ORIGINALES

Pulmonary tuberculosis prevention behavior improvement and structured-health education in Bogor regency

Mejora del comportamiento preventivo de la tuberculosis pulmonar y la educación sanitaria estructurada en el distrito de Bogor

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ABSTRACT:
Pulmonary Tuberculosis (pulmonary TB) is a common infectious disease in the world, including in Indonesia. It is very easily transmitted through sputum splashes. It encourages development of interventions in order to control the transmission of TB, such as structured health education.
The aims of this study were to determine the effect of structured health education intervention on the prevention behavior of pulmonary TB in Bogor regency, Indonesia.
This study used quasi-experimental design with pre- and post-test design, involving 82 adults age community member who were devided into intervention and control group. The study was conducted in districts with high TB prevalence selected by purposive sampling, while the research subject was selected using simple random sampling.
The results showed that structured education significantly affects knowledge (p value = 0,000), attitude (p value = 0,000), and skill prevention of pulmonary TB transmission (p value = 0,000). Structured health could applied as an alternative choice of community nursing interventions that can be given to people at risk of pulmonary TB.

Key words: nursing intervention; pulmonary TB; prevention of transmission; structured health education

RESUMEN:
La tuberculosis pulmonar (TB pulmonar) es una enfermedad infecciosa común en el mundo, incluso en Indonesia. Se transmite muy fácilmente a través de las salpicaduras de esputo. Fomenta el desarrollo de intervenciones para controlar la transmisión de la TB, como la educación sanitaria estructurada.
El objetivo de este estudio fueron determinar el efecto de la intervención de educación sanitaria estructurada sobre el comportamiento preventivo de la tuberculosis pulmonar en la regencia de Bogor, Indonesia.
Este estudio utilizó un diseño cuasiexperimental con diseño previo y posterior a la prueba, que involucró a 82 miembros adultos de la comunidad de edad que se dividieron en grupos de intervención

y control. El muestreo aleatorio en varias etapas se utilizó para determinar el área de investigación, mientras que el sujeto de investigación se seleccionó mediante muestreo aleatorio simple.

Los resultados mostraron que la educación estructurada afecta significativamente el conocimiento (valor de p = 0,000), la actitud (valor de p = 0,000) y la prevención de habilidades de transmisión de TB pulmonar (valor de p = 0,000). La salud estructurada podría aplicarse como una alternativa de intervención de enfermería comunitaria que se puede administrar a las personas en riesgo de TB pulmonar.

Palabras clave: Intervención de enfermería; tuberculosis pulmonar; prevención de la transmisión; educación estructurada en salud.

INTRODUCTION

World Health Organization suggests that pulmonary tuberculosis (TB) is the world's highest leading cause of illness related death [1]. By 2015, there were about 10.4 million people in the world with pulmonary TB, 1.8 million people died from the disease and 95% of those deaths occured in developing countries, including Indonesia. Indonesia was the second highest prevalence of pulmonary tuberculosis, is 10% of the total number of pulmonary TB cases worldwide [2]. In 2015, the number of TB cases in Indonesia reached 330,910 — 38% of which occurred in West Java. The highest number of cases occurred in Bogor Regency, where 8,271 cases were seen by 2015[3].

Various efforts were made to address this issue, one of which was the directly observed treatment short-course (DOTS) program. Although some obstacles are still experienced by government of Bogor regency such as dropping the TB drug and not providing sputum examination at the end of treatment [4]. TB patients who have not been cured have the potential to pass the disease on to others. WHO [2] suggests that active TB clients can transmit this desease at least to 10-15 people with whom they come into contact in a year. Therefore, the community around the pulmonary TB client becomes vulnerable to transmission.

Community knowledge about pulmonary TB has an effect on the risk of disease transmission to society. A low level of knowledge leads to poor health behavior and encourages disease transmission [5]. Furthermore, it is necessary to develop interventions that can increase knowledge to improve health behavior and can suppress disease transmission.

For the purposes of this study, the researcher prepared a structured health education programme to improve behaviours related to pulmonary TB transmission prevention. Structured health education is a planned and assessed process that facilitates the knowledge, skills and abilities of self-management and empowers individuals to live healthy, to maintain and improve their quality of life and play an active role in care their health [6]. These structured health education interventions have been developed for several health conditions such as for clients Chronic Obstructive Pulmonary Disease (COPD) and Diabetes mellitus. The results of this study show that structured health education affects the beliefs about a disease and increases the potential for empowering themselves in an effort to manage their health conditions [7,8]. For that reason the researchers chose this method to improve the prevention behavior of pulmonary TB transmission in Bogor Regency. Therefore, This study aims to determine the effect of structured health education on the pulmonary TB transmission prevention behaviour in Bogor Regency, which can later be used as an alternative intervention to improve TB prevention behaviour in the community.

METHODS

Design

Quasi-experimental design was used for this research with pre- and post-tests using a control group method. The study was conducted in two districts with the highest TB prevalence selected by purposive sampling, while the research subject was selected using simple random sampling. Cilember village was selected to be the intervention group, while Tugu Utara village selected to be the control group.

Sample

The sample size was 82 adults age community member (20-59 years), 41 of whom were assigned to the intervention group and 41 to the control group.

Research Instrument

The data collection tool used in this study was a questionnaire that modified based on the guidelines of previous research and guidance from the Association of Tuberculosis Eradication Indonesia [5,9]. Validity and reliability test was conducted. The result of the validity and reliability test showed that the instrument is valid and reliable as a measure of tuberculosis transmission prevention behaviours, with 12 questions of knowledge variables (content validity with expert), 12 questions of attitude variables (R table > 0,361; Cronbach's aplha = 0, 831), 12 questions of skill variables (R table > 0,361; Cronbach's aplha = 0, 829).

Procedure

The intervention took place in four times within two-week periode for 60 minutes each session. Each session consisted of 20 minutes were accomplished with material explanations by lecture and followed by group interaction through group work, demonstrations, role-plays, and educational games stimulated by cases according to the material described in the first 20 minutes of the meeting. In the first 20 minutes, material explanation were given to large groups, whereas group interaction was performed on a small group consisting of 7-8 people per group. The learning material were overview of pulmonary tuberculosis disease in session 1, physical activity and sleep rest in session 2, nutrition management in session 3, and cough management in session 4. Final test was taken 10 days after the last session were over [10]. The researcher also provided health education about pulmonary tuberculosis prevention to the control goup once in the end of study.

RESULTS

Table 1. Respondents' characteristics on intervention and control group in Bogor Regency in 2017 (n=82)

Characteristics	Intervention Group		Control Group	
	Mean	**SD**	**Mean**	**SD**
Age	36,51	12,15	36,20	10,63

Characteristics	Frequency	Percentage	Frequency	Percentage
Gender				
a. Men	4	9,8	5	12,2
b. Women	37	90,2	36	87,8
Ethnic				
Sundanese	41	100	41	100
Education Level				
a. Basic Education	33	80,5	34	82,9
b. Middle Education	8	19,5	6	14,6
c. College	0	0	1	2,4
Income				
a. < Regional Minimum Wage	40	97,6	39	95,1
b. ≥ Regional Minimum Wage	1	2,4	2	4,9

*Standard Deviation

The characteristics of responden were as follows: age, ethnic, education, and economic status. The mean age of respondents in this study was 36.51 years (95% CI: 32.68-40.35) for the intervention group and 36.20 years (95% CI: 32.84-39.55) for the control group, (90.2%), came from the Sundanese (100%), most were elementary education (80.5%), and most of them were less than regional minimum wage (RMW) of Bogor Regency (97.6%).

The behavioural variables in this research were as follows: knowledge, attitudes and skills. The results of the analysis presented in Table 2 and Table 3.

Table 2. Results of the paired t-test of knowledge, attitude, and skill variable on intervention and control group in Bogor Regency in 2017 (n = 82)

Variable	Intervention Group					
	Before		After		Mean Difference	p value
	Mean	SD	Mean	SD		
Knowledge	9,59	1,28	11,15	0,91	1,56	0,000
Attitude	36,83	3,80	40.56	3,72	3,73	0,000
Skills	32,15	3,37	41,76	2,78	9,61	0,000

Variable	Control Goup					
	Before		After		Mean Difference	p value
	Mean	SD	Mean	SD		
Knowlegde	9,80	1,31	10,00	1,18	0,20	0,173
Attitude	36,32	3,63	36,34	4,02	0,02	0,951
Skills	34,76	4,32	35,17	4,04	0,41	0,051

*Significant at α <0.05

The result of analyzing knowledge, attitude, and sklills variables shows that there were a significant change in levels of each variable before and after engaging in structure health education. While, in control group there was no significant change in the mean value of knowledge, attitude, and skills variables.

Table 3 The independent t-test results of the knowledge, attitute, and skill on intervention and control group in Bogor Regency, in 2017 (n = 82)

Variable	Group	Mean	SD	p value
Knowledge	Intervention	11,15	0,91	0,000
	Control	10,00	1,10	
Attitude	Intervention	40,56	3,72	0,000
	Control	36,34	4,02	
Skill	Intervention	41,76	2,78	0.000
	Control	35,17	4,04	

*Significant at α <0.05

The result of the analysis showed the significant differences in the knowledge, attitude, and skill variables between intervention and control group after structure health eduction was given in intervention group.

DISCUSSION

The results of the analysis showed that there was a significant increase in the mean of knowledge variables after being given structured health education in the intervention group. This is in line with previous research which suggests there was a significant increase in pulmonary TB knowledge among respondents in the intervention group after completing a structured health education programme [11, 12]. In the educational process there was a learning process that facilitates the exchange of information and the addition of knowledge [13, 14]. Health information provided by researchers was a stimulus that affects the thinking process of respondents perceived in the form of knowledge. Knowledge is the result of one's sense of an object that was influenced by the intensity of attention and perception of the object [15]. Increased of knowledge on the respondents occurs due to the stimulus when the intervention process was given.
Structured health education that researchers provide was accompanied by the process of group interaction with several methods of group work, demonstration, and educational games. With group interaction, each member has their respective roles, giving each group a chance to think and express his or her opinion. Group members can then have a discussion to gain as much input and ideas as possible for each problem [16].

The result of bivariate analysis also showed significant increase of mean score of attitude after giving structured health education in intervention group. This study is in line with previous research on health education on the behavior of people with pulmonary TB disease in the work area of Surakarta Community Health Center whereas the results showed that there was a significant difference in mean score of attitudes after being given intervention [17]. Increased mean of attitude skor is related to knowledge improvement. Attitudes are not a fixed condition but can be changed based on previous cognitive (informational sources), feelings, and behaviors [15].

Attitudes formed by certain values which can be studied gradually, perceived as a way or response displayed by family, friends, and social influences [18]. Someone can judge

an information from a new source to evaluate the value that will impact the change of attitude.Attitude is a closed response of the stimulus of an object expressed in the form of cognitive, affective, and behavioral responses [15]. Objects observed by respondents during the process of structured health education can shape changes in attitude in a more positive direction.

Previous research on structured health education for DM type 2 clients with control groups receiving ordinary health education. Health education interventions are given for 6 hours in one full day or over two days for the same amount of time. The results of this study indicate that structured health education is more significant in influencing beliefs and readiness about diseases associated with longer intervals and program contact times [8]. This is consistent with this study, in which the intervention group was provided with structured health education with longer meeting times compared with the control group who were only given 30 minutes of health education. It can be concluded that the interval and time of health education meetings have an effect on the improvement of respondent attitude.

The result of bivariate analysis also showed significant difference mean score of prevention skills of pulmonary tuberculosis transmission after giving structured health education in intervention group. This study is in line with previous studies showing that there is a significant difference in mean score of skill after intervention [17]. Improved skills were identified from increased score number while answer the questionnaire question. Variable questions that have increased scores include skills in serving healthy diet, handwashing with soap and running water after cough or touch public utility , closing the mouth while cough with mask or tissue, exercising, and modifiying environment such as ventilation and lighting. Increased score on skills question prove that stuctured health education is effective in improving pulmonary TB prevention skills. Structured health education method can also used to provide practical education for pulmonary TB prevention skills such as serving healthy diet, handwashing with soap and running water after cough or touch public utility , closing the mouth while cough with mask or tissue, exercising, and modifiying environment such as ventilation and lighting.

Improvement of skills in this study can not be separated from the increased knowledge and attitude of respondents. Skills are formed through a process of awareness and interest, weighing the good of information obtained, trying new skills, and will accept and practice them based on their knowledge and attitude [15]. It is also related to the educational method that the researcher uses is the material explanation by lecture and followed by group interaction through group work, demonstration, and educational games stimulated with the case according to the material described. Lecture provide an understanding of the respondents about the overall material provided in each day. Group work can facilitate cooperative learning, problem solving, the sharing of ideas, brainstorming, or be nothing more than a device to allow the members of the group to get to know one another. While educational games were given to develope interest and reduce boredom [16].

Researchers also use demonstration methods in this structured health education. Demonstration methode allow the learner to observe how something is done in order to transfer theory into practical applications [16]. Demostration methode provide direct, manifested and first-hand experiments that was more effective than slides or films [19]. Direct practice is more effective at improving skills and the was more opportunitie for developing skills through repeated demonstration continoustly [20].

Structured health education in this study was based on preced-proceed health education theory. This model suggests that behavior was influenced by three factors: predisposing factors, enabling factors, and reinforcing factors [21]. Structured health education is designed to control the predisposing factors such as the knowledge, attitudes, and value of a person to the disease of pulmonary TB so that there is a change of habit. The study of behavioral changes using precede proceed model has been done in diabetic patients where the results showed that there is a significant change in eating habits of respondents who are at risk of developing type 2 diabetes mellitus [22].

Behavior changes will be maximized if the intervention is also provided with other factor changes such as social support. Behavior changes do not occur quickly, but require a long process. For a person to remain motivated to make behavioral changes, there needs to be support from the people around him. Previous study suggest that accepted social support is associated with an increase in one's physical activity [23]. In Bogor district itself, social relations between communities are still closely intertwined. This was seen during the research process and group discussions among social workers who active to invite the community to attended this study and cooperation during the group discussion process. This was a source of support for nurses in conducting behavioral change interventions in the community.

CONCLUSION

Structured health education improves pulmonary TB prevention behavior of adult age community member. This intervention that provide interactive methode appropriate with adult age condition. Stucture health education provide material explanation in order to make the respondents understand about TB material. Meanwhile, respondents is also being facilitated to observe how something is done in order to transfer theory into practical applications by demonstration methode. This methode facilitate the respondents to practice healthy behavior that can accelerate behavioral change process. Stuctured health education can be used as an alternative nursing intervention in improving pulmonary TB prevention behavior in the community. Similar research needs to be done with longer time to show more behavioral changes. Furthermore, stuctured health education can also applied to other health condition which related to non healthy behavior, such as prevention of hypertension and diabetes tipe II.

Acknowledgments

REFERENCES

1. World Health Organization. Global tuberculosis report 2016 [Internet]; 2016 [cited 2017 January 23]. Available from: http://apps.who.int/iris/bitstream/10665/250441/1/9789241565394-eng.pdf?ua=1
2. World Health Organization. Tuberculosis. [Internet]; 2015 [cited 2017 January 23]. Available from http://www.who.int/mediacentre/factsheets/fs104/en/

3. Statisctic Centre Board West Java. West Java Province in figure 2016. [Internet]; 2016. Available from: http://jabar.bps.go.id/new/website/pdf_publikasi/Jawa-Barat-Dalam-Angka-2014.pdf

4. Bogor Health Department. Bogor regency health profil in 2015. Bogor : Bogor Health Department; 2016.

5. Tolossa D, Medhin G, & Legesse M. Community knowledge, attitude, and practices towards tuberculosis in Shinile town, Somali Regional State, Eastern Ethiopia : A cross-sectional study. *BMC Public Health,* 2014,14; 804: 1–13.

6. Forde R, Dinneen S, Humphrey M, Carmody M, Clarke A, O'Leary K & Conway J. Review of diabetes structured education [Internet]. 2009 [cited 2017 January 23]. Available   from http://www.hse.ie/eng/services/Publications/topics/Diabetes/diabetesstructureded. pdf.

7. Casey C, Murphy K, Cooney A, Mee L & Dowling M. Developing s structured education programme for clients with COPD [Internet]. *British Journal of Community Nursing,* 2011 May;16(5):231-7, doi: 10.12968/bjcn.2011.16.5.231. Available from https://www.ncbi.nlm.nih.gov/pubmed/21642927.

8. Khunti K.,et.al. Effectiveness of a diabetes education and self management programme (DESMOND) for people with newly diagnosed type 2 diabetes mellitus: three year follow-up of a cluster randomised controlled trial in primary care. *BMJ* 2012;344:e2333 doi: 10.1136/bmj.e2333.

9. Association of Tuberculosis Eradication Indonesia. Informasi tentang tuberkulosis (TB). Association of Tuberculosis Eradication Indonesia: South Jakarta; 2010.

10. Seal N & Seal J. Developing healthy childhood behaviour: outcomes of a summer camp experience. Int J Nurs Pract. 2011;17(4):428-34.

11. Patil BY. A study to evaluate the effectiveness of structured teaching programme on knowledeg on tuberculosis among tuberculosis patients in Bangalore Urban District. International Journal of Research adn Engineering. 2015; 2(8), 9–12.

12. Latha KG. Effect of structured teaching programme on knowledge regarding pulmonary tuberculosis and its management among patients of pulmonary tuberculosis. The Nursing Journal of India. 2013: CIV(2), 6–9.

13. Smeltzer SC & Bare G. Brunner & Suddarth's textbook of medical surgical nursing. Philadelphia: Lippincott; 2008.

14. Potter S & Perry H. Fundamental of nursing. 8th ed. Missouri: Mosby Elsevier; 2013.

15. Notoatmodjo S. *Promosi kesehatan & ilmu perilaku.* Jakarta: Rineka Cipta; 2012.

16. Gilbert GG, Sawyer & McNeil EB. Health education for school and community health. Canada: Jones and barlett Publishers, LLC; 2011.

17. Palupi DLM. Pengaruh edukasi kesehatan terhadap perubahan pengetahuan, sikap dan perilaku penderita tuberkulkosis yang berobat di wilayah kerja Puskesmas Surakarta. Tesis. Pasca Sarjana Universitas Sebelas Maret; 2011.

18. Allender JA, Rector C, Warner KD. Community health nursing: Promoting and protecting the public's health. 7th Ed. China: Wolters Kluwer│Lippincott Williams & Wilkins; 2011.

19. Karimi Mauneghi H, Derakhshan A, Valai N, & Mortazavi F. The effectiveness of video-based education on gaining practical learning skills in comparison with demonstrating method's effectiveness among university students. *Journal of Medical Education,* 2003; 4(1): 27-30.

20. Xuan LTT, Rheinlander T, Hoat LN, Dalsgaard A, & Konradsen F. Teaching handwashing with soap for schoolchildren in multi-ethnic population in northern rural Vietnam. *Global Health Action*, 2013; 6: 10.3402/gha.v6i0.20288. doi: 10.3402/gha.v6i0.20288.

21. Nies MA & McEwen M. Community/Public health nursing: Promoting the health of population, 6th ed. Canada: Saunder Elsevier; 2015.
22. Moshki M, Dehnoalian A, & Alami A. Effect of precede–proceed model on preventive behaviors for type 2 diabetes mellitus in high-risk individuals. Sage Journals. 2016: 26 (2): 241-253.
23. Harvey IS & Alexander K. Perceived social support and preventive health behavioural outcomes among older women. J Cross Cult Gerontol, 2012: 27(3): 275-290.