TUBERCULOSIS PREVENTION: NEUMAN'S HEALTH CARE SYSTEM APPROACH

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ABSTRACT

Tuberculosis remains a global health emergency. There is an increase in number of TB cases and suspect in East Sumba from 2013 to 2015. This study aims to determine the effect of Neuman's Health Care System approach on tuberculosis prevention. This research used a quasi-experimental research design with pre-test and post-test method with control group. Intervention was health promotion with booklet media. Sample is 32 families selected using purposive sampling method with error rate 5%. Data was collected using questionnaires. Data was analysed using Wilcoxon sign rank test and Mann Whitney Test. Wilcoxon test showed significant difference in knowledge of treatment group before and after health education (Z=-3,432; p= 0,001) and preventive effort of control group (Z=-2,039; p=0,041). Mann Whitney test showed significant differences in knowledge and prevention effort between groups (Z=-0266; p= 0.039 and Z=-4,642; p= 0.000 respectively). Neuman's Health Care System Approach is effective to increase knowledge and prevention effort of family regarding TB.

Keyword : Prevention of transmission, tuberculosis, neuman's health care system approach

ABSTRAK

Hingga saat ini tuberkulosis (TB) masih menjadi perhatian dunia dan ditetapkan sebagai keadaan darurat kesehatan bagi masyarakat global. Sepanjang tahun 2013 hingga 2015 terjadi peningkatan jumlah kasus TB dan orang yang dicurigai TB di Sumba Timur. Penelitian ini bertujuan untuk mengetahui pengaruh pendekatan Neuman's System Model terhadap pencegahan penularan tuberkulosis. Penelitian ini menggunakan rancangan penelitian eksperimen semu dengan metode pre-test dan post-test dengan kelompok kontrol. Perlakuan yang diberikan adalah promosi kesehatan dengan media booklet. Sampel penelitian ini yaitu 32 keluarga yang ditentukan secara purposive dengan tingkat kesalahan 5%. Data dikumpulkan menggunakan kuesioner. Pengaruh intervensi di uji dengan Wilcoxon sign rank test dan uji beda menggunakan Mann Whitney Test. Hasil yang diperoleh menunjukkan pengaruh perlakuan yang signifikan terhadap tingkat pengetahuan kelompok perlakuan dengan Z-3,432 dan nilai signifikan 0,001 dan pengaruh signifikan dari perlakuan yang diberikan kepada kelompok kontrol pencegahan dengan nilai Z-2,039 dan nilai signifikan 0,041. Uji beda menunjukkan perbedaan signifikan pada pengetahuan kelompok kontrol dan perlakuan sebesar 0,039 dan nilai Z -2.066, dan terdapat perbedaan yang signifikan pada upaya pencegahan kelompok kontrol dan perlakuan sebesar 0,000 dengan nilai Z-4.642. Pendekatan Model Sistem Neuman yang dilakukan pada kelompok perlakuan berpengaruh signifikan terhadap peningkatan pengetahuan dan pencegahan penularan penyakit TB yang dilakukan oleh keluarga.

Kata kunci : Pencegahan penularan, tuberkulosis, neuman system model

BACKGROUND

Tuberculosis remains a global health emergency despite the fact that it is a curable and preventable disease. Ending the TB epidemic becomes one of the indicators of Sustainable Development Goals. East Sumba Regency is located in province of East Nusa Tenggara in eastern part of Indonesia. Data from the Office of East Sumba Regency Health showed that TB disease was ranked third of the 10 most common diseases in East Sumba Regency in 2013. Despite the decline in the number of new cases in the year 2014 as compared to 2013, the number of suspect by the year 2014 are approximately 1795 people. Gunawan (2015) found there were lack of knowledge of family about concept of TB, transmission method and prevention of TB among families who have family member with TB. Basically, family supports TB treatment program for the sick family member, but lack of family resources; for example limited knowledge, inadequate house infrastructure and limited family financial capacity; result in less optimal treatment outcome. From these facts, it was assumed that family has not played an optimal role in supporting health care of family members who suffer from TB.

Nurses are responsible for providing nursing care to families. Thus, they should be able to design interactive nursing interventions that can help families optimize family resources to care for their families members (Muhtar, 2013). The role of the nurse is in line with the principle of the Health Care System Model proposed by Neuman who views clients as an open system involved in mutual exchange with the environment. The open system can be an individual, group, family, or community. The main aspects of the Neuman Health System model are physiological, sociocultural, developmental and spiritual variables; basic structure and energy source; endurance line; normal line of defense; flexible lines of defense; stressors; reaction; primary, secondary and tertiary prevention; intrapersonal, interpersonal and extrapersonal factors; and reconstitution (George, 1995 in Friedman, 2013). Neuman views family as an open system consisting of subsystems of family members. The focus of this theory is on the relationships between individual family members. Stressors experienced by family can lead to disruption of family stability and threaten family welfare status. In this case, family aims to maintain stability by maintaining the basic structure of the family (Alligood, 2010).

Based on the background described above, thus it is important to do research on the prevention of TB disease transmission with Neuman's Health Care System Approach in the Public Health Clinic, East Sumba regency. This study aims to determine the effectiveness of Neuman's Health Care System Approach in preventing transmission of TB disease in the Public Health Clinic at East Sumba regency.

METHOD

This is a quasi-experimental research with control group pre and post test design. Experimental group was provided health education using booklet, while control group only receive booklet without health education. The study was conducted from September to November 2016 in a Public Health Clinic in East Sumba Regency. Sample were 32 families (16 families in each group) with an alpha rate of 5% obtained from the Montgomery formula. Sampling technique used in this research is nonprobability sampling which is purposive sampling method.

Instrument used in this study is a 2 parts questionnaire developed by researchers. The first part of questionnaire is to identify knowledge about disease and prevention of TB transmission. It consists of 10 questions with 3 answer choices for each question. Each correct answer is given a score of 1, whereas the wrong answer is given score 0. The second part is to identify efforts to prevent TB transmission by the family. It consists of 10 questions with 4 points Likert scale answer, start from Strongly Agree (SS), Agree (S), Less Agree (KS) and Disagree (TS). There are 5 positive statements and 5 negative statements. The scores for the positive statements are as follows: SS = 4,

S = 3, KS = 2, and TS = 1 and vice versa.

Validity and reliability of the questionnaire were tested on 28 respondents in one of the Public Health Clinic in East Sumba which has the same characteristics with the study's respondent. There are 8 questions in the first part and 10 questions in the second part of questionnaire were identified to be valid. Cronbach's alpha value were 0.741 and 0.781 for the first and second part of questionnaire respectively.

All respondents in both groups were given explanation about the study and signed inform consent if they agree to participate in the study. The research procedures were as follows: First, level of knowledge and prevention effort of TB of respondents in both groups was examined in pre-test. After completing the initial data collection (pre-test), treatment groups were given 3 sessions of a 60 minutes family health education about basic concept of TB disease and causal factors that can be controlled by the family. Media booklets and posters were used during health education. Respondents in control group were only given booklet, without health education. After that, post-test were conducted in both groups. The difference in level of knowledge and prevention effort before and after treatment was tested using Wilcoxon sign rank test, while the difference between groups was tested using Mann Whitney test.

RESULT

a. Patient Characteristics

Tabel 1. Characteristic of Respondent

Variable	Control (n=16) n (%)	Intervention (n=16) n (%)
Age (year)		
≤ 20	3 (18,75)	4 (25)
21 – 40	9 (56,25)	7 (43,75)
41 – 60	3 (18,75)	3 (18,75)
61 – 80	1 (6,25)	2 (12,5)
Sex		
Male	11 (68,75)	11 (68,75)
Female	5 (31,25)	5 (31,25)
Religion		
Christian	7 (43,8)	11 (68,75)
Catholic	3 (18,75)	1 (6,25)
Marapu (local religion)	6 (37,5)	4 (25)
Education		
None	5 (31,25)	3 (18,75)
Elementary School	6 (37,5)	5 (31,25)
Junior High School	3 (18,75)	3 (18,75)
Senior High School	2 (12,5)	5 (31,25)
Relation with patient		
Mother	2 (12,5)	2 (12,5)
Son/daughter	6 (37,5)	5 (31,25)
Sister/brother	4 (25)	3 (18,75)
Son in law	2 (12,5)	3 (18,75)
Grandchild	1 (6,25)	1 (6,25)
Wife	1 (6,25)	2 (12,5)

Respondents were divided into 2 groups: control group and treatment group. General characteristics are including age, sex, religion, education level and relationship to patients (Table 1). Most respondents in both groups aged between 21-40 years (56.25% in control group and 43,75% in treatment group). The proportion of male and female respondents in both groups are similar 68.75% male and 31.25% female).

Christiani is a religion shared by

many respondents in both groups (43.8% in control group and 68.75% in treatment group). The relation of the respondent to the patient quite varies. Most of respondents in both groups are son or daughter of the patients (37.5% in the control group and 31.25% in the treatment group), and the least was the grandson of the patients (12.5% in both groups).

b. Knowledge of Respondents

Tabel 2. Knowledge Level within Control Group (n=16)

Level	Pretest, n(%)	Postest, n%)	
Good	3 (18,75)	10 (62,5)	
Moderate	11 (68,75)	4 (25)	Z=-2,380; p=0,017
Low	2 (12,5)	2 (12,5)	

Tabel 3. Knowledge Level within Treatment Group (n=16)

Level	Pretest, n(%)	Postest, n%)	
Good	1 (6,25)	3 (18,75)	
Moderate	6 (37,5)	13 (81,25)	Z=-3,432; p=0,001
Low	9 (56,25)	0 (0)	

Respondent knowledge about prevention of TB disease transmission is described in table 2 and 3., More than half respondents in the control group had moderate level of knowledge (68.75%) at pre-test and at post-test, most of respondents were in good category (62,5%) (Table 2). While in the treatment group, 56.25% of respondents showed low level of knowledge in pre-test and 81,25% showed moderate level of knowledge after treatment (table 3).

c. Prevention of TB Control

Tabel 4. Effort Prevention within Control Group (n=16)

Level	Pretest, n(%)	Postest n%)	
Good	7 (43,8)	10 (62,5)	
Moderate	8 (50)	6 (37,5)	Z=-2,039; p=0,041
Low	1 (6,25)	0 (0)	

Tabel 5. Effort Prevention within Treatment Group (n=16)

Level	Pretest, n(%)	Postest n%)	
Good	0 (0)	0 (0)	
Moderate	1 (6,25)	8 (50)	Z=-3,304; p=0,001
Low	15 (93,75)	8 (50)	

Level of effort prevention of TB is described in table 4 and 5. Table 4 showed that at pre-test 50% of the respondents in control group were at moderate category and 43.8% were at good category. For post-test, there were 62.5% and 37,5% of respondents who made good and moderate effort respectively. While in the treatment group, 93.75% of respondents had low level of effort and only 6.25% had moderate effort (Table 5). After treatment, 50% of respondents showed moderate and low level of effort.

d. The effect of the application of the Neuman Health Care System (within group)

Pre and post test result for knowledge level of treatment group can be seen in table 3. Wilcoxon sign rank test showed a significant difference between pre and post-test following intervention (Z= -3.432 and p value =0.001). Similarly, in

the control group, result showed a significant difference between pre and post test result (Z= -2.380 and p= 0.017) (Table 2).

For effort prevention, there were significant difference between pre and post test result in treatment group (Z= -3.304 and p=0.001) and in control group ((Z=-2.039 and p= 0.041) (See table 5 and table 4 respectively).

e. Differences in effort prevention level between groups.

Tabel 6. Difference in Effort Prevention Level on Post Test between group (n=32)

	Control, n(%)	Treatment, n(%)	
Good	10 (62,5)	0 (0)	
Moderate	6 (37,5)	8 (50)	Z=-4,642; p=0,000
Low	0 (0)	8 (50)	

Difference in family efforts to prevent TB transmission between groups was tested using Mann Whitney Test. As seen in Table 6, there were significant differences in effort prevention of TB transmission between groups (Z= -4.642 and p=0.000).

DISCUSSION

Neuman's Health Care System approach (intervention as prevention) was used in this study. Health education was given to treatment group using booklet media in 3 sessions. While control group only received booklets without education session. Interesting finding is that in both groups there are significant changes in knowledge. It is assumed that this is due to cooperative relationship between Public Health Clinic in East Sumba and TB Responsible foundation. These two parties intensively conducted approaching and counselling on tuberculosis suspects and their family. In addition, individuals who were detected suffering from TB were closely monitored by health cadres living in the same village in the working area of the Public Health Clinic.

Notoadmojo (2007) stated that knowledge is the result of learning process that occurs after individual sensing a particular object through their senses. Knowledge becomes an important domain in shaping one's actions. There are six levels of knowledge in the cognitive domain, including knowing, understanding, application, analysing, synthesising and evaluating. Gunawan (2015) found that many factors can affect individual's ability in absorbing information, including education level, interest, study habits and informers (ie. health worker). Good communication skill is required for successfully delivering counselling or education to patients, families and communities. Information provided is adjusted from the point of view of the patient, family or society and incorporating socio-cultural values.

Health Promotion in Neuman's Health Care System was used in this study. It appears that family knowledge about TB becomes an important thing so that TB can be cured completely and no transmission occurs in the family. Adequate information from health officer would minimize misperception and wrong beliefs about TB. Moreover, Public Health Clinic needs to involve community leader in East Sumba in their program. East Sumba culture that still holding system of classis or distribution of social strata can be seen as an opportunity for health workers or policy makers in implementing their programs. Public Health Clinic or policy makers should consider involving those who respected in the community for successful program implementation.

Pratiwi, et al (2012) conducted an ethnographic study to assess community autonomy in prevention of pulmonary tuberculosis transmission in three districts in Indonesia including in Rote Ndao District, East Nusa Tenggara Province which has similar characteristics to community in East Sumba. Pratiwi et al. (2012) stated that the attitude is influenced by many variables including poverty, social, slum, moist and hygiene aspects. Sanitation is found to be closely related to

disease transmission. Houses with good lighting and ventilation will inhibit TB transmission process. This is similar to this study, where poverty, social, slum, humidity and cleanliness still become major problems in rural areas. In addition, the distance between home and health care facilities, limited transportation and bad terrain can be obstacles for adequate health care. East Sumba Regency is a mountainous area that has a tropical climate where rainfall is very low. As a result, East Sumba is likely to be dry, hot and dusty.

It was noted health workers plays important role in TB prevention and treatment programs. However, educational and demographic factors also have significant contributions to the success of TB treatment. Community participation to prevent transmission of TB should be maintained by providing health education, counselling, and health cadres training continuously. and also by involving community leaders and other sectors in the program.

CONCLUSION

There is significant effect following health education using booklet and posters both to level of knowledge and effort prevention of the families in treatment group. Similarly, level of knowledge of the families in control group was also improved after they were given booklet without health education. Significant differences were found in knowledge and prevention effort between groups. Neuman's Health Care System Approach was effective to improve family's knowledge and prevention effort of TB transmission.

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