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# The Predicted Quality Adjusted Life Years (QALYS) Using St. George Respiratory Questionnaire (SGRQ) in Indonesian Tuberculosis Patients

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## The Predicted Quality Adjusted Life Years (QALYS) Using St. George Respiratory Questionnaire (SGRQ) in Indonesian Tuberculosis Patients

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**Abstract:** Tuberculosis (TB) disease is one of the chronic diseases which could influence the patients' quality and quantity of life. The quality and quantity of life may be affected by the disease itself or the disease's treatment due to the adverse effect. The purpose of this research is to predict Quality Adjusted Life Years (QALYs) value before and during the treatment using Indonesian version of St George Respiratory Questionnaire (SGRQ) instruments which has been validated. This study used a cross sectional design conducted prospectively in 91 new patients diagnosed as pulmonary TB in Pulmonary Clinics, province of Yogyakarta on November 2013 until April 2015. Patients filled out the SGRQ and the total score was counted to predict the QALYs. We found that the predicted QALYs before and during the treatment significantly different with value was 0,691 before the treatment and they were 0.805; 0.846; 0.877; 0.892 and 0.899 during the first until fifth month of treatment respectively ( $p < 0,05$ ). The TB treatment can improve health status from index number 0.691 to 0.899 which is 0.208 during the treatment will produce 2 QALYs. We conclude that the predicted QALYs of TB patients during the treatment are good and show that the patients experience significant improvement of quality of life.

**Keyword:** Tuberculosis, Saint George Respiratory Questionnaire (SGRQ), Quality Adjusted Life Years (QALYs).

### Introduction

Tuberculosis [3] is the disease that could influence the quality of life of the patients. Currently, quality of life is one of main outcome to understand the impact of intervention of health service besides morbidity and mortality [1]. In developing country, at the latest decade, the incidence of chronic disease has become to be dominant as the infection disease in community. A number of people can live longer, but by carrying the burden of chronic disease or disability, so the quality of life becomes a concern of health services [2]. In 2013, Indonesia was still become the fifth of highest TB incidence in the world after

India, China, Nigeria and Pakistan [3]. Due to this situation, TB treatment should be effective and may increase patients' quality of life.

Quality of life was defined as individual perception about individual status in life in context of culture and value system, the relationship of life with purpose, hope, standards, and attention [4]. Quality of life measurement can be conducted by two ways, which is the quality of live as a whole, whereas the individual evaluation toward themselves completely and quality of life measurement that only measure a certain domain [5].

*Quality Adjusted Life Years (QALYs)* is an individual status of health measurement which illustrates any incensement in quality and quantity of life obtained by individual as treatment result [13]. QALYs is an arithmetic result from life expectancy and patient's quality of life measurement at the rest of their life. QALYs determine how much the quality of life in disease condition [6].

QALYs is a performance measures for particular medical treatment and health intervention in a single two-dimensional metrics that is important as a result in the form of a degree of health improvement within a certain time interval including an increase in duration of life. The duration is measured in 1 year and quality of life is expressed in number between 0 and 1 with 0 as died and 1 as perfect health. So the treatment is expected can increase the duration of life by 1 year from perfect health to produce 1 QALYs. The result of an intervention that could be increase the status of health from index 0,25 to 0,75 that is equal to 0,5 for two years will produce 1 QALYs [7].

The prediction of QALYs value previously had been conducted to patient with Chronic Obstructive Pulmonary disease with the objectives to develop and validate an algorithm that can be used to predict the QALYs value from SGRQ instrument [8]. The result of the other study stated that QALYs from the treatment result until the end of life has higher social values when compared to QALYs that obtained from a palliative care or temporarily. The quality of QALYs on individual that has a treatment until the end of life is higher so it can improve the quality of life at the rest of life [9].

The objective of this research is to predict the value of QALYs before and during the treatment using Indonesian version of SGRQ instrument which has been validated.

## Material and Methods

### Design Study, Subjects and Ethical Consideration

This study was conducted by cross sectional design. The subjects of this study were 91

patients that met inclusion criteria; newly diagnosed as lung TB, age 18-80 years old, non-illiterate, willing to be involved in the study. We conducted this study at Pulmonary Hospitals of Yogyakarta on November 2013 until April 2015. All of the patients were informed about the study and signed the consent form. The ethical consideration was approved by the National Ethics Committee of Health Study, Number: KE 01.06/EC/531/2012.

### Data Collection

We collected patients' characteristics data from the medical records. Patients were asked to fill in Indonesian version of SGRQ. The QALYs values can be predicted using recommendation model from previous study [8].

### Statistic Analysis

Statistic analysis to know the difference of Predicted QALYs of TB patients before and during the treatment by using Friedman test and then tested with Post Hoc Wilcoxon test.

## Results

We recruited 91 newly diagnosed TB patients. Most of the patients are male (60.4%) and in the age group of 18-36 yo. There are 54.9% patients with the Body Mass Index less than 18.3 and experienced cough with sputum (85.7%). Most of them are experience cough more than 3 weeks (72.5%). Table 1 presents TB patients' characteristics. Table 2 presents that the scores of SGRQ domains is getting decrease, meaning that the patients' quality of life are getting better during the treatment. The differences of the scores among the visitation are significant.

The predicted QALYs from total score value of SGRQ used the recommendation model "QALYs = 0.9617 - 0.0013SGRQ Total - 0.0001SGRQ Total<sup>2</sup> + 0.0231 for male patient" [8] can be seen in Table 3.

The predicted QALYs before and during the treatment from the first month until fifth month showed significant difference with value of  $p < 0.05$ . QALYs before the treatment is 0.691; then the first until fifth month are 0.805; 0.846; 0.877; 0.892 and 0.899, respectively.



**Table 1: Patients' Characteristics**

Characteristics	N	(%)
Gender		
Male	55	60.4
Female	36	39.6
Age (yo)		
18-36	43	47.3
37-56	36	39.6
57-76	12	13.1
BMI		
13.3-18.3	50	54.9
18.4-24.3	33	36.3
24.4-29.3	8	8.8
Cough		
With sputum	78	85.7
Without sputum	13	14.3
Cough duration (week)		
1	17	18.7
2	8	8.8
3	66	72.5

**Table 2: Domains' Scores of SGRQ**

Domain (%)	Months Before treatment	Months					P value
		1	2	3	4	5	
Symptom	51.90	33.96	27.37	21.53	18.19	16.25	<0.05
Activity	44.12	33.22	29.33	26.23	24.78	22.24	
Impact	40.64	27.68	22.21	16.90	14.94	13.34	
Total	43.57	30.40	25.22	20.50	18.45	16.51	

**Table 3: Predicted QALYs of TB patients**

Patient Visit	Prediction of QALYs
Before treatment	0.691
First Month	0.805
Second Month	0.846
Third Month	0.877
Fourth Month	0.892
Fifth Month	0.899

**Table 4: Differences of predicted QALY of TB patient's before and during treatment**

Variable	Mean $\pm$ SD	Friedman test
QALYs - before treatment	0,6914 $\pm$ 0,21949	<i>p Value</i> = 0,00
QALYs - 2	0,8463 $\pm$ 0,15022	
QALYs - 5	0,8996 $\pm$ 0,14259	

Table 4 shows the statistic result of *Friedman* test continued by *Post hoc wilcoxon* which presents the significant difference from the predicted QALYs before and during the treatment ( $p = < 0,05$ ). This values show that the quality and quantity of life in TB patients before treatment are at

the lowest level but during treatment the quality of patient's condition is increased.

### Discussion

According to the patients' characteristics, our study results are in line with some previous study. Most of the patients are

male, is also reported by WHO that the TB prevalence of male are 2.3 times higher than female due to the social characteristic of male [10]. Smoker was supposed to be the contributor of high prevalence of male patients in TB [11]. Most of the TB patients are in the productive age, whereas they have to be careful with the working environment to avoid the spread of the disease in their environment. Furthermore, they also may experience productivity loss due to the intensive treatment of TB.

The scores of all domains of SGRQ show similar pattern, which is the quality of life is getting better during the treatment compare to the before treatment or after the diagnosis procedures. Among the three domains, the symptom domain has the highest score, meaning that symptoms experienced by the patients have significant impact to the quality of life. Previous studies in India, China and USA using different instruments show similar results that physical domain was the most influenced domain affected by TB [1,12,13].

In general, we found that the predicted QALYs of TB patients increase from the lowest value before the treatment to the higher values during the treatment. The lowest value before the treatment may be caused by the TB symptoms like cough which experienced by the patients for 3 weeks. The predicted QALYs value are in line with the quality of life scores in all domains.

Because there is no specific standard to determine the criteria value of QALYs, so it is assumed that the prediction value of QALYs > 0.5 told as the good condition close to healthy condition. In the period before treatment the prediction value of QALYs is 0.691 which mean the value is above 0.5 and can be assumed the condition is good enough. This is showed that when the patient is diagnosed as TB patient, the

occurring of TB disease symptoms whether main symptoms or following with or without additional symptom causes the deterioration of patient's quality of life limited daily activity which causes productivity loss.

The treatment result can increase the health status from index 0.691 to 0.899 which is 0.208 during the treatment will produce 2 QALYs. Previous study about health quality loss due to TB shows that acute TB morbidity can cost 0.046 QALY and chronic morbidity can cost 0.96 QALY [14].

Regarding to our study result, it is important to support patients' adherence during the treatment, which need at least 6 months treatment, and to give information about TB drugs adverse reactions. If the patients adhere to the treatment and they understand about how to treat or avoid the adverse drug reaction, then the treatment will be effective and can increase their quality of life.

Our study has limitation due to the instrument used in this study which is not specific for tuberculosis and the limited sample size. Future study is recommended to compute the predicted QALY using other methods of QALY measurement.

### Conclusion

The predicted QALYs and Quality of life of Indonesian TB patients during the treatment are good and show that the patients experience significant improvement of quality of life. Patients should be supported by health care providers for increasing their adherence to get better quality of life and effective TB treatment

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