n	%	n	%		
Low stigma (score < 17)	16	9.70	118	57.28		
Moderate stigma (score 17–44)	86	41.74	79	38.34	-4.519	0.000*
High stigma (score > 44)	104	50.85	9	4.36		
Jumlah	206	100%	206	100%		

*Wilcoxon signed-rank test.

Following the structured education delivered through the “Don’t Be Afraid to Have Your Sputum Checked” and “TB Patients and Families Have the Right to Remain Productive” modules, the posttest revealed a marked shift: the high-stigma category fell sharply to 9 families (4.36%), the moderate-stigma category declined to 79 families (38.34%), while the low-stigma category rose substantially to 118 families (57.28%).

The Wilcoxon signed-rank test indicated a statistically significant difference in stigma scores before and after education ($Z = -4.519$, $p < 0.001$), suggesting that the observed reduction in TB stigma is unlikely to be attributable to measurement variability alone and is instead associated with the structured educational intervention.

The predominance of high stigma at baseline, observed in more than half of participating families, is consistent with prior studies indicating that TB stigma in Indonesia is largely rooted in limited community knowledge of transmission mechanisms, giving rise to disproportionate fear despite the fact that TB is transmitted through respiratory droplets rather than ordinary physical contact (Stop TB Partnership Indonesia, 2022). This finding reinforces the argument that stigma does not necessarily stem from deliberately negative attitudes, but more often originates from information gaps that can be addressed through appropriately targeted education (Rekawati & Yuni Nursasi, 2024).

With respect to the association between stigma and delayed treatment-seeking, prior research has emphasised that stigma constitutes a major barrier to community-based TB control because it contributes to diagnostic delay and poor treatment adherence, as affected individuals are often reluctant to seek examination for fear of being associated with the disease and its accompanying stigma (Chen et al., 2021). This is consistent with the relatively low TB case-detection rate in Berau District, which stood at only around 47.5% in 2025, well below the national target (Dinas Kesehatan Kabupaten Berau, 2026). The “Don’t Be Afraid to Have Your Sputum Checked” module directly targets this underlying barrier by providing accurate information on the procedure, benefits, and importance of early sputum examination without fear or shame, which is expected to contribute to improved case detection going forward.

The sharp decline in high stigma from 50.85% to 4.36% following education indicates that a structured, interactive, community-based educational approach can effectively shift community perceptions within a relatively short period. This finding aligns with other community engagement initiatives affirming that health education and counselling are essential strategies for raising community awareness of TB symptoms, transmission, prevention, and treatment adherence (Saputra, Setiawan, Soemarwoto, Messah, & Lyanda, 2026), while also reinforcing the role of health cadres as agents of change in reducing negative stigma toward TB patients within the community - consistent with the collaborative screening-strengthening efforts led by the Indonesian Association for the Elimination of Tuberculosis (PPTI) together with the Berau District Health Office at the village/ward level (Dinas Kesehatan Kabupaten Berau, 2026).



Figure 2. Educational materials for the “Don’t Be Afraid to Have Your Sputum Checked” and “TB Patients and Families Have the Right to Remain Productive” modules used in the “Semut Narsis” innovation

Community Social Productivity Index Before and After Education

Consistent with the high baseline stigma, the pretest CSPI results showed that nearly half of the target families - 99 families (48.05%) - fell into the low social-productivity category, 92 families (44.66%) into the moderate category, and only 15 families (7.28%) into the high social-productivity category.

Table 2. Community Social Productivity Index (CSPI) before and after implementation of the “Semut Narsis” innovation in Gunung Tabur sub-district (n = 206)

CSPI Category	Pre-Test		Post-Test		Z	Sig
	n	%	n	%		
Low social productivity	99	48.05	23	11.16	-3.109	0.000*
Moderate social productivity	92	44.66	96	46.60		
High social productivity	15	7.28	87	42.23		
Jumlah	206	100%	206	100%		

*Wilcoxon signed-rank test

After the structured education, posttest CSPI results showed improvement consistent with the observed reduction in stigma. The low social-productivity category fell to 23 families (11.16%), the moderate category rose to 96 families (46.60%), while the high social-productivity category increased sharply from 15 families (7.28%) to 87 families (42.23%).

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The parallel improvement in the Community Social Productivity Index and the reduction in stigma reinforces the conceptual framework that stigma is not merely an individual psychological issue but has tangible consequences for the socio-economic dimension of family life (Nurjannah et al., 2022). TB patients who experience stigma tend to exhibit diminished self-confidence and to withdraw from community life owing to shame and fear of discrimination, thereby limiting their participation in economic and civic activities (Aryani et al., 2021). The “TB Patients and Families Have the Right to Remain Productive” module was specifically designed to correct this misperception by affirming the right of TB survivors and their families to continue working, attending school, and participating in social activities during standard treatment, provided that proper cough etiquette and treatment

adherence are maintained. The rise in high social productivity from 7.28% to 42.23% suggests that strengthening knowledge of these rights and of the continued capacity for social functioning can encourage TB-affected families to resume active social and economic participation.

From an implementation standpoint, this activity yields several important lessons. First, a structured educational intervention built around clear, memorable key messages — such as “Don’t Be Afraid to Have Your Sputum Checked” and “TB Patients and Families Have the Right to Remain Productive” - proved well received by communities in a setting with the geographic and socio-cultural characteristics of Gunung Tabur sub-district. Second, the significant reduction in stigma achieved within a relatively short period indicates that investment in community-based education merits prioritisation within TB-control programs, consistent with national policy directives mandating the establishment of district/city-level TB Control Acceleration Teams (Presidential Regulation of the Republic of Indonesia No. 67 of 2021). Third, the close association between stigma reduction and improved social productivity underscores the importance of incorporating socio-economic indicators — not only clinical and epidemiological indicators - into the evaluation of TB-control program performance at the Puskesmas and sub-district levels.

Nevertheless, this activity has several limitations that warrant attention in any replication or further development. The one-group pretest–posttest design without a control group does not permit full control over confounding factors external to the intervention, such as exposure to health information from other sources during the activity period; the net effect attributable specifically to the “Semut Narsis” education therefore requires further confirmation through designs incorporating a control group. In addition, the durability of post-education attitudinal and behavioural change should be evaluated through longer-term follow-up measurement, to ascertain whether the observed reduction in stigma and improvement in social productivity are sustained rather than short-term effects of the educational activity alone.



Figure 2. Delivery of the “Don’t Be Afraid to Have Your Sputum Checked” and “TB Patients and Families Have the Right to Remain Productive” education, together with practitioners, academics, cross-sector partners, and university students.

CONCLUSION

Structured education through the “Semut Narsis” innovation - comprising the “Don’t Be Afraid to Have Your Sputum Checked” and “TB Patients and Families Have the Right to Remain Productive” modules - was effective in reducing community stigma toward TB while simultaneously improving the Community Social Productivity Index among 206 families in Gunung Tabur sub-district, Berau District. The proportion of high stigma fell from 50.85% to 4.36%, while the proportion of high social productivity rose from 7.28% to 42.23% following the intervention. These findings demonstrate that stigma reduction and the recovery of social productivity among TB-affected families can occur concurrently through a structured, community-based educational approach that directly targets both knowledge and attitudes.

Based on these findings, it is recommended that Puskesmas and the Berau District Health Office consider integrating the “Semut Narsis” educational modules into routine, sustained TB-control programming, engaging health cadres and local community leaders as educational champions at the village/ward level. Future activities should incorporate medium- to long-term follow-up evaluation to confirm the sustainability of stigma reduction and social-productivity gains, and should consider

designs incorporating a control group in replications elsewhere to enable a more rigorous estimate of intervention effectiveness.

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