

## **IMPLEMENTATION OF THE FAMILY HEALTH PROMOTION MODEL (FHPM) ON FAMILY COMMITMENT IN TB TRANSMISSION PREVENTIVE ACTION AMONG THE HEADS OF FAMILIES OF TB PATIENTS: A STRUCTURAL MODEL**

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### **ABSTRACT**

Tuberculosis (TB) transmission prevention centering on family is an effective strategy to suppress the emergence of new clusters of pulmonary TB transmission. The commitment of family heads and several factors are related to this action. This study was conducted to identify, examine, and analyze the determinants of family commitment in preventing the transmission of pulmonary TB. This study applied a quantitative cross-sectional approach to 170 family heads of pulmonary TB patients using proportionate simple random sampling. The family health promotion model (FHPM) was used to analyze family commitment determinants in preventing TB transmission. Data were collected using a questionnaire. SEM analysis was utilized to determine the paths and the relationship between family function, perception of the disease transmission risk, as well as family support, and commitment to action to prevent TB transmission. This study recorded that 50.6% of respondents were male with an average age of  $46.75 \pm 46$  and an age range of 36-55 years, 53% had a high school education; 25.9% were self-employed; had an average decent living need of  $1.93 \pm 0.85$ , 75.3% had nuclear family, and 47.1% were from patriarchal family. Model fit was achieved in the structural equation ( $\chi^2 = 173.44$ ;  $df = 71$ ,  $RMSEA = 0.072 \leq 0.08$ ;  $GFI = 0.90 \geq 0.90$ ;  $RMR = 0.019 \leq 0.05$ ;  $NFI = 0.98 \geq 0.90$ ;  $CFI = 0.99 \geq 0.90$ ;  $TLI = 0.98 \geq 0.95$ ;  $IFI = 0.99 \geq 0.90$ ;  $PGFI = 0.59$ ;  $PNFI = 0,76$ ). All dimensions and item scales are significantly related to their respective latent constructs. All factors forming the FHPM framework have a significant positive direct effect between latent variables. Factors from the FHPM framework significantly (family function  $t = 8.74$ , perception  $t = 4.46$ , and family support  $t = 7.37$ ) have an influence on commitment to action to prevent pulmonary TB transmission. Family function is the most powerful factor explaining commitment to preventive action. This study reveals the paths and influences of family function, perception, and support on a commitment to prevent pulmonary TB transmission through structural model analysis.

Keywords: commitment; family function; family support; perception; tuberculosis

### **INTRODUCTION**

Tuberculosis (TB) is one of the priority health problems that must be addressed in several countries in the world to end its epidemic status. WHO (2022) recorded that TB is the 13<sup>th</sup> cause of death and the second infectious killer after Covid-19. The prevention and control program for pulmonary TB transmission in Indonesia is not optimal. Indonesia ranks third in terms of tuberculosis-related health problems in the world. Tuberculosis incidence in Indonesia in 2021 was 385,295 per 100,000 population and the death rate for tuberculosis sufferers was 40 per 100,000 population. In the past ten years, the number of TB cases has fluctuated. In 2011, 321,308 cases of TB were found and treated. Then, the number increased to 570,289 cases in 2018 (Kemenkes, (2021). Dinas Kesehatan Provinsi Jawa Tengah (2021) reported that the incidence of tuberculosis in Central Java in 2021 was 42,095 per 100,000 population. Pulmonary TB cases in the five regencies/cities in Central Java

Province per 100,000 population occurred in Tegal (716.5 people), Magelang (528.7 people), Surakarta (231.1 people), Salatiga (207.7 people), and Banyumas (198.9 people).

In addition, the success rate for tuberculosis treatment was 85.1% and had not yet reached the target of the established strategic plan of >90%. Surakarta City is the third contributor of pulmonary TB cases in Central Java and has the highest rank of pulmonary TB cases out of six regencies/cities in Solo and its vicinity (Surakarta, Boyolali, Sukoharjo, Wonogiri, Sragen, and Klaten). Dinas Kesehatan Kota Surakarta (2022) recorded that the coverage of all pulmonary TB cases found and treated in Surakarta in 2021 was 1,574 cases, distributed in five sub-districts: Laweyan (191 cases/12.1%), Serengan (115 cases/7.4%), Pasar Kliwon (199 cases/12.6%), Jebres (577 cases/36.7%), and Banjarsari (492 cases/31.2%).

Coverage of all pulmonary TB cases has experienced a fluctuating trend from the previous year. The results of the field study field showed that the interviews with healthcare workers and family members with TB cases in mid-April 2021 in the Working Area of Surakarta Health Center (*Wilayah Kerja Puskesmas Surakarta*) disclosed that out of 85 TB sufferers, two of them (3.2%) thought that pulmonary TB was difficult to be cured, two people (2.15%) had the stigma that pulmonary tuberculosis was an inherited disease, 12 people (12.6%) discontinued taking medication because they were not supervised by their families, 17 people (17.9%) did not know the side effects of Pulmonary TB treatment, 21 people (22.1%) did not know the behavioral risk factors that trigger the transmission of pulmonary TB, 22 people (23.2%) did not cover their mouths when coughing, seven people (7.4%) admitted they got tired of taking medicine because of the duration long treatment, and the remaining 11 people (11.6%) no longer visited healthcare services. These behaviors have the potential to contribute to the emergence of new clusters of pulmonary TB transmission at the family level.

Pulmonary TB transmission has an impact on other aspects of life, such as mental health and financial problems, as well as physical and social burdens. A study conducted by Kurt, (2020) reported that pulmonary TB can cause a decrease in quality of life relating to mental health such as symptoms of depression and anxiety. Sulistyono & Tristiana, (2018) explained that there are four major themes related to the burden felt by pulmonary TB sufferers and their families, including physical, psychological, social, and financial burdens. The programs for preventing new cases, increasing the cure rate, and reducing the TB mortality rate in Indonesia are not optimal. Efforts to increase the prevention of family-centered pulmonary TB transmission must be carried out in a specific way (Kementerian Kesehatan, 2014). Factors of family concern and acceptance are significant in the prevention of pulmonary TB transmission at the family level. Rachmawati et al., (2019) explained that family resilience is a good model and a reference in preparing family plans for pulmonary TB patients.

Family is also an important source of influence among family members to increase or decrease commitment, challenge, or control over health promotion behavior and family health behavior (Chen et al., 2018). To minimize family-based transmission of pulmonary TB, it is necessary to have a family commitment to be directly involved in preventing the transmission of pulmonary TB. Family commitment is a real family action with certain people or alone following the time and place to avoid transmission of pulmonary TB at the family level. Several factors influence family

commitment, including family functions, perceptions, and support. Giri et al., (2022) explicated the relationship between barrier perception and interpersonal perception with a commitment to prevention. (Kim et al., 2018) explained that someone who feels having higher social support reports more willingness to work, which in turn results in more active participation in work engagement. Duran et al., (2021) reported that sociodemographic variation and barrier perception were the factors that predict professional commitment.

Family-centered prevention of TB transmission through the implementation of effective health behavior regimens is a strategy to minimize the emergence of new clusters of pulmonary TB transmission. Information about research related to behavioral models has been widely carried out. However, few studies investigated the Family Health Promotion Model (FHPM) to identify the various dimensions and factors that influence family commitment to action to prevent TB transmission. Changes in pulmonary TB prevention behavior are related to several factors, including perceived vulnerability related to the disease experienced as well as social factors, such as signals to act and attention (Yoshitake et al., 2019). However, the current research centers on the factors related to family commitment to action to prevent TB transmission, so it is necessary to systematically study the determinants that influence family commitment to action to prevent TB transmission. Given the complexity of factors that affect family commitment in preventing pulmonary TB transmission, this model approach is essential to prevent the emergence of pulmonary TB transmission clusters. The current research uses a structural equation model (SEM) to test a complex and comprehensive model of family commitment including predictors, latent variables, and outcomes. This study aimed to evaluate and analyze the model adapted from the FHPM framework about the commitment to action to prevent transmission of pulmonary TB among the heads of families of patients with pulmonary TB using SEM.

## **METHOD**

### **Research Design**

This study applied a quantitative design with a cross-sectional approach, which was conducted at fifteen Community Health Centers in the government of Surakarta City, Central Java, Indonesia. The government of Surakarta City was selected because Surakarta is a relatively developed and dense area in Central Java with 12,802 population per km<sup>2</sup> and an area of 44.04 km<sup>2</sup>. Surakarta has a 563,814 population, increasing 12,767 population per km<sup>2</sup> compared to the previous year. This condition allows the risk of pulmonary TB transmission in the community more quickly.

### **Participants and Procedures**

The sample size of this study used the formula = number of indicators + number of latent variables x (at least five or 10 times) according to Hair et al. (2018). The SEM model in this study consists of 14 indicators and four latent variables, so the required minimum sample size was at least =  $(14 + 4) \times 5 = 90$  samples, and the maximum sample size was  $(14 + 4) \times 10 = 180$  samples. The research participants were 170 heads of families of TB sufferers who were proportionally represented at each community health center selected using a proportional random sampling technique. The sampling unit was grouped based on the community health center located in each sub-district. The sample size was determined based on the number of pulmonary TB patients who received health services at the community health center in each sub-district. The heads of the patients' families were randomly selected from each village in the Community Health Center. Their consent of

participating in this study was obtained. The researchers collaborated with the team in charge of the pulmonary TB control and prevention program trained to distribute a questionnaire survey.

### **Research instruments**

Data were collected with a questionnaire administered during face-to-face interviews with the heads of families of pulmonary TB patients from October to December 2022. Each questionnaire filling generally took between 25 and 30 minutes. After the information collection process, the completed questionnaires were assembled. The participants were informed that they were completely free to take part or not in the interview and that they were not required to answer questions they did not wish to answer or when they felt uncomfortable. To design the questionnaire items, we conducted a comprehensive review of relevant previous studies (Smilkstein, 1978) and managed the items. All questionnaire items were measured using a 5-point Likert scale and the validity was verified by twelve healthcare experts and tested with Aiken's  $V$  with criteria  $0.80 < r_{xy} < 1.00$ : (very high validity/very good),  $0.60 < r_{xy} < 0.80$  (high validity),  $0.40 < r_{xy} < 0.60$  (moderate validity),  $0.20 < r_{xy} < 0.40$  (low validity),  $0.00 < r_{xy} < 0.20$  (very low validity), and  $r_{xy} < 0.00$  (invalid). The questionnaire reliability was measured through the Intraclass Correlation Coefficients (ICC) using the computer-assisted SPSS for Windows program showing the consistency of all factors within the FHPM framework in the range  $0 \leq ICC \leq 1$ .

### **FHPM determinant framework**

FHPM is a theoretical model of family-based health behavior assuming how the family will influence their possibility to plan activities that can improve family welfare. The family behaviors, such as perceived barriers or the benefits of health promotion activities from the whole family, influence the extent of family commitment to start activities that can improve health. FHPM involves families in promoting health behaviors influenced by three factors, comprising general influence, health, and specific behavior (Kaakinen et al., 2015). The general influences include patterns of family systems (e.g., values, communication, and interactions), demographic characteristics (e.g., family size, structure, income, and culture), and biological characteristics (genetic/familial characteristics). Health-related influences include family health socialization patterns, family definitions of health, and perceived family health status. Specific behavioral influences cover perceived barriers to health-promoting behaviors, perceived benefits of health-promoting behaviors, prior behaviors, family norms about health-promoting behaviors, support between systems of behaviors, situational influences, as well as internal family and environmental signs. This study used the FHPM model as a framework. The family function was chosen as the general factor, family support was the factor in the pattern of health socialization, and the perceived threat of disease transmission was selected as a specific behavioral factor.

As presented in Figure 1, this study made the following assumptions:

1. Family function factor has a direct predictive effect on perceptions related to the perceived risk of pulmonary TB transmission, family support, and family commitment in preventing pulmonary TB transmission.
2. Perception factor related to the perceived risk of pulmonary TB transmission has a direct predictive effect on family support and family commitment in action to prevent pulmonary TB transmission.
3. Family support factor is perceived to have a direct predictive effect on family commitment in action to prevent pulmonary TB transmission.

## Statistical analysis

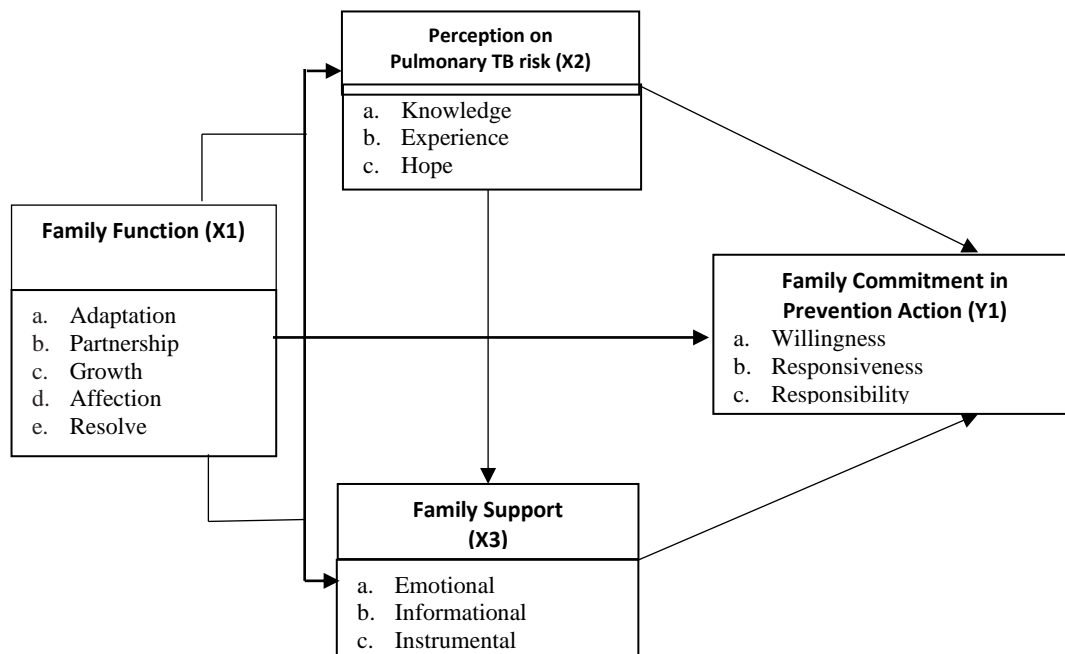


Figure 1. FHPM Framework

Data were analyzed using descriptive statistics, including standard deviation, mean, median, and interquartile range to describe the distribution of continuous variables and percentages for categorical variables using SPSS. Pearson Chi-square or Fisher exact test was conducted to examine categorical variables and One-Way ANOVA was performed to measure continuous variables to determine the baseline characteristics. SEM was used to test the fit between the research model and data using Lisrel. SEM is a multivariate analysis method for investigating direct and indirect relationships.

## Sociodemographic Measurements

Sociodemographic measurements are believed to have an influence on family commitment in action to prevent disease transmission and behavior, which include age, gender, education level, employment status, and income of the family head of a patient with pulmonary TB, as well as family structure and type. The gender of the reported family head includes binary variables for males and females. The age categories of participants gathered through the survey were: late teenagers (17-25 years), early adults (26-35 years), late adults (36-45 years), early elderly (46-55 years), late elderly (56 - 65 years), and elderly over 65 years. The educational levels of the family heads collected in the survey cover five categories: elementary school, junior high school, senior high school, Diploma/Bachelor, and Master's. The family heads' occupations include civil servants, employees, self-employed (entrepreneurs), laborers, and unemployed. Family income fell into three categories: poor living needs with an income of fewer than 857,728 rupiahs, decent living needs with an income of 857,728–2,035,000 rupiahs, and very decent living need with an income of more than 2,035,000 rupiahs. The data on family structure collected in the survey showed three

categories: nuclear, blended, and extended families. The types of families fall into three categories: patriarchal, matriarchal, and mixed patriarchal-matriarchal.

### **Family functions**

Family functions were measured using five measurement dimensions, consisting of adaptation, partnership, growth, affection, and resolve/APGAR), assessed with 19-item scales determined by the choices of responses. The choices are “strongly satisfied (scored 5)”, “satisfied (scored 4)”, “less satisfied (scored 3)”, “dissatisfied (scored 2)”, and “strongly dissatisfied (scored 1)”. The total score ranged from 19 to 95. The test results showed that the family function construct was highly valid, with a value ranging from 0.60 to 0.80. The results of the ICC test showed that the consistency of family function factors was in the range  $0 \leq ICC \leq 1$  (ICC value of family function = 0.352).

### **Family perceptions of the risk of TB transmission**

The family perception of TB transmission risk was measured using three dimensions (knowledge, hope, and experience) with 19-item scales determined by the answer choices. The choices are “strongly agree (scored 5)”, “agree (scored 4)”, “less agree (scored 3)”, “disagree (scored 2)”, and “strongly disagree (scored 1)”. The total score ranged from 19 to 95. The results of the family perception construct test showed that family perceptions are highly valid, with a value ranging from 0.60 to 0.80. The results of the ICC test showed that the consistency of family perception factors was in the range of  $0 \leq ICC \leq 1$  (family perception ICC = 0.113).

### **Family support**

Family support was measured through three dimensions (emotional support, information, and instruments) with 19 scales of items. The choices of answers include “strongly agree (scored 5)”, “agree (scored 4)”, “less agree (scored 3)”, “disagree (scored 2)”, and “strongly disagree (scored 1)”. The total score ranged between 19 and 95. The results showed that the family support was highly valid, with a value of 0.60-0.80. The results of the ICC test indicated consistency in the family support factor in the range of  $0 \leq ICC \leq 1$  (ICC family support = 0.174).

### **Family Commitment**

The family commitment was measured using 3 dimensions (intention, responsiveness, and responsibility), assessed with 20-item scales. The choices are “strongly satisfied (scored 5)”, “satisfied (scored 4)”, “less satisfied (scored 3)”, “dissatisfied (scored 2)”, and “strongly dissatisfied (scored 1)”. The total score extended from 20 to 100. The results of the family commitment construct test showed that family commitment was highly valid, with a value range of 0.60-0.80. The results of the ICC test indicated consistency in the family commitment factor of  $0 \leq ICC \leq 1$  (ICC family commitment = 0.333).

### **Ethical Considerations**

Ethical consideration was obtained from the health research ethics committee of Dr. Moewardi General Hospital, Faculty of Medicine, Universitas Sebelas Maret, Surakarta Number 1.281/X/HERC/2022, which indicates the approval of this study. Information obtained in the survey was kept confidential and would only be used for scientific purposes.

Participation in this study was voluntary and the respondents were kept confidential.

## RESULTS AND DISCUSSION

### Sociodemographic characteristics

Basic characteristics regarding gender, age, education, occupation, decent living needs, family structure, and family type are presented in Table 1. Of the 185 subjects who filled out the online questionnaire, 170 (91.9%) subjects had completed the survey, while 15 (8.1%) subjects were eliminated because the responses were incomplete and/or did not meet the criteria. Therefore, 170 heads of families of TB sufferers were listed in this study, most of whom were 50.6% women (41% of each were late adults and early elderly with an average age of  $46.75 \pm 46$  and an age range of 36-55 years), 53% high school education level (25.9% respondents were self-employed, the average need for decent living was  $1.93 \pm 0.85$ ), 75.3% were nuclear families, and 47.1% were patriarchal families. There is no difference in family functions based on age as well as family structure on family functions in preventing pulmonary TB transmission. There are no differences in age, gender, education level, occupation, or income based on decent living needs, family structure, and family type on family function in preventing pulmonary TB transmission.

Table 1.

Sociodemographic characteristics (n=170)

Characteristics	Item	f	%
Gender	Male	84	49.4
	Female	86	50.6
	P	0.493	
Age (years)	Late teenagers (17- 25 years)	24	14.1
	Early adults (26- 35 years)	33	19.4
	Late adults (36-45 years)	41	24.1
	Early elderly (46- 55 years)	41	24.1
	Late elderly (56 - 65 years)	23	13.5
	Elderly > 65 years	8	4.7
	Minimum	18	
	Maximum	82	
	Mean $\pm$ Standard deviation	47.10 $\pm$ 10.62	
	Median	46.00	
P	0.451		
Education Level	Elementary school	23	13.5
	Junior high school	34	20
	Senior high school/vocational high school	90	52.9
	Diploma/Bachelor (S-1)	22	12.9
	Master (S-2)	1	0.6
	P	0.154	
Occupation	Civil servant (government officer)	5	2.9
	Employee	43	25.3
	Self-employed (entrepreneur)	44	25.9
	Labor	31	18.2
	Unemployed	47	27.6
	P	0.171	

Decent living needs (million)	Less decent (inadequate) (< 857,728 rupiahs)	2	1.2
	Decent (857,728–2,035,000 rupiahs)	124	72.9
	Very decent (> 2,035,000 rupiahs)	44	25.9
	Minimum	1	
	Maximum	7	
	Mean ± Standard deviation	1.93±0.85	
	Median	2.00	
	P	0.238	
Family structure	Nuclear family	128	75.3
	Blended family	41	24.1
	Extended family	1	0.6
	P, Family structure * Family function		
Family type	Patriarchal	80	47.1
	Matriarchal	48	28.2
	Mixed	42	24.7
	P	0.485	

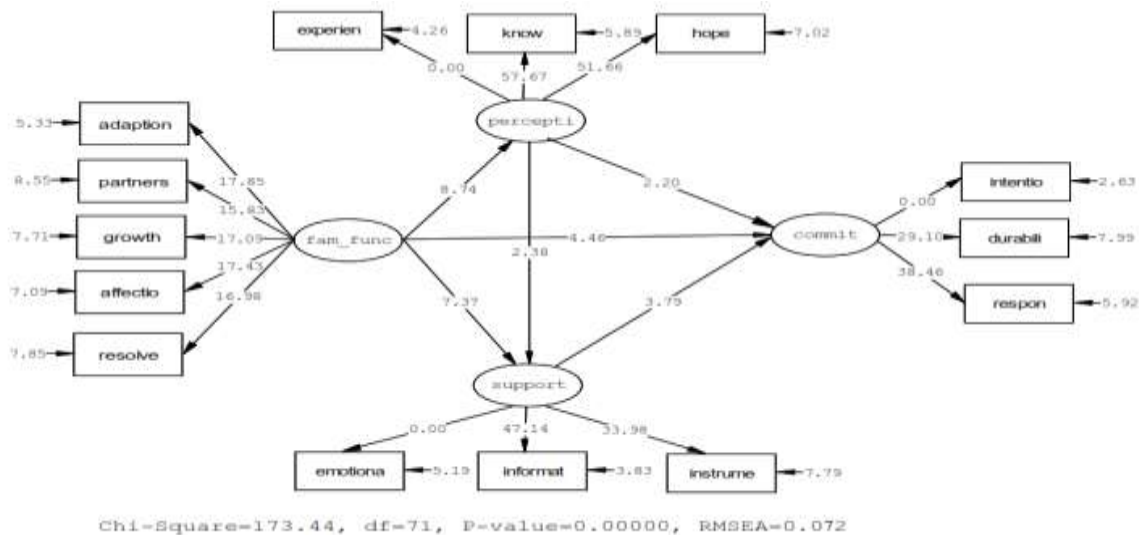


Figure 2. Structural Model Diagram of t-count estimation  
 Source: Data analyzed with Lisrel 8.80 (2023)

Before the model was tested, the normality of the data was analyzed. The results of the multivariate normality evaluation showed that all dimensions and indicator items in this study were normally distributed ( $1.214 > 0.05$ ). Furthermore, latent variables were selected as independent variables significantly affecting one another and placed into the model test to determine the level of hypothesis fit. Figure 2. illustrates the final analysis of the overall degree of the model fit, including all paths from a family function, family perception regarding the perceived risk of disease transmission, and family support which has a direct effect on family commitment in disease transmission prevention actions and pulmonary TB transmission prevention behavior (Chi-square)

$\chi^2 = 173.44$ ;  $df = 71$ ,  $RMSEA = 0.072 \leq 0.08$ ;  $GFI = 0.90 \geq 0.90$ ;  $RMR = 0.019 \leq 0.05$ ;  $NFI = 0.98 \geq 0.90$ ;  $CFI = 0.99 \geq 0.90$ ,  $TLI = 0.98 \geq 0.95$ ;  $IFI = 0.99 \geq 0.90$ ;  $PGFI = 0.59$ ,  $PNFI = 0.76$ ). Figure 2. shows that all indicators are significantly related to each latent construct. Exogenous latent variables in the FHPM construct have a positive effect on latent variables ( $t > 1.96$ ). Perception of the risk of pulmonary TB transmission have a direct relationship with family support ( $t = 2.38$ ), and family commitment in action to prevent transmission of pulmonary TB ( $t = 2.20$ ). Family support has a direct relationship with family commitment in preventing pulmonary TB transmission ( $t = 3.79$ ).

Figure 2 presents the results of the structural model analysis, which obtained commitment =  $0.382X_1 + 0.164X_2 + 0.302 X_3$ . Family function, perception, and support have a positive influence on family commitment in preventing pulmonary TB transmission, as indicated by  $v$ -value of 8.74, 4.46, and 7.37, respectively. The  $R^2$  value was 60%, suggesting that variations in family commitment to be involved in preventing pulmonary TB transmission can be explained by family function ( $X_1$ ) and perceptions of the risk of disease transmission ( $X_2$ ), and family support ( $X_3$ ), and the remaining 40% is explained by other variables outside the set model.

Table 2.  
 Structural Equation Analysis Results

Latent Variable	Standardized Coefficient	t-value	$R^2$	Description
Family function	0.382	8.74	0.60	Significant
Family perception	0.164	4.46		
Family support	0.302	7.37		

Table 2 presents the results of the structural model analysis, which obtained commitment =  $0.382X_1 + 0.164X_2 + 0.302 X_3$ . Family function, perception, and support have a positive influence on family commitment in preventing pulmonary TB transmission, as indicated by  $v$ -value of 8.74, 4.46, and 7.37, respectively. The  $R^2$  value was 60%, suggesting that variations in family commitment to be involved in preventing pulmonary TB transmission can be explained by family function ( $X_1$ ) and perceptions of the risk of disease transmission ( $X_2$ ), and family support ( $X_3$ ), and the remaining 40% is explained by other variables outside the set model.

The results exhibited that family function had a positive and significant effect on family perceptions of pulmonary TB transmission. This positive and significant relationship indicates that good family function is directly proportional to the high formation of family perceptions about the transmission of pulmonary TB. Thus, the family function also becomes one of the important determinants in shaping the family's perception of pulmonary TB transmission. The findings of this study are the findings of previous studies. These results are consistent with research conducted by Abiodun et al., (2021) that family function influences the perceptions of high-risk sexual behavior. Changes in family function are associated with the perceptions of family system dysfunctionality (Torres et al., 2021). However, other studies suggest conflicting results, and the other literature on family function is inconsistent. Family dysfunction is related to the perception of family function in epilepsy management.

This study reveals that family function has a positive and significant influence on family support in preventing pulmonary TB transmission. This positive and significant relationship indicates that

the better the family function, the higher the family support in preventing pulmonary TB transmission. On the other hand, the lower the family function, the poorer the family support will be in preventing pulmonary TB transmission at the family level. The results of this study follow the findings of previous studies. The results of this study are following research conducted by Y. Huang et al., (2021), explaining that family function has a direct positive relationship with family social support. There is a positive and significant relationship between family function and family social support in health control in outpatient clinics (Odume et al., 2015). Gaspar et al., (2022) explained that better family function is positively and significantly related to better social support. Huang et al., (2021) reported that family function has a significant relationship with social support during a pandemic.

The results of the study also demonstrate that family function has a positive and significant influence on a commitment to action to prevent pulmonary TB transmission. This positive and significant influence indicates that good family function can encourage commitment to action plans for transmission. This means that good existing family function indicates the belief and awareness of the family to be committed to the action plan to prevent pulmonary TB transmission. High confidence can provide high motivation to the family. Commitment relates to an individual belief in choosing the possibility and determination of something selected. To make a choice, families need a variety of information and realize their knowledge in making decisions based on their interests and abilities. The results of this study are in accordance with the results of research by Kurniawan, (2019) suggesting a positive and significant correlation between family function and commitment related to vocational choices. Fouad et al., (2016) explained that family function is correlated with family obligations, willingness to work, work values, calling, and work involvement. To increase family commitment and effectiveness, it is necessary to consider family function factors (Huang et al., 2022). However, other studies show inconsistent results. Hatam et al., (2016) explicated that conflict in the family has an inverse relationship with commitment.

The results showed that the perception of the risk of pulmonary TB transmission had a positive and significant effect on family support. This positive and significant effect indicates that high perceptions can encourage family support in preventing pulmonary TB transmission. In other words, if the perceptions of existing family members have a high value, the beliefs and awareness of family members form family support in preventing the transmission of pulmonary TB. With high confidence, family members can provide high motivation to the family in preventing transmission of pulmonary TB. The results of this study are in line with the findings of previous studies. Abiodun et al., (2021) explained that adolescent perceptions influence family support and function in high-risk sexual behavior.

Min et al., (2019) suggested that perceptions of signs and symptoms related to severe pulmonary TB can help them to identify TB patients who are prone to poor treatment results. This study also revealed that the perceived risk of pulmonary TB transmission had a positive and significant effect on a family's commitment to action plans to prevent pulmonary TB transmission. This positive and significant effect specifies that the perception of a high risk of pulmonary TB transmission can motivate family members to commit to an action plan to prevent pulmonary TB transmission. This indicates that the higher the perception of the risk of pulmonary TB transmission, the higher the family's commitment to the action plan to prevent its transmission. On the other hand, families

with very low perceptions tend to have family members who have a low family commitment to action plans to prevent pulmonary TB transmission at the family level. The results of this study are in accordance with the findings of previous studies. Giri et al., (2022) confirmed that barrier perception and interpersonal perception have a significant relationship to prevention commitment. It was further explained that the influence of interpersonal perception is the most dominant factor related to the commitment to prevent pulmonary TB transmission.

The results of this study indicate that family support factors have a direct influence on family commitment in preventing pulmonary TB transmission. In other words, the higher the family commitment to the action plan to prevent transmission of pulmonary TB, the higher the behavior to prevent the transmission at the family level and vice versa. This positive and significant influence directs that family commitment to the action plan to prevent pulmonary TB transmission is an internal driving factor in preventing pulmonary TB transmission. These results are consistent with the outcomes of previous research that nurses' commitment to primary care can be a driving force for a service that seeks to guarantee the quality of service and access to TB patients so that the disease can be treated and patients can recover, live healthy lives, and carry out their social roles satisfactorily (Cavalcante & Silva, 2016). Hatam et al., (2016) reported that the prominent role of organizational commitment prevents the negative effects of staff desertion in the health sector. Commitment has a positive and significant effect on patient health behavior (Berry et al., 2008).

This current study has identified several important factors for predicting the commitment of the family to be directly involved in preventing pulmonary TB transmission, but this study has several limitations. The limitation lies in the use of a cross-sectional design, meaning that the results of the study only reflect the conditions experienced during the data collection process. This is of particular note in the SEM context where the direction of the relationship between variables cannot be assessed at one point in time. Future research is required to identify the variables that are integrated with other longitudinal health promotion construction models.

## **CONCLUSION**

This study provides a theoretical framework and shows that factors from FHPM can explain the direct influence on family action commitments in preventing TB transmission. This study has revealed the effects and paths of family function, family perceptions related to the perceived risk of disease transmission, family support that has a direct effect on a commitment to action to prevent disease transmission. Family function is the most powerful factor explaining commitment to preventive action. Commitment to action to prevent the transmission of pulmonary TB as a type of family-centered pulmonary TB management strategy can serve as one of the additional strengths to inhibit the emergence of new cases due to the transmission of pulmonary TB. Assessing predictors or determinants (family functioning, perceived threat of pulmonary TB transmission, and family support) the theoretical framework of FHPM is a strategy that can be used to promote family commitment to action in preventing pulmonary TB transmission at the family level.

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