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Effects of supplementary feeding (PMT) Milk to increase Nutritional Status of Tuberculosis Patients in Kediri Public Health Center

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Abstract
Tuberculosis is an infection of lung disease caused by mycobacterium tuberculosis which is still a major public health problem. Tuberculosis patients often experience anorexia, weight loss and general malnutrition. In West Lombok district, additional milk has been proven has not been proven effective in improving the nutritional status of tuberculosis patients. This study used a pre-experimental design conducted in Kediri Public Health Center, involving 16 respondents as tuberculosis patients with body mass index (BMI) <18.5. Data was collected by interview using questionnaire and observation sheet then given intervensions and then analyzed by using Wilxocon Signed Rank Test statistic with significance level $p \leq 0,05$. The results showed an increase in body mass index after supplemental feeding. For the government is increasing the cost to get milk and public health center to manage milk distribution for tuberculosis patients. Based on the results of the above research, the addition of additional milk has been shown to be very effective in improving the nutritional status of tuberculosis patients.

Keywords: *Tuberculosis, Milk effects, supplementary feeding, Nutritional Status*

I. INTRODUCTION

Tuberculosis (TB) is a lung infection disease caused by Mycobacterium tuberculosis which is still a major public health problem in the world (Knechel, 2009). TB patients experience anorexia, weight loss and general malnutrition. Appetite is disrupted by fatigue due to severe coughing, sputum formation, chest pain or general weakness status (Pranowo, 2010). TB patients experience drastic weight loss due to loss of appetite and decreased nutritional intake resulting in calorie and protein deficiency where the impact seen is decreased body weight, immunity to TB germs decreases and slows the healing process (Isselbacher, 1999 in Usman, 2008). Anorexic TB patients result in a decrease in energy intake of about 20% below the usual intake.

The symptoms of fever (high heat) that accompany TB disease will increase energy expenditure, which is about 15% for every 1^{o}C increase above 37^{o}C (Gibney, *et al*, 2009). TB patients often become weak due to prolonged chronic illness and impaired nutritional status. Poor nutritional status will affect the productivity of work from human resources at the productive age. Patients with low weight at diagnosis, after the first 2 months of treatment, if there is a weight gain of less than 5% will be susceptible to recurrence than patients with weight gain greater than 5%. (Knechel, 2009).

The prevention of TB program in West Lombok district with DOTS program and PMT of milk has been done, but still found more people with low BMI. The results of the interviews revealed that some factors that cause BMI is still low due to irregular consume, insufficient milk and milk utilization not only for patients but also for other family members (Puskesmas Kediri, 2011). The primary factor affecting nutritional status is when one's diet is wrong in quantity and/or quality caused by lack of food supply, poor food distribution, poverty, ignorance, erroneous eating habits, and so on, while secondary factors include all factors that cause substances nutrition does not reach the body's cells after food is consumed such as digestive disorders, absorption, metabolism and excretion (Almatsier, 2009).

Indonesia is the country with the 5th most TB patient in the world after India, China, South Africa and Nigeria (UPPI, 2011). The number of TB patients in Indonesia is about 10% of the total number of TB patients in the world. In 2009, in Indonesia found 566.000 TB patients (224 per 100.000 population). The year 2010 was 1.718.193 suspects and 181,125 smear positive (Subdit TB Depkes RI in Majalah Asy Syifa, 2010). In 2010, the number of all TB cases in West Lombok district amounted to 339 people (Health Office of West Lombok District, 2010). The number of TB cases in Kediri public health center 2010 was 59 people and based on preliminary survey data conducted by the researcher on october 24, 2011 stated that the temporary TB patients currently treatment is 28 people where normal BMI is only 8 people (28.57%) while patients with a skinny BMI of 20 people (71.43%). Body mass index of TB patients with low body weight indicates that nutrient intake is less and possibly related to disease condition, thus making the patient is not appetite and absorption of food is inadequate (Usman, 2008).

Tuberculosis patients generally experience a decrease in nutritional status, can even be malnutrition status, if not matched with the right diet (Ratnawati, 2002). If the TB patient is not treated seriously, it will lead to death where death from TB is 25% of all preventable deaths (Usman, 2008). Every 1 minute emerges 1 new TB patient, every 2 minutes one new infectious tuberculosis patient appears and every 4 minutes 1 person dies from TB in Indonesia (Hateyaningsih, 2009). Management of TB patients not only with the provision of medication, but need counseling about the importance of improved nutrition of good food so that the healing of disease can be maximal (Usman, 2008). In TB patients experiencing malnutrition, adequate nutritional support is required with the aim of improving nutritional status and enhancement of the immune system, thus helping to speed TB recovery. Regular TB treatment is needed to kill bacteria and break the chain of transmission of tuberculosis (Taslim, 2006).

Gastroenterology of FKUI RSCM provides protein intake in patients with severe chronic disease and TB patients with malnutrition and low weight after 2 weeks found significant increase in body mass index ($p < 0.05$), weight gain and also nitrogen balance which is positive (Simadibrata, 2002 in Usman, 2008). The TB patient therapy program at West Java showed good results where after 1 month of OAT administration along with dietary changes and goat milk feeding of 150 cc per day, increased appetite, cough and shortness of breath decreased. On average after 5 months with radiological examination, the lung tissue has improved and the chronic process has shifted back towards healing (Administrator Susu Segar, 2011). In East Sumba Disrict, TB control program with DOTS strategy and infant formula PMT has been given to TB patients but it is not known the effect of milk PMT on improving nutritional status of TB patients in Kediri public health center, West Lombok district.

II. METHODS

The method used in this research was pre experiment with one group pre-test post-test design. This study attempts to reveal the effect of an action given to the experimental group without involving the control group. Subject groups beginning with pre-test and after treatment were re-measured (post-test). (Nursalam, 2008). This research was conducted at Kediri Public Health Center of West Lombok district which was held on January 2013.

The population in this study were TB of TB tuberculosis patients (positive BTA TB, negative BTA TB positive RO, extra pulmonary TB) and relapse TB, which in Kediri Public Health Center, which has followed DOTS treatment program as many as 21 people. The samples in this study were clients who met the inclusion criteria: inclusion criteria were a common characteristic of target populations that were affordable and would be investigated (Nursalam, 2008). The inclusion criteria in this study were TB Patients with good TB both new (positive BTA TB, negative BTA TB positive RO, extra pulmonary TB) and relapse TB at the age of 18 years old, TB patients were temporarily undergoing treatment, patients with BMI <18.5, patients who are cooperative and willing to follow the research. While the exclusion criterion is to eliminate or publish subjects that are inconsistent with the inclusion of the study for various reasons (Nursalam, 2008). Exclusion criteria in this study were patients who have allergies to patients, TB patients who have comorbid diseases such as diabetes mellitus, ascites, patients with advice drop out (do not drink regular milk 6 times from 42 times or 14.28% for 14 days because if not drinking as much as 6 times will cause weight around 140 grams or 0.14% of body weight 1 kg for 14 days).

This research used nonprobability sampling with purposive sampling method that was sample determination technique by choosing sample among the appropriate population. So the sample can be considered a previously known population (Nursalam, 2008). The sample size used was the number of population members who have fulfilled the inclusion and exclusion criteria of 16 people. The data used in this research was by conducting interviews, making informed consent, measurement. The researcher provides an explanation of the words and goals for the TB patient and provides informed consent or letters to the patient that the patient is willing to be investigated. If the patient has received informed consent, the researchers weigh the BB and measure the TB patients in Kediri Public Health Center. The measurement results were written in the created graph. Data to be used to conduct research on TB patients at Waingapu Public Health Center. At baseline before the intervention, the researcher reviewed the general data sheet on the patients who were being sampled accordingly inclusion problems. Respondents and families (PMO) were collected at Kediri Health Center to get an explanation of the research tasks to be carried out. The family was given counseling about TB, the benefits of milk, how to make milk and an explanation of how to drink the regularity of drinking milk and food methods remember 24 hours. This training discusses the role of families in providing milk and medicine. Family on how to make milk that is with 7 dairy meal available in 1 cup warm water 200 cc 3 times a day for 14 days. Next do with the family (PMO) make the milk for the patient and drink when that can be monitored using the regularity of drinking milk relationship. On the 14th day, the researcher will review the patient's home to evaluate the final weighing result. Data tabulation was then performed to compare initial nutritional status and after milking. After the data collected, grouped, tabulated data were then analyzed by Wilcoxon Signed Rank Test statistic test. In this research will be applied pre-post test to one sample to know relation between independent variable and dependent variable with

ordinal data scale and significance level $\alpha \leq 0.05$ meaning if result of statistical test show $\alpha \leq 0.05$, hence there is significant influence between independent variable and dependent variable that is effect of supplementary feeding (PMT) of milk to increase nutrition status of TB patient. In this study using computer software with SPSS 16 for windows release system so that statistical test obtained more accurate (Sugiyono, 2010).

III. RESULTS

A. Charateristic of Respondents

Table 1. Charateristic of Respondents

Number	Charateristic of Respondents	Frequency (n)	Percentage (%)
1.	**Sex**		
	Man	5	31.25
	Women	11	68.75
2.	**Education**		
	No school	5	31.25
	Elementary school	8	50
	Senior High School	2	12.5
	College	1	6.25
3.	**Age (Year)**		
	18-20	1	6.25
	21-40	6	37.5
	41-60	6	37.5
	>60	3	18.75
4.	**Occupation**		
	Housewife	0	0.0
	Civil Servants	0	0.0
	Fishery	0	0.0
	Farmers	8	50.0
	Entrepreneur	3	18.75
	Others	5	31.25
5.	**Household Income per month**		
	<Rp. 500.000	12	75.0
	500.000 – 999.999	3	18.75
	1.000.000-1.999.999	0	0.0
	>2.000.000	1	6.25
6.	**Household expenditures per month**		
	<Rp. 500.000	12	75.0
	500.000 – 999.999	3	18.75
	1.000.000-1.999.999	0	0
	>2.000.000	1	6.25
7.	**TB type**		
	New	16	100
	Relapse	0	0
	Default	0	0
	Failed	0	0
	Moved	0	0
	Others	0	0
8.	**Duration of Drinking drugs**		
	<1 Month	5	31.25
	<2 Months	6	37.50
	<3 Months	4	25.00
	<4 Months	1	6.25
9.	**History of drinking milk**		
	Yes	16	100
	No	0	0
10.	**Milk sources**		
	Public Health Center and Purchased	1	6.25
	Public Health Center	15	93.75
	Purchased Alone	0	0
	No Drinking	0	0

Number	Charateristic of Respondents	Frequency (n)	Percentage (%)
11.	**Utilization of milk by Respondent**		
	Respondents	5	31.25
	Respondents and children	8	50.00
	Respondents and all	3	18.75
	Respondents did not drink	0	0.0
12.	**Total of milk during milk making**		
	6 tablespoons	0	0.0
	4 tablespoons	0	0.0
	3 tablespoons	7	43.75
	2 tablespoons	9	56.25
13.	**Adequate amount of milk provided by Public Health Center**		
	More	0	0
	Enough	0	0
	Less	1	6.25
	Very less	15	93.75

Table 2. Measurement of variables of nutritional status and dietary habbit

Number	Variable	Category	Frequency (n)	Percentage (%)
1	Weight	Not increase	1	6.25
		< 1 kg	5	31.25
		≥ 1 kg	10	62.50
		Total	16	100
2	IMT Post Intervention	Thin	5	31.25
		Normal	11	68.75
		Fat	0	0.00
		Total	16	100
3	Dietary habbit	Less	7	43.75
		Medium	5	31.25
		Good	4	25
		Total	16	100

Table 3. Comparison of pre and post weight feeding of supplementary feeding of milk

Number	Early weight (kg) (*Pre*)	Final weight (kg) (*Post*)	Diffrence weight (kg)
1	35.2	36.2	1
2	56.1	57.1	1
3	47	48	1
4	33.8	34.7	0.9
5	36.3	37.4	1.1
6	45.8	46.8	1
7	47.1	47.9	0.8
8	43.1	44.1	1
9	44.2	45.3	1.1
10	46	47.2	1.2
11	48	48.8	0.8
12	44.9	45.8	0.9
13	43.3	44.3	1
14	35	35.7	0.7
15	45	46	1
16	33	33	0

Table 3 showed that there is an increase in body weight after supplemental feeding of milk. Weight gain reached <1 kilogram as many as 5 people (31%) and ≥ 1 kilogram as many as 10 people (63%). There were also respondents who did not gain weight as much as 1 person (6%).

Table 4. Pre and Post BMI comparison of supplementary feeding of milk

Number	BMI (Pre)	BMI (Post)	Difference BMI
1	18.1	18.6	0.5
2	18.3	18.6	0.2
3	18.4	18.8	0.4
4	15.5	16.0	0.45
5	16.0	16.9	0.4
6	18.0	18.8	0.8
7	17.9	18.3	0.4
8	18.1	18.6	0.5
9	18.1	18.9	0.8
10	18.2	19.0	0.8
11	18.3	18.7	0.4
12	18.3	18.7	0.4
13	18.1	18.6	0.5
14	16.6	17.1	0.5
15	18.3	18.7	0.4
16	14.7	14.7	0

Table 4 showed that there is an increase in BMI after milk supplementary feeding is given. With Wilcoxon Signed Ranks Test test results obtained p = 0.001. The result of the statistic test is smaller than the significance level (p ≤ 0.05), H_1 is accepted which means that the feeding of milk supplement (PMT) has an effect on the improvement of nutritional status of TB patient at Kediri Public Health Center of West Lombok District.

IV. DISCUSSION

Nutritional status of the research respondents before being given food at the Kediri Public Health Center was also included in the confirmation with the skinny BMI (<18.5%) based on the calculation of BMI in accordance with the weight and height of the respondent. The results showed that most of the respondents had a poor diet that is 7 people (44%), respondents with moderate diet 5 people (31%) and respondents with diet only 4 people (25%). Most respondents only eat 2 times a day with only rice, vegetables, cannot afford to eat 1 portion of food, and no food interlude. This is evidenced by the results, "Do not know what it is nutrition, eat 2 times a day, just with rice and vegetables, eat not run out, no snacks between meals".

This unbalanced diet will cause the intake of incoming nutrients not in accordance with the actual needs of calories needed by the body so that the impact on decreased endurance and disease progression becomes more progressive. The results showed that more respondents worked as farmers as many as 8 people (50%), entrepreneurs 3 people (19%), other jobs 5 people (31%). This affects the family income where appropriate the results of the study found that the income of the families of respondents under Rp. 500.000 per month as many as 12 people (75%) and only 1 person (6%) with income> Rp. 2.000.000 per month. The diet in West Lombok district also still expects agricultural and livestock products with the majority of the population as farmers with the majority of the population with low family income level, so that more families consume food with unsuitable quantities and types.

The results showed that all respondents had drunk milk, as many as 15 people (94%) who consumed milk only came from public health center and 1 person (6%) got milk from public health center and also bought their own. In terms of quantity of milk is still very low where new milk is given as much as 400 grams per month for 6 months. This does not correspond to the actual amount of milk that is 35 grams each time drinking milk or as much as 4.095 grams per month. This is consistent with the results of the study where about 15 people (94%) stated that the number was very less and only 1 person (6%). This matter also influence the amount of milk dairy when make milk. More respondents know only make milk with 2 tablespoons as many as 9 people (56%) and 3 tablespoons as much as 7 (44%), for that TB patient need to be given 35 gram of milk for 3 times per day or about 500 kcal so that weight can increase. If milking is not given according to the amount it should be, then the amount of nutrients will not match the actual needs of the body. Therefore it is necessary to increase the amount of milk

for TB patients from 400 grams per month to 3150 grams per month. In terms of milk utilization, based on milk research results are not only given to sick patients but also to other family members where there are 8 people (50%) given to children. There is also milk given to all families as many as 3 people (19%). There were 5 people (31%) who consumed their own milk, 4 respondents, because they were separated from their families, so they were not given to other family members and 1 person, able to buy and consume their own milk supported by good economy.

After intervention with supplementary feeding of 35 grams or 7 tablespoons (500 kcal) 3 times daily for 14 days, it was found that the respondents experienced significant weight gain in which 7 people (44%) had an increase of 1 kg and 3 people (19%) had an increase of ≥ 1 kg. There were respondents who experienced weight gain <1 kg as many as 5 people (31%) and 1 person (6%) did not gain weight. During the intervention of milk supplement feeding, the researcher assessed the energy requirement for Basal Metabolism (AMB) by using the formula of weight loss multiplied by weight plus the absolute number based on gender and age of respondent. From the result of the research, the highest number of male respondents are male as many as 11 people (69%) and female 5 people (31%). And from the age of respondents known more in productive age where age 21-40 years and 41-60 years have amount each with 6 people (37%), age> 60 years there are 3 people (19%). The smallest age is 18-20 years as many as 1 person (6%).

From the result of the research, it is known that the respondent's activity level is adjusted to the work of the patient which can be differentiated into the heavy activity that is 11 people (69%) with the job as farmer and self-employer as many as 3 people (19%). Medium activity as much as 1 person (6%) and light activity of 4 people (25%). According to FAO/WHO/UNU, 1985 in Almatsier, 2009, to estimate total daily energy requirements, grouped by weight of activity is weight, moderate and mild with the set of activity factor values by sex. From the research results known AKG either 3 people (19%), where these respondents consume more food regularly with the number, type and schedule are regularly accompanied by low activity, so that if associated with weight increase there is a significant correlation where the respondent with a good AKG weight gain >1 kg. Respondents with moderate (80-99%) ACR (7%) (44%), consume regular meals three times a day with heavy and moderate activity. There was also a significant correlation of 1 kilogram weight gain. AKG less (70-80%) as many as 5 people (31%), where irregular eating pattern with insufficient calorie number and heavy activity, there is a significant relationship that is weight gain but not reaching 1 kilogram and deficit AKG as much as 1 person (6%), caused by irregular eating pattern, physiological condition of anorexic patient, nausea vomiting and shortness of breath so that nutrition intake is not sufficient for body needs, this causes no weight gain.

Based on data analysis and statistical test Wilcoxon Signed Ranks Test obtained results p = 0.001. The result of the statistic test is smaller than the significance level ($p \leq 0.05$), H_1 is accepted which means that the feeding of milk supplement (PMT) has an effect on the improvement of nutritional status of TB patient at Kediri Public Health Center of West Lombok District in West Nusa Tenggara Province. Many TB patients who weigh less than the minimum stated with a skinny BMI (BMI <18.5) and are at risk for infectious disease (TB), after supplemental feeding of milk increases weight. This is in line with the results of research from Gastroenterology of FKUI RSCM which provides protein intake in patients with severe chronic disease and tuberculosis patients with malnutrition after 2 weeks found significant increase of BMI ($P \leq 0,05$), weight gain and also nitrogen balance positive (Simadibrata, 2002 in Usman, 2008). TB patients with skinny BMI (<18.5) if given a good diet according to balanced nutrition with the number of calories in accordance with the needs of the body followed by normal activities, then there will be an increase in weight that will affect the increase in BMI.

V. CONCLUSION

The state of nutritional status in TB patients prior to receiving supplementary feeding (PMT) of milk has low nutritional status due to unbalanced diet, low economic and educational levels and the habit of consuming unsuitable food due to social culture.

Weight gain in tuberculosis patients after receiving supplementary feeding (PMT) of milk has increased nutritional status due to adequate nutritional supplementation according to body requirement, continuous counseling, milk use only for TB patients with tight supervision of milk by the family and PMO. Supplemental feeding has been shown to improve nutritional status in TB patients.

VI. SUGGESTION

Public health center can be better manage the distribution of milk and ensure its use only for TB patients by providing continuous counseling and improve cooperation with the Drug Swallowing Supervisor so that the supervision of drinking medicine and milk regulation is improved, as a consideration for the government

especially for the Health Office of West Lombok district to increase the number of dairy budgets according to the required amount and to evaluate the distribution and utilization of milk for TB patients.

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