

## Quality of Life and Illness of Silicosis Patients

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### Abstract

**OBJECTIVES:** To evaluate the quality of life (QOL) and illness among silicosis patients.

**MATERIALS AND METHODS:** The cross-sectional study was conducted among 125 silicosis patients aged between 29-79 years old. Four different tools were used in the study these included WHOQOL-BREF-THAI, Suanprung Stress Test-20 (SPST-20), peak flow metre and depth interview with the method of Feeling, Idea, Function, and Expectation (FIFE).

**RESULTS:** Approximately 80% of the silicosis patients can live life at a moderate to poor quality of life, and 83.2% of the silicosis patients had abnormal PEFR. In-depth interviews implemented with FIFE methods revealed that most of the silicosis patients are aware that silicosis is incurable but preventable. Additionally, it was known among workers that changing occupation might be necessary when diagnosed with the disease. Annual chest x-rays and medical checkup by physicians are considered to be the most practiced for silicosis patients. The relation between %PEFR and QOL showed low correlation ( $r = 0.05$ ). In addition, the relation between %PEFR and stress level also showed low correlation ( $r = 0.07$ ).

**CONCLUSION:** Four different tools may be considered to monitor silicosis amongst workers through home visits carried out by the residents' local health assistants or nurses.

**Keywords:** quality of life, illness, silicosis, WHOQOL-BREF-THAI, SPST-20, peak flow metre, FIFE

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Thailand has been operating under greater levels of surveillance, control and prevention of silicosis since 2001 instated by the Bureau of Occupational and Environmental Disease.<sup>1-5</sup> However, silicosis is still a major health problem affecting workers who are exposed to silica. Moreover, silica has now been classified as The International Agency for Research on Cancer (IARC) class I. Silicosis is incurable and continuous exposure to silica will eventually lead to fatality especially in developing countries.<sup>6-9</sup> The International Labour Organization/World Health Organization (ILO/WHO) has established a silicosis elimination programme, aiming to reduce the incidence of silicosis between 1995 to 2015, and to completely eradicate silicosis by 2030. Even though Thailand has been participating in this programme along with another 22 countries, there are still new cases of silicosis that are continuously reported.<sup>3,5,8,9</sup>

Due to the nature of disease progression, silicosis is incurable.<sup>6,9,10</sup> Without behavioral change and the minimization of silica exposure, the disease will progressively affect the QOL of both patient and family. Studies on QOL and illness of patients have yet to be explored, despite studies and continuous reports on silicosis. Based on this, researchers are interested in evaluating QOL and illness of silicosis patients to allow for a proper preparation for home visits and medical treatments by an interdisciplinary team including occupational physician and family physician.

Received: June 8, 2020

Revision received: July 1, 2020

Accepted after revision: August 12, 2020

BKK Med J 2020;16(2): 158-161.

DOI: 10.31524/bkkmedj.2020.21.008

www.bangkokmedjournal.com

**Materials and Methods**

*Participants*

125 silicosis patients aged between 29-79 years old who were diagnosed with silicosis in Nongnam Sai district, Amphoe Sikhiu, Nakhon Ratchasima province. All data were collected from February 2017 to March 2018. This research study was approved by the Ethics Committee of Thammasat University on Research in Human Subjects, document number MTU-EC-CF-022/60.

*Tools*

1. WHOQOL-BREF-THAI was used to evaluate QOL.<sup>11</sup>
2. SPST-20 was used to evaluate general stress.<sup>12</sup>
3. Peak flow meter was used to evaluate PEFR.<sup>13</sup>
4. Illness assessment questionnaire was used for FIFE interview.<sup>14-16</sup>

*Data Analysis*

SPSS program for Windows Version 19 was used for analyzing data as follows:

1. Descriptive statistics was used in case of frequency distribution to describe the results in percentage, mean, median and interquartile range.
2. Pearson correlation was used to assess correlation between PEFR, QOL and stress.

**Results**

125 workers aged between 29-79 years old were diagnosed with silicosis. The average age of workers was 49.80 ± 9.76 years old. 63 (50.40%) of silicosis patients are male and 62 (49.60%) are female. The majority of the silicosis patients (78.70%) were under universal coverage scheme. Average

monthly income was roughly 9,500 baht. 108 (86.40 %) silicosis patients have elementary education. 72 silicosis patients (57.60%) were not addicted to smoking while 25 silicosis patients (20%) smoked and 28 (22.40%) of them had quit. Silicosis patients had underlying diseases as follows; 6 (0.80%) asthma, 8 (6.4 0%) pulmonary tuberculosis, 8 (6.40%) allergic rhinitis and 2 (1.60%) heart disease. For their work, 45 (36%) silicosis patients were stone-cutters in the mountains, 27 (21.60%) silicosis patients were stone-cutters in their house and 34 (27.20 %) silicosis patients were stone crafters. 19 silicosis patients (15.20%) lived in the carving area without working.

Result of QOL evaluation by WHOQOL-BREF-THAI revealed that most of silicosis patients had moderate QOL in four aspects (physical, mental, social and environmental) but only 1 (0.8%) silicosis patient had poor QOL (Table1). Evaluation on QOL of silicosis patients separated by job characterization showed that stone cutting workers had moderate QOL in environmental aspect (Table 2).

The results of the general stress test stated that 68 (54.40%) of silicosis patients suffered from stress at moderate level; 29 (23.20%) of silicosis patients suffered from stress at high level and 20 (16%) at low level. High stress level was characterized by stress that made the individual anxious, panic, fearful or being in a conflicting situation that could not be resolved. High stress level might result in illness such as hypertension and peptic ulcer. 8 (3.85%) of silicosis patients had severe stress that was characterized as life-span critical situation, such as severe illness, chronic diseases, disability and loss of loved one. Severe stress might result in physical and mental illness affecting oneself and family. Severe stress should be treated by professional specialists as soon as possible (Table 3).

**Table 1:** Evaluation QOL of silicosis patients ( n = 125 ) using WHOQOL-BREF-THAI

	Physical	Mental	Social	Environmental	Overall
Poor	2 (1.60)	1 (0.80)	26 (20.80)	1 (0.80)	1 (0.80)
Moderate	88 (70.40)	67 (53.60)	68 (54.40)	71 (56.80)	98 (78.40)
Good	35 (28.00)	57 (45.60)	31 (24.80)	53 (42.40)	26 (20.80)

**Table 2:** Evaluation QOL of silicosis patients using WHOQOL-BREF-THAI and classified by job characterization.

WHOQOL-BREF THAI	Stone-cutting workers				Stone Crafters		Residents living nearby		Others	
	in mountain		in home		(in home)		stone factory			
n	45		27		20		14		19	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
Physical	24.91	2.72	23.78	2.47	25.30	3.23	24.21	3.13	25.32	3.92
Mental	22.84	3.47	22.30	2.85	22.65	3.42	22.36	2.03	23.63	3.86
Social	9.38	1.91	9.59	2.11	9.75	2.23	10.29	2.00	9.68	2.33
Environmental	28.60	3.01	29.26	2.97	30.25	3.90	30.29	3.33	30.58	3.56
Overall	85.73	9.55	84.93	8.49	87.95	10.75	87.14	9.73	89.21	10.28

Respiratory effect of silicosis patients in this study was evaluated by peak flow metre. 75 silicosis patients (60.0%) had a PEFR value between 50-79%, which indicated early obstructive airway. Interestingly, 29 silicosis patients (23.2%) had PEFR value below 50%, which indicated severe obstructive airway. The other 21 silicosis patients (16.8%) had PEFR value between 80-100%, which indicates normal airway (Table 4).

Correlation analysis among %PEFR, QOL and stress suggested that %PEFR and QOL had low correlation (r value was close to 0). %PEFR and stress had a low correlation with no statistical significance (Table 5).

### Silicosis patient illness analysis result evaluated by FIFE

#### F- Feeling

*Patients' feeling about patient illness in relation to disease or current symptom by emphasizing their feeling and emotion.*

More than 75% of silicosis patients feel that silicosis is not terrifying but their concerns are that their offspring who work at the same place might suffer from the same or similar disease. 25% of silicosis patients feel terrified because they have witnessed their neighbour passing away from the disease.

*"I know that silicosis is incurable but I have been doing this job for such a long time. When I work, I usually use a mask to cover my nose. Since I was diagnosed with silicosis from chest x-ray the doctor showed me, I have worked less and let my children do the work instead. I tell them to use mask but only sometimes they use it because they feel uncomfortable."*

*"When I was diagnosed with silicosis, I stopped cutting stone right away because my neighbour passed away from this disease. Now, I switched to selling coal instead. In fact, I am really scared of death."*

#### I- Ideas

**Ideas about disease or current symptom that may be treated based on silicosis patient's belief. For example, what do you think about current disease, what might be the cause of your present symptoms and how to cure them?**

90% of silicosis patients understand that silicosis is incurable but preventable. Only 10% of silicosis patients believe that silicosis is caused by trespassing the forest, land excavation that is sacred to spirits who make them ill from working.

#### F- Function

70% of silicosis patients can work normally without any dyspnea or fatigue. 20% of silicosis patients changed from working outdoors to working indoors in order to minimize the chance of exposing themselves to harmful particles, especially silica. 10% of silicosis patients stopped working in stone-cutting industry and switched to agriculture such as growing corn and cassava.

**Table 3:** General Stress Evaluation with method of SPST-20 (n = 125)

Stress level	Number of silicosis patients (n (%))
Low	20 (16)
Moderate	68 (54.40)
High	29 (23.20)
Severe	8 (6.40)

**Table 4:** PEFR value of silicosis patients measured by Peak Flow Metre

PEFR Value	n (%)
< 50%	29 (23.20)
50 - 79%	75 (60)
80 - 100%	21 (16.80)

**Table 5:** Correlation between % PEFR - QOL and % PEFR- stress amongst silicosis patients

Correlation	R	p
% PEFR – QOL (Overall)	0.051	0.573
% PEFR- stress	0.049	0.586

*"I can work as usual but recently, there has not much work to do. I am aware that I have silicosis but I do not feel any exhaustion."*

*"I can do the work normally without any symptom"*

*"I quit working at the mountain. Now I work at home instead"*

*"I cannot go in stone cave anymore. I stay at home doing stuff and raising grandchildren."*

#### E- Expectation

More than 90% of silicosis patients expect to have annual chest x-rays and medical check-ups done by the GP (General Practitioners) at the primary care centre. 10% of silicosis patients expect free mask giveaway.

*"It would be nice if we have annual chest X-rays so I could know if I had gotten more severe"*

*"I don't expect anything. I know if I get this disease, I have to stop working"*

### Discussion

Evaluation of QOL by WHOQOL-BREF-THAI demonstrated that 99 silicosis patients have moderate to poor QOL. Studies on QOL of silicosis amongst workers are very lacking. To the best of our knowledge, this is the first assessment on QOL of silicosis patients in Thailand. There are a few

studies from Sri Lanka, China and India which showed moderate QOL in silicosis patients with COPD.<sup>17-20</sup> However, the methods used to evaluate QOL were different so the scores cannot be directly compared.

Concerning PEF, there were 104 silicosis patients that had abnormal PEF. From Table 5, it showed %PEFR were slightly correlated with stress levels of silicosis patients. Interestingly, 37 patients had a high to severe stress level according to SPST-20. As a result, action should be taken to provide an appropriate treatment for these patients.

Concerning QOL, there were no statistical significance in every job category, which may possibly be derived from healthy worker effects.<sup>17</sup> This is in coordination with illness evaluation that diagnosed silicosis workers tend to change work from cutting stone to crafting stone, or switch to another job sector, including animal husbandry and agriculture.

Silicosis can progress even after the absence of silica exposure.<sup>21</sup> As a result, it is necessary to follow up on the patients regularly. In many situations, it is difficult for the

patients to follow up at hospitals. Hence, an interdisciplinary team composing of a local nurse, health personnel and volunteers is an appropriate treatment response. The interdisciplinary team should be specialized in occupational medicine as well as family medicine.

In the present study, there seems to be less connection from %PEFR with QOL, and stress. The beliefs and understanding of the disease has led to the FIFE method being adopted in order to assess the patients. A combination of the four different tools may be an appropriate method for the follow-ups with the patients.

### Conclusion

Combination of 4 different tools including WHOQOL-BREF-THAI, SPST-20, peak flow metre, and depth interview with the method of FIFE may be considered to monitor silicosis patients. Local interdisciplinary team should consist of the appropriate personnel in order to conduct home visits effectively.

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