Relationship between the Degrees of Severity Sequelae after Treatment with Quality of Life in Patients of Pulmonary Tuberculosis Patients

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ABSTRACT

Background: Tuberculosis remains a global health problem, especially for developing countries. Tuberculosis can cause permanent deformity of the lung parenchyma, airways, pleura, mediastinum, chest wall, and vascular. This deformity is residual symptoms or sequelae. Tuberculosis sequelae may occur in most patients although has completed treatment. These sequelae can affect lung function and will ultimately influence patient's quality of life.
Objective: This study aims to determine the relationship between the severities of sequelae after tuberculosis based index Willcox with patient's quality of life.
Methods: The study design was cross-sectional at patients of outpatient clinic BP4 Yogyakarta from September 2013 until the samples are met. The relationship between the severities of the degree of sequelae after treatment with the quality of life in patients with pulmonary tuberculosis will be analyzed using t test. Relationship is significant if $p < 0.05$ with 95% confidence intervals.
Results: The total of the subjects are 37 consist of 24 patients (64.9%) males and 13 (35.1%) women. Subjects who met the criteria will be examined the thoracic x-ray poster anterior (PA). Severity of tuberculosis sequelae will be assessed according to the index Willcox. Subjects also completed a SGRQ questionnaire as a tool for assessing their quality of life. There is a significant correlation between the severity of tuberculosis sequelae with the quality of life in the activity ($\rho = 0.031$) and total ($\rho = 0.037$) domain.
Conclusions: There is a relationship between the severities of the quality of life in patients with pulmonary tuberculosis sequelae.

Keywords: tuberculosis sequelae; tuberculosis; Willcox index; SGRQ; quality of life.

ABSTRAK

Latar Belakang: *Hingga kini tuberkulosis masih menjadi masalah kesehatan global terutama untuk negara berkembang. Tuberkulosis dapat menyebabkan deformitas permanen pada parenkim paru, saluran pernapasan, pleura, mediastinum, dinding dada, dan vaskuler. Deformitas ini merupakan gejala sisa atau sekuele. Sekuele tuberkulosis dapat terjadi pada sebagian besar pasien meskipun telah selesai menjalani pengobatan. Sekuele ini dapat mempengaruhi fungsi paru dan pada akhirnya akan mempengaruhi pula kualitas hidup penderita.*
Tujuan: *Penelitian ini bertujuan mengetahui hubungan antara derajat keparahan sekuele paska tuberkulosis berdasarkan indeks Willcox dengan kualitas hidup penderita.*

Metode: *Desain penelitian ini adalah potong lintang pada pasien-pasien rawat jalan poliklinik BP4 Yogyakarta dari September 2013 hingga sampel terpenuhi. Subjek yang memenuhi kriteria akan dilakukan pemeriksaan foto thoraks posteroanterior (PA). Derajat keparahan sekuele tuberkulosis akan dinilai dari foto thoraks menurut indeks Willcox. Subjek juga mengisi kuesioner SGRQ sebagai alat untuk menilai kualitas hidup. Hubungan antara keparahan derajat sekuele paska perawatan dengan kualitas hidup pada pasien tuberkulosis paru akan dianalisis menggunakan uji t. Hubungan bermakna bila p<0.05 dengan interval kepercayaan 95%.*

Hasil: *Didapatkan subyek penelitian sebanyak 37 pasien yang terdiri dari 24(64,9%) laki laki dan 13(35,1%) perempuan. Terdapat hubungan yang signifikan antara keparahan sekuele tuberkulosis dengan kualitas hidup pada domain activity (ρ =0,031) dan total (ρ =0,037).*

Kesimpulan: *Terdapat hubungan antara derajat keparahan dengan kualitas hidup pada pasien sekuele tuberkulosis paru.*

Kata kunci: *sekuele tuberculosis; tuberculosis; indeks Willcox; SGRQ; kualitas hidup*

INTRODUCTION

Tuberculosis is an oldest chronic infection disease on the respiratory tract caused by Mycobacterium tuberculosis.[1,2] This diseases could spread almost entire human body, especially the lungs.[3] In 1993 declared TB a "global public health emergency" with infection of one-third of the world population.[4] Tuberculosis still being a global health problem, especially in the developing country where can be found 80% for total tuberulosis case in the world. Indonesia is a sequence hearts sign with fifth term highest tuberculosis sufferers in the World. The others come from India, China, South Africa, and Nigeria. Data Beginning in May 2010, Indonesia recorded total 294.732 tuberculosis cases (MoH, 2011).

The history of eradication of tuberculosis began with the discovery of streptomycin in 1944, which was followed by the discovery of PAS (the amino salicylic acid). Not long after that successively reported the discovery of several drugs that until now the first-line treatment of tuberculosis, isoniazid, pyrazinamide, ethambutol, and rifampin[5,6.] Handling management systems are getting better enhances the success of the healing of pulmonary tuberculosis.

Recorded cure rate of new cases of smear positive pulmonary tuberculosis increased in 2001-2009[7]. However, patients who have been declared cured of pulmonary tuberculosis still have a permanent deformity as residual symptoms or sequelae.[8] Sequelae can be described with caseating granuloma formation, liquefaction, and cavities.[9]

Sequelae that occur can cause damage to the lung structure and manifest in difficulty breathing until the cause of death. The manifestation of the severity of sequelae of tuberculosis varies widely depending on the location of the lesion.

Sequelae of tuberculosis will be served to increase the TB burden. Texas study shows that the overall TB burden by entering data after TB treatment interruption would be higher than previously burden TB of data that does not include it. In the study calculated a loss of 0.37 DALY/1000 population compared to previous data with a loss of 0.07 DALY/1000 populations. This shows that the negative effects arising from post-tuberculosis sequelae a greater share of the burden of TB [9]

Some studies suggest that the evaluation of lung function is not fully reflected the impact of the illness of a patient so should be analysis using a quality of life questionnaire [10]. To analyze the impact on the lives of patients with tuberculosis sequelae can be used SGRQ quality of life questionnaire. Research conducted by Mikhail Chushkin and his colleagues in 2011 showed that SGRQ reliable and valid to analyze the quality of life of patients after pulmonary tuberculosis.

The information about the quality of life in Indonesia is not robust. In addition, all the reports from the existing literature have not found a discussion of the quality of life of patients based on the severity of sequelae of pulmonary tuberculosis.

This study aims to determine whether there is a relationship between the severities of sequelae of post-treatment quality of life in patients with pulmonary tuberculosis.

METHODS

The sample used post-treatment pulmonary tuberculosis patients who have finished running the program for at least 6 months of treatment, has been declared cured with smear negative, and had sequelae on chest x-ray examination. Samples were obtained from patients with pulmonary tuberculosis post-treatment visit in Lung Disease Clinic, Hospital Dr. Sardjito BP4 Yogyakarta. The study began in September 2013. Patients will be asked to answer a questionnaire to determine their quality of life. The severity of pulmonary sequelae determined using the index Willcox through chest x-ray radiographic examination results. At the beginning of the meeting, the patient will fill out an informed consent. The samples obtained were 45 patients, but after only 37 patients were selected to be analyzed and appropriate inclusion and exclusion criteria.

There were 37 patients aged 18-59 years of data that can be analyzed in this study. In Table 3 are shown the basic characteristics of the study subjects.

The severity of pulmonary sequelae in patients with post-TB is measured using an index Willcox. Of the total 37 patients, there were 25 (67.6%) patients had a severity 1 (mild) and 12 (32.4%) patients had a severity 2-3 (severe). The average score of the subject domain symptoms was 20.69 ± 18.28 points score. Symptoms domain scores range is 0-100 points maximum score.

Figures show the average score 20.69 20.69 maximum score of 100 points, which means that impaired quality of life that occurs is equivalent to 20.69%. This also applies to other domains (activity, impact and total).

The fourth domain of the SGRQ, symptoms had the highest score. This may imply that the post-tuberculosis patients tend to experience more interference in respiratory symptoms compared to the activity, as well as social Functions, and psychology (Table 3).

The smoking status of the subject of sequel tuberculosis sufferers are rated based on anamnesis. Of the 37 patients obtained 21 subject smokers (current and former smokers) and 16 of the subject is not a smoker (passive smokers and non-smokers). Based on the results of the research of Willcox et al. (1989), mentioned that some sufferers of tuberculosis are smokers good largely

Variable	Distribution and frequency
Old, year	36.59±1.08
Body mass index, kg/m²	1.86±0.63
BMI, n (%)	
Underweight	10 (27.0)
Normal	22 (59.5)
Overweight	5(13.5)
Sex, n (%)	
Man	24 (64.9)
Woman	13 (35.1)
Smoking status, n (%)	
Active smokers	12 (32.4)
Passive smokers	8(21.6)
Former smokers	9(24.3)
Non smokers	8(21.6)
FVC (%prediction) (mean±SD)	80.8±22.3
FVC (L) (mean±SD)	2.3±0.8
FEV1 (% prediction) (mean±SD)	2±0.8
FEV1/FVC (%)	89.7±15.3
Index Willcox, n (%)	
1	25 (67.6)
2-3	12 (32.4)
SGRQ, Skor 0-100	
Symptoms	20.69±18.28
Activity	16.24±24.56
Impacts	18.86±15.14
Total	18.38±1.57

Table 3 The Univariate analysis, the variables in the form of scale intervals and categorical. and Distribution and frequency characteristics of the subject

Smoking can decrease the FEV1, triggered respiratory tract obstruction progressively, increasing disability and symptoms such as sneezing, coughing, and shortness of breath.[11, 12] States 90% of COPD patients are smokers but only 15-20% of smokers who suffer from COPD. Smoking can also increase the risk of incident tuberculosis.[13, 14]

Tuberculosis can occur 3-4 times higher than women as well as men over 35 years old and smoked more than 20 rods per day. Never smoking with symptoms in people with tuberculosis such as coughs and dyspnea can increase. In radiology, tuberculosis to someone who never smoked is more likely to exhibit the existence of cavities, miliari, and the presence of pulmonary damage wider participation such as the upper zone 11. From these data can be interpreted that just maybe there is a connection between smokers with lung tuberculosis. When looking at the relationship between tuberculosis and lung COPD, tuberculosis is one of the risk factors that can increase the occurrence of chronic airway obstruction. Airway obstruction can be found when the diagnosis of tuberculosis is enforced or be a symptom of time (sequel). COPD that occur after the tuberculosis lung shows higher resistance on respiratory tract and response to bronchodilator that increasingly low when compared COPD because respiratory tract obstruction on constricting the chronic (Jordan et al. 2010). From the information it is known that chronic obstructive

pulmonary disease (COPD) in people with tuberculosis can be caused due to damage to the lungs of tuberculosis disease itself, but with the habit of smoking then the incidence of COPD can be increased.

Bivariate analysis, the relationship between Willcox indexes

SGRQ score obtained an increase in the average score across all domains of SGRQ (symptoms, activity, impacts, and total) along with an increase in the degree of severity index Willcox. This can mean that a patient's quality of life post tuberculosis in every dimension of good activity, symptoms, effects, and overall will decline over time as the increasing degrees of severity of post-Easter possessed sequels tuberculosis. There is a decline in the quality of life in patients with interstitial lung disease.[15] However, this data is statistically significant only in the domains of activity and total ($\varrho < 0.05$). The domain of the symptoms (0.057) and impact (0.106) was not statistically significant (table 4).

DISCUSSION

At the beginning of the study, the average test has done between Willcox index 1 (mild) and Willcox 2-3 indexes (weight) with the four outputs of the research. Exodus research here among other things, the symptom domains of activity, impacts, and the total of the SGRQ. In sequel tuberculosis, anatomical changes will occur on a permanent lung caseating granuloma formation, due to liquefaction, and cavities. Sequel caused tuberculosis not limited only in the parenchyma of the lungs, but can also attack the respiratory tract, pleura, mediastinum, chest wall, and vascular surgery. The result of this sequel will tend to cause disruption in breathing. This disorder can cause abnormalities in the restriction, obstruction, or a mixture. In research conducted by [16] found 14/41 (34%) subjects had respiratory tract obstruction, 8/41 (20%) subjects had obstruction with restriction, 9/41 (22%) subjects with a decrease in volume of non-obstructive lung, and 10/41 (24%) subjects had normal lung function. Pulmonary disorder due to sequel tuberculosis also varies. The number of pulmonary restriction is more than obstruction.[17] The incidence of pulmonary restriction is recorded as much as 24%, obstructive disorders of 23%, and abnormalities of the mixture as much as 19%.

People with tuberculosis sequel and cavities found the incident light whereas the restriction in sufferers without cavities shows the normal functioning.[18] Based on this data it can be seen that the tuberculosis patient under treatment have a tendency to have a breathing disorder. This disorder can vary greatly based on the degree of severity of the sequel-owned sequel is getting worse because the more lung zones involved and the more the cavities formed.

Interstitial Pulmonary damage due to sequel will tend to result in disorders of the respiratory form of shortness of breath and can affect the amount of maximal O2 uptake (VO2 max). When interstitial damage occurs it will lower the total volume of the lung which resulted in lowering the number of VO2 max. Person with pulmonary tuberculosis after the devastating damage will lower VO2 max.[19] VO2 max fitness system correlates with the body. The higher the VO2 max someone then the higher a person's fitness so it can do a lot more.

SGRQ	Willcox Index		ρ value	Mean diference
Skor 0-100	1	2,3		
Symptoms				
mean±SD	15.88±13.53	30.72±23.06	0.057	-14.83
Median	11.88	23.51		
Activity				
Mean±SD	8.67±16.16	32.01±31.67	0.031	-23.34
Median	8.67	35.35		
Impacts				
Mean±SD	16.07±13.35	24.68±17.51	0.106	-8.61
Median Total	16.07	19.78		
Mean±SD	13,82±11,32	27.87±19.67	0.037	-14.04
Median	10,25	23.68		

Tabel 4. Bivariate analysis, variable in the form of interval scale. SGRQ score based on Willcox index.

Research conducted by Green, GM et al. 1976, against 25 patients with interstitial lung disease found that the intensity of the fibrosis associated with air exchange during a break or activity.[20] Therefore, the more severe damage to pulmonary tuberculosis, amid increasingly severe breathlessness suffered the more limited activity that can be done.

Respiratory disorders (Croup) and limitation of activities that can be experienced sequel tuberculosis sufferers will likely have an impact on an individual's social function because it cannot be the task and activity as readily. Plus a negative stigma in society about the disease tuberculosis cannot be avoided despite the sufferers already cured of his illness. These disturbances may also have an impact on mental health sufferers. So it can be said that sequel tuberculosis this harms the social and psychological functioning of sufferers. Ferreer et al. (1996, 1997) and Engstrom et al. (2001) in Wulan (2006) say that the worse the value of FEV1 then getting worse anyway psychosocial status of sufferers (ϱ-0.37-(-0.38)).

Psychosocial disorders sufferers will vary depending on the motivation of your family and yourself as well as the severity of sequel tuberculosis. The higher degree of tuberculosis sequel was the higher possibility of psychosocial disorders of the sufferer. A person's overall quality of life is affected by a variety of things like physical health, mental, and social functions. According the above explanation, in patients with tuberculosis will be obtained after the devastating decline in physical health in the form of interstitial lung damage sequel. This damage will have an impact on respiratory disorders, decreased activity, ability and inclination disorders occurred in psychosocial. It can therefore be concluded that the sequel tuberculosis can lower the quality of life of sufferers. This is in accordance with the research done [22]the quality of life in patients with chronic obstructive pulmonary disease decreases the occurrence of decline in FEV1. However, the study obtained a weak correlation between pulmonary function with quality of life.[23] This difference can be caused due to the influence of psychosocial factors on the measurement of quality of life 22 The magnitude of the disruption of each factor in quality of life depends on the severity of the patient's post on sequelae tuberculosis. Sequelae is getting worse; the more impaired function of social and physical health of a

person, then it is likely also to mental health disorder. So it can be said that the higher the severity of tuberculosis under sequelae then the lower the quality of life. There is a decline in the quality of life in patients with interstitial lung disease[24]. There are limitations in this study i.e. the researcher cannot follow the disease distribution of patient so patient's lung condition is unknown before experiencing tuberculosis. This is due to the design of this research is to cut the latitude so that backup data and observations done in one time only. This condition can allow the occurrence of bias on Lung examination results because patients may be worsening lung condition has happened since before suffering from tuberculosis as a result of the smoking habit. Smokers themselves have their risk factors for the onset of COPD, so bias can occur whether the severity of tuberculosis this is really due to tuberculosis or disease has been around since before the patient was suffering from tuberculosis.

CONCLUSION

There is a relationship between the degrees of severity of the devastating sequel of care with the quality of life of patients with tuberculosis sufferers.

BIBLIOGRAPHY

1. Longo, DL et al. 2012, Harrison's Principles of Internal Medicine, 18 edn, McGraw-Hill, United States of America.
2. Hegewald, E., Wolf, M., Keller, A. Friedl, T. & Krienitz, L. (2010). ITS2 sequence-structure phylogeny in the Scenedesmaceae with special reference to *Coelastrum* (Chlorophyta, Chlorophyceae), including the new genera *Comasiella* and *Pectinodesmus*. *Phycologia* 49(4): 325-335.
3. Bothamley, GH, Grange, JM 1991, 'the Koch Phenomenon and Delayed Hypersensitivity: 1891-1991', Tubercle, vol. 72, no. 1, pp. 7-11.
4. Departemen kesehatan (DEPKES) dan World Health Organization, 2008: Lembar Fakta Tuberkulosis.
5. Robitzek, EH, Selikoff, IJ 1952, 'Hydrazine Derivates of Isonicotinic Acid (Rimfon,Marsilid) in The Treatment of Active Progressive Caseous Pneumonic Tuberculosis', Am Rev Tuberc, vol. 65, pp.402-28.
6. Amin, Z & Bahar, A., 2007, 'Tuberkulosis Paru', Dalam: Sudoyo A. W., Setiyohadi B., Alwi I., Simadibrata M.K., Setiati S., Buku Ajar IlmuPenyakitDalam, Jilid II, Ed IV, FKUI, Jakarta, pp. 988-1000.
7. Kementerian Kesehatan Republik Indonesia 2011, Strategi Nasional Pegendalian TB.
8. Harada S, Harada Y, Kitahara Y, Ishibashi T, Shinoda 1990, 'Tuberculosis Seqeulae: Clinical Aspect'.
9. Pasipanodya, JG et al. 2007, 'Pulmonary Impairment After Tuberculosis', Chest, vol. 131, pp.1817-1824. Pasipanodya, JG et al. 2007, 'Using the St. George (Pasipanodya et al. 2010)
10. El Rhazi, K et al. 2006, 'Validation of the St George's Respiratory Questionnaire in patients with COPD or asthma in Morocco', The International Journal of Tuberculosis and Lung Disease, vol. 10, no. 11, pp.1273-1278.
11. Chakrabarti, B, Calverley, PMA, Davies, PDO 2007,'Tuberculosis and Its Incidence, Special Nature, and Relationship with Chronic Obstructive Pulmonary Disease',

International Journal of COPD, vol. 2, no. 3, pp. 263–272.

12. Ikalius, Yunus F, Suradi, dan Rachma N. 2007. Perubahan Kualitas Hidup dan Kapasitas Fungsional Penderita Penyakit Paru Obstruktif Kronis setelah Rehabilitasi Paru.*Majalah Kedoteran Indonesia.*Vol 57. No12: Desember. hal 447
13. Kolappan, C & Gopi, PG 2002, 'Tobacco Smoking and Pulmonary Tuberculosis', Thorax, vol. 57, no. 11, pp. 964-966.
14. Boon, SD et al. 2005, 'Association between Smoking and Tuberculosis Infection: A Population Survey in A High Tuberculosis Incidence Area', Thorax, vol. 60, pp. 555-557.
15. Jacqueline a. Chang, j. Randall Curtis, Donald l. Patrick, and Ganesh Raghu (1999)
16. Willcox, PA and Ferguson, AD (1989) Chang, JA, Curtis, JR, Patrick, DL, Raghu, G 1999, 'Assessment of Health-Related Quality of Life in Patients with Interstitial Lung Disease", Chest, vol. 116, pp. 1175-1182.
    Willcox, PA & Ferguson 1989. 'Chronic Obstructive Airways Disease Following Treated Pulmonary Tuberculosis', Respirator Medicine, vol.83, pp. 195-19
17. Snider, GL, Doctor, L, Demas, TA, Shaw, AR 1971, 'Obstructive Airway Disease in Patients with Treated Pulmonary Tuberculosis', Am Rev Respir Dis, vol. 103, no. 5, pp. 625-640.
18. Sepmeitutu, I 2013, 'Perbedaan Fungsi Paru Pada Berbagai Derajat Sekuele Tuberkulosis Paru', thesis, Yogyakarta, Universitas Gadjah Mada.
19. Byoung h. Lee, Jae Hyung Lee, Kyung Chan Kim, and Sang-hoon Kim (2007) Lee, BH, Kim, YS, Lee, KD, Lee, JH, Kim, SH 2008, 'Health-related Quality of Life Measurement with St. George's Respiratory Questionnaire in Post-tuberculous Destroyed Lung', Tuberculosis and Respiratory Diseases, vol. 65, no. 3, pp. 183-190.
20. Green, GM et al. 1976, 'Correlated Studies of Interstitial Pulmonary Disease', Chest, vol. 69, no.2_supplement, dilihat pada tanggal 4 Maret 2014, http://journal.publications.chestnet.org/article.a spx?articleID=1048439
21. Ferreer et al. (1996, 1997) and Engstrom et al. (2001) in Wulan (2006) Wulan, HR 2006, Hubungan Derajat Keparahan Penyakit Paru Obstruktif Kronik Dengan Kualitas Hidup, thesis, Yogyakarta, Universitas Gadjah Mada
22. Stahl et al. (2005) Stahl, E et al 2005, 'Health-Related Quality of Life Is Related to COPD Disease Severity', Health and Quality of Life Outcomes, vol. 3, pp. 56.
    Stahl et al. (2001), Stahl E, Wadbo M, Bengtsson T, Strom K, Lofdahl CG 2001, 'Health Related Quality of Life, Symptoms, Exercise Capacity and Lung Function During Treatment for Moderate to Severe COPD', Journal of Outcomes Research, vol. 5, pp. 11-24.
23. Jacqueline a. Chang, j. Randall Curtis, Donald l. Patrick, and Ganesh Raghu (1999) 'Assessment of Helath-Related Quality of life in Patients with Interstitial Lung disease', Chest, vol 116, pp.1175-1182.