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Interprofessional Strategy using Stress Management Telemonitoring for reducing Self-Stigma of Tuberculosis

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Abstract
This study proposes to investigate the impact of stress management due to self-stigma in Tuberculosis using interprofessional collaboration. Intervention applied by the medical and nurse professional students. A total of 36 respondents were investigated for their level of self-stigma, given information, and demonstrated stress management, then follow-ups for one month via WhatsApp platform, a total of 8 sessions. Self-stigma of Tuberculosis was measured before and after the intervention. The paired t-test showed -4.772 and a probability of 0.0001. Interprofessional collaboration might have implications for the education of medical and nurse professional students.

1.0 Introduction
Tuberculosis (TB) is a chronic infectious disease that is endemic in the world, especially in developing countries. Indonesia is one of the targets "End-TB program" in treating tuberculosis from the World Health Organization (World Health Organization, 2022). The ministry of health of the republic of Indonesia reported that Tuberculosis (TB) in Indonesia ranks third after India and China, with 824 thousand cases and 93 thousand deaths per year or the equivalent of 11 deaths per hour. Based on the Global TB Report for 2022, the highest number of TB cases is in the productive age group, especially those aged 25 to 34 years. In Indonesia, the highest number of TB cases is in the productive age group, especially at the age of 45 to 54 years (Ministry of health Republic Indonesia, 2023). It is estimated that between 40% and 70% of people with TB suffer from mental disorders, including depression and anxiety disorders (World Health Organization, 2017). Pulmonary tuberculosis (TB) is a major cause of morbidity and mortality worldwide, and is found commonly as a comorbidity of depression (World Health Organization, 2023). In addition to depression, TB also has an impact on reducing quality of life, productivity, and stigma (Aggarwal, 2019; World Health Organization, 2023). A study found that the relationship between TB and depression is a monotonous relationship, that is, there is a tendency for pulmonary TB sufferers to become depressed due to infection which possibly stimulates the hypothalamus part of the brain (Fang et al., 2022). The depression and

anxiety that arise in chronic pulmonary TB may be caused by self-stigma, isolating behavior by society, drug side effects, and financial burdens (Mason et al., 2016). Mental health management at the community level is very important to prevent more serious impacts; Psychological interventions for Tuberculosis sufferers have the most influence in improving compliance and treatment outcomes (Ardiana et al., 2022). However, the mental health problems of chronic tuberculosis patients who experience depression are lack of identified in a structured by health professionals. Most of the research focuses on the physiological symptoms associated with TB recovery (Khawbung et al., 2021; Mirzayev et al., 2021). Mental health problems in Tuberculosis sufferers are usually related to social problems, such as stigma and discrimination (Burke et al., 2021). Therefore, early detection of psychosocial problem like self-stigma is very important in individuals who suffering from Tuberculosis. Comprehensive treatment considering various factors is very important to achieve this target. Self-esteem disturbance due to chronic disease Tuberculosis may create stigma. Self-stigma is a reflection of low self-esteem. Stigma toward people with Tuberculosis is prevalent, which is psychological stress. Health staff's roles were crucial in providing psychological treatment. Interprofessional collaboration is a surefire strategy for overcoming health problems; on the other hand, interprofessional practice in rural areas is limited, futhermore, Research that investigation of factors between demographics, diagnosis period, and self-stigma in Tuberculosis is still limited conducting in Indonesia. Interprofessional collaboration is a healthcare approach from interdisciplinary expert work interwoven for patients, families, and communities to deliver the best possible care (Collaborative IE, 2023). It emphasizes teamwork, shared decision-making, and mutual respect to achieve common goals and focus on improving patient outcomes (Dewi, et al, 2023). In essence, interprofessional collaboration encompasses more than just professionals working together; it is about creating a synergistic environment where diverse knowledge and skills are leveraged and improved among teams and optimize patient care (Vaseghi, et al, 2022).This study aims to investigate the impact of stress management due to self-stigma using interprofessional collaboration. The objective of the study was to identify contributing factors for the self-stigma level, and assess the impact of these strategies on the self-stigma level.

2.0 Material and Method
This study adopted pre-experimental correlated sample. Correlated samples also known as paired samples refer to conditions where two or more groups are linked (Creswell, 2021). The relationship can be formed through repeated measurements on the same subjects, matched pairs of individuals, or other natural pairings. Sampling was carried out by identifying Tuberculosis (TB) patients' data at the home base of each Community Health Center. The stages in this research were included: 1) The Tuberculosis patients were invited to each Community Health Center to be given a respondent demographic questionnaire. 2) Next, based on the demographic data, we determined respondents that appropriate with sample criteria. The sample criteria comprised of adult with range age between 32 and 66 years, undergoing Tuberculosis treatment for at least 1 month, receiving the same type of medicines, and has no comorbidity. 3) After that, respondents who met the criteria were then taken by non-probability sampling technique. A total of 36 respondents then were assessed using a tuberculosis self-stigmatize questionnaire. The self-stigma questionnaire was designed by combining Stuart's 2014 theory of self-concept and depression. The Tuberculosis self-stigma questionnaire consists of 15 items with a minimum score of 15 and a maximum of 45. This questionnaire has done for validity and reliability using Cronbach Alpha with a probability validity of 0.001 and a reliability of 0.805. 4) Finally, we identified tuberculosis self-stigma before and after intervention of interprofessional education. The questionnaires were filled out and collected, were carried out editing, entering and data analysis. Data analysis used paired t test to distinguish the participants' self-stigma before and after intervention

2.1 Implementation of IPE
The IPE as a collaborative core competency domain was used by students from each profession to provide integrated training. Interprofessional Education (IPE) was conducted by a group of medical and some nursing professional students. All students engaged in the health education, share specific duties of each profession and the amount of activities needed for each role. In the initial stage, we investigated the level of the self-stigma of participants, then were given information on how to manage it, after that, we demonstrated stress management for them. We prepared intervention including module, leaflet, sound system, tutor guidelines and place for activities. Professional medical students provide the concept and management of Tuberculosis through lectures and discussions. Nursing professional students provide self-stigma stress management in tuberculosis through simulation using classical music therapy guided imagery that illustrated the problem on achievement of happiness. Cognitive therapy was given during listening to music. Simulation was conducted for 90 minutes in the home-based center. Next, stress management was applied for the participants using remote follow-ups for one month via the WhatsApp platform support for a total of 8 sessions. Finally, the participants were measured for self-stigma after the intervention.

2.2 Ethical Consideration
We obtain ethical clearance from Health Research committee Faculty of Medicine Muhammadiyah University of Surakarta with number 4853/B.2/KEPK-FKUMS/V/2023.

3.0 Results
The Sociodemographic of respondents is described in table 1.

Table 1. Sociodemographic of respondents (N:36)

Variable	Percentage
Gender	
Male	12 (33.3%)
Female	24 (66.7%)
Age	
25-35	4 (5.1%)
36-50	24 (72.3%)
51-66	8 (22.6%)
Treatment period	
1-3 moths	14 (38,8%)
4-6 months	19 (52.7%)
>6 months	3 (8,5%)
Self-Stigma	
Mild	12 (33.4%)
Moderate	24 (66.6%)

Table 1 illustrates that the majority of respondents were female 24 (66.7%) and male 12 (33.3%). The age of the most respondents was between 36-50 years, there were 24 (72.3%), the least was between 25-35 years, 4 respondents (5.1%) and the age between 36-50, there were 8 (22.6%) respondents. The treatment period of less than 3 months was 14 (38.8%) respondents and more than 6 months there were 3 (8.5%) respondents, majority they had treatment period 4-6 months. Self-stigma was experienced by 24 (66.6%) respondents with a moderate level and the remaining mild self-stigma was 12 (33.4%) respondents.

Table 2 contributing factor of stigma level as dependent variable

Variable	unstandardized coefficients		standardized coefficients	t	Sig	95.0% confidence interval for B	
Independent	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	87.830	6.385		13.756		75.155	100.506
Age	-.165	.063	-.176	-.2633	.001	-.290	-.41
Income	-.385	.043	-.677	-.8877	.001	-.471	-.299
Length of treatment period	.118	.032	-.252	-.3667	.001	-.182	-.054

Independent variable: self-stigma

Table 2 describes that all independent variables have a significant relationship with self-stigma; The effect of age on self-stigma level shows a figure of -.165, this means that for each one-year decrease in age, followed by a drop of 0.165 in the level of self-stigma. All independent variables remain constant, the length of treatment period show a coefficient of 0.118 (see Coefficient table); This means that for every increase in the score of length of treatment there is an increase in the score of self-stigma by 0.118; So, it can be concluded that the longer Tuberculosis treatment period, they would have experienced self-stigma.

Table 3 paired test self-stigma before and after intervention

| | | | | | | | Paired differences | | | | |
Pair	N	Mean	Std Dev	Mean pair	Std Dev pair	Std Error Mean Pair	95% Confidence Interval of difference		t	df	Sig. (2-tailed)
							Lower	Upper			
SS 1	36	34.4444	1.66381	10.77778	2.84967	.47495	9.81359	11.74197	22.693	35	.0001
SS 2	36	23.6667	1.97122								

Table 3 shows the results of the analysis of differences between the dependent variable (self-stigma before intervention with IPE) and the independent variables (Self-stigma after intervention with IPE). In this case this would be t (35) = 22.693, p < 0.0005. Due to the means of the two level of self-stigma and the direction of the t-value, we can conclude that there was a statistically significant reduction in self-stigma level following the IPE programmed from 34.4 ± 1.66 level decrease to 23.66 ± 1.97 level (p < 0.0005); a decrease of 0.22 ± 0.22 level.

4.0 Discussion

This study found that the IPE program influenced the occurrence of the level of self-stigma in chronic pulmonary Tuberculosis patients. Interprofessional Education (IPE) is an approach to learning that involves cooperation between two or more professional students to learn from each other. The goal of this collaborative learning experience is to develop effective teamwork and improve patient outcomes through the preparation of students for collaborative healthcare practice (Moyers & Finch-Guthrie, 2024). The inter-collaboration program is very varied from professional experts including social, natural, and physical science (Bebasari et al., 2022).

Self-stigma in patients with pulmonary tuberculosis (TB) can be influenced by the patient's demographic factors, such as age, income, and length of treatment period. It can be seen in the results of this study that there was a significant correlation among them. The duration of the treatment may involve physiological and psychological conditions. Physical complaint is the implication of biological aspects that can originate from internal conditions such as hormones and external stimulation like the impact of medicine. Several types of medicine taken by the patient may occur as a mechanism that changes the body's metabolism, including the influence of hormones (Mirzayev et al., 2021). Psychological and social aspects can be related to self-perception of the disease due to long periods of recovery, including the patient's perspective on Tuberculosis. On the other hand, from an individual perspective about a disease that they experienced, some people do not always have a negative perception but also accept the disease with sincerity, which means that the length of treatment is considered a positive blessing (Pratiwi, 2023). This long healing process requires individuals such as tuberculosis patients to be in a happy condition so that their quality of life is stable; it is hoped that individuals will remain productive and healing will occur on time. This study applied stress management using professional collaboration as a strategy to maintain the quality of life of TB patients and found that there was reduced self-stigma among TB Patients. Research related to the long period of taking drugs found that there were 76% of 1200 pulmonary TB patients in Asia; this means that the treatment period was prolonged beyond the target time of six months (Esmail et al., 2022). Next, this duration of treatment is the second predictor of stigma in Tuberculosis patients (Pratiwi, et al., 2024). Respondents who were involved in this study had a length of treatment ranging from two to nine months. The longer the treatment period has a positive correlation with the higher score of self-stigma, this can be seen that TB sufferers who undergo treatment for longer and suffer from drug resistance show symptoms of depression and stigma. Several studies have concluded that patients who experience drug resistance generally experience moderate depression (Huque et al., 2020; Redwood, et al., 2020). In addition, the prevalence of depression in pulmonary tuberculosis sufferers is very high, where these two variables may be related to each other, that depression has a high risk infected with TB and conversely, tuberculosis has a high risk of developing depression (Zhang et al., 2019). This application of IPE reduces self-stigma, possibly preventing depression in tuberculosis patients, one of these can be prevented with IPE that combine telemonitoring strategy. Study by Hudiyawati (2023) found that telemonitoring proven to improve the quality of life of people with chronic diseases at home. But a study by Ding et al. (2020) argued that telemonitoring had a high participants' withdrawal rate was high during intervention. Research using IPE has successfully reduced self-stigma, specifically increasing self-efficacy in patients with behavioral disorders (Stephanie, 2024). Research by Perzhinsky et al. (2024) found that IPE was successful in reducing the stigma of mental disorders. In contrast, Noureddine and Hagge (2021) argued that success in IPE is influenced by several factors, not solely by the IPE strategy, but also by the role of each profession which is not interrelated but which most influences the intervention.

Conclusion and Suggestion

In this study found that professional relationship on patient therapy was affective to reduce self-stigma on Tuberculosis patients. On the other hand, some factors that influence the success of the intervention must be considered. Despite some limitations possessed in this study, some practical implications give information and guidance for further studies in health education.

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Conflict of interest statement

The authors have stated that there are no potential conflicts of interest in relation to the research, and publication of this article.

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