CHARACTERISTICS OF SMOKERS AND NON-SMOKERS AMONG TUBERCULOSIS PATIENTS IN A SOCIO-ECONOMICALLY UNDERPRIVILEGED AREA IN METRO MANILA, PHILIPPINES

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ABSTRACT:

Background: Smoking is one of the serious non-communicable health issues. Currently, 80% of the smokers are living in low- and middle income countries. Around 6 million people died due to smoking every year; and more than 600,000 non-smokers died as second- hand smokers. Otherwise, communicable disease such as tuberculosis (TB) still posed a serious threat for the people, especially in the developing countries. Previous studies indicated that smoking cessation by health providers is effective; also recommended the smoking cessation program into TB program. TB treatment takes at least 6 months; and this is a good opportunity to take smoking cessation by health professionals. However, there are not enough data which based on people who live in the socio-economically underprivileged areas. This study was to identify the characteristics between smokers and non-smokers among TB patients in Metro Manila, Philippines.

Methods: A cross-sectional study was conducted in 263 TB patients from January 2015 to January 2016. A structured questionnaire was used for the data collection. It composed of 6 sections which are patient profile, socio-demographics, TB symptoms, smoking motivation, smoking situation for smokers, and basic smoking knowledge test. Smokelyzer which is biochemical measurement was used in order to clarify the smoking situation of each patient. Data was analyzed by Chi-square test; and smoking knowledge test was evaluated by t-test.

Results: Total respondents were 263 (smoker n=60, non-smoker n=203). Smoking rate in males was 19.0% and 3.8% in females. The smoking rate of the family members (61.7% of smoker and 48.3% of non-smoker) and friend (83.3% of smoker and 61.1% of non-smoker) of smokers were higher than those who are socially close to non-smokers. There were significant differences on their smoking motivation about whether close friend smoker or not (χ^2=10.2404, p=0.03720, p<0.05). Moreover, the data obtained indicated that low-educational background, low-income in the respondents.

Conclusion: The data showed that the smoking behavior tend to influenced by their family's and friend's smoking habits. The comprehensive approaches will be required to quit smoking and also anti tuberculosis activities.

Keywords: Smokerlyzer, Economically underprivileged area, Tuberculosis, Philippines

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INTRODUCTION

To fight against communicable diseases and non-communicable diseases are the largest issues in the public health field widely, especially in developing countries. Most of the smokers in the

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world live in developing countries; and nearly half of the men are in low-income countries with less education and lower incomes [1]. Indeed, the smoking rate is decreasing in the developed countries but increasing in the developing countries [2]. Tobacco is killing nearly 6 million people a year; and it has the negative impact on economic productivity, living standards, development and human health [3].

Nowadays, HIV/AIDS, tuberculosis (TB) and Malaria are known as serious communicable diseases. Approximately 6 million people are dead as a result of those three major diseases. Among them, about one-third of the world's population has latent TB; and 1.3 million died from the disease in 2012. Over 95% of cases and deaths are happened in developing countries [4].

The relationship of smoking and TB has been revealed extensively for the past decade. Recent studies showed that smoking is one of the most important risk factors for TB patients such as increasing the probabilities of relapse after treatment and death of TB. There are enough evidences to conclude that the smoking is causally associated with TB [5]. Thus, the World Health Organization Framework Control on Tobacco Control (WHO FCTC) was established in response to the globalization of the tobacco epidemic in order to reduce the smoking prevalence rate and introduced tobacco controlled measures such as laws, regulations, and administrative decisions [6]. Also, WHO Tobacco Initiative (WHO/Tobacco Free Initiative: TFI) was established in 1998 to take measures for the global tobacco epidemic. TFI published 'Policy recommendation for smoking cessation and treatment tobacco dependence in 2003". WHO/TFI recommended that evidence based background material tailored to their specific local needs, [7] however, there are no distinct data regarding the economic status and smoking rate in terms of understanding the socio-demographic grounds about the people who live in economically underprivileged area. WHO and International Union Against Tuberculosis and Lung Disease (IUATLD) recommend that the smoking cessation program is integrated into TB program; because DOTS is a good opportunity for TB patients who are smoking to take smoking cessation advice by the health professionals during their long term treatment [8].

The study sites are the big urban economically underprivileged areas in Metro Manila, Philippines. There are no available data regarding the socio-demographic background. The finding of this study will be essential to guide further research when an organization or the government establishes the smoking cessation program into TB program. This study was to identify the characteristics between smokers and non-smokers among TB patients in Metro Manila, Philippines.

METHODOLOGY

A cross-sectional study carried out in Tondo, Manila city and Payatas Quezon city, Metro Manila, Philippines during January 2015 to January 2016. Study areas were the 2 TB clinics in Manila city and 3 TB clinics in Quezon city. Two hundred and sixty three TB patients were required. For the sampling technique, newly diagnosed patients, who were 18 years old or above and came the cooperation TB clinics for their treatment, were recruited as the respondents in this study. However, Multidrug resistant (MDR) TB patients and the patient who cannot well communicate with the interviewer classified as exclusion criteria.

Yamane in 1967 with 95% confidence level and *p*-value =0.05 was used to calculate the sample size for this study as follows,

$$n = \frac{N}{1 + N(e)^2} = \frac{647}{1 + 647(0.05)^2}$$

Smokerlyzer (CO measurement)

The Smokerlyzer is a breath carbon monoxide monitor. Carbon monoxide (CO) is a toxic, odorless, colorless and tasteless gas. When a smoker inhales smoke from a cigarette, CO is aborted into their blood through their lungs; and Smokerlyzer show the high CO ppm as follows [9]. However, in this study, the CO level was categorized 0-10ppm as a non-smoker and 11ppm and above a smoker (Table 1).

Study limitation

Smokelyzer is an useful biological measurement tool to clarify the smoking situation of each TB

Table 1 Guideline of CO level (ppm)

Description	Adult (ppm)
Non-smoker	0-6
Danger zone	7-10
Smoker	11-15
Frequent smoker	16-25
Addicted smoker	26-35
Heavily addicted smoker	36-50
Dangerously addicted smoker	51+

Table2 Smoking status by gender

Title	Classification	Number	%
Smoking status (n=263)	Smoker	60	22.8
	Non-smoker	203 (*55)	77.2 (*20.9)
Smoking prevalence rate (n=263)	Male smoker	50	19.0
	Female smoker	10	3.8
Male-female ratio in smokers (n=60)	Male smoker	50	83.3
	Female smoker	10	16.7

*Including ex-smoker

Table 3 Smoking motivation

	Smoker		Non-smoker		Total		*p*-value
	Number	%	Number	%	Number	%	
Does anyone smoke inside your home?							
Yes	37	61.7	98	48.3	135	51.3	0.068
No	23	38.3	105	51.7	128	48.7	
Total	60	100	203	100	263	100	
Does your close friend smoke?							
Yes	50	83.3	124	61.1	174	66.2	0.013
No	10	16.7	79	39	89	33.8	
Total	60	100	203	100.1	263	100	
Have you received smoking prohibit information at health facility?							
Yes	56	93.3	174	85.7	230	87.5	0.117
No	4	6.7	29	14.3	33	12.5	
Total	60	100	203	100	263	100	
Have you received smoking prohibit information from your friend?							
Yes	24	40	45	22.2	69	26.2	0.005
No	36	60	158	77.8	194	73.8	
Total	60	100	203	100.0	263	100.0	
Have you received smoking prohibit information from your family?							
Yes	43	71.7	56	27.6	99	37.6	0.000
No	17	28.3	147	72.4	164	62.4	
Total	60	100.0	203	100.0	263	100.0	
Have you received smoking prohibit information from any other place?							
Yes	19	31.7	45	22.2	64	24.3	0.131
No	41	68.3	158	77.8	199	75.7	
Total	60	100.0	202	100.0	263	100.0	
Why do you smoke?							
I like smoking	20	33.3					
I cannot stop	27	45					
No reason	0	0					
Offering by someone	12	20					
Others	1	1.7					
Refused	0	0					
Total	60	0.0					

patient. However, TB patients who have had strong symptoms are not able to hold the breath 15-seconds, besides, Smokyrlyzer shows the incorrect value due to heavy air pollution. Feeling of the TB symptoms is depends on the personal. It is difficult to measure their symptoms only using the questionnaire.

Analyze the data

TB symptoms, smoking motivation by smoking status and smoking knowledge test were a patient

Table 4 Smoking situation

Smoking situation	Smoker		Non- smoker		Total	
	Number	%	Number	%	Number	%
Have you ever smoked?						
Yes	60	100.0	55	27.1	115	43.7
No	0	0	148	72.9	148	56.3
Total	60	100.0	203	100.0	263	100.0
Did you smoke in the last 3 months?						
Yes	60	100	0			
No	0	0	0			
Total	60	100.0	0			
How often do you smoke?						
Daily	57	95.0				
Less than daily	3	5.0				
Total	60	100.0				
During the past 2 weeks, have you tried to stop smoking?						
Yes	44	73.3				
No	16	26.7				
Total	60	100.0				
Are you willing to stop smoking?						
Yes	58	96.7				
No	2	3.3				
Total	60	100.0				
What kind of tobacco do you smoke?						
Manufactured tobacco	59	98.3				
Hand-rolled tobacco	1	1.7				
Others	0	0				
Refused	0	0				
Total	60	100.0				
How much money do you spend for your smoking per month?						
P0-99 (US$0-2)	3	5.0				
P100-199 (US$2-4.1)	5	8.3				
P200-299 (US$4.2-6.4)	4	6.7				
P300-399 (US$6.5-8.5)	5	8.3				
P400 and above (US$8.6-)	43	71.7				
Total	60	100.0				

profile, socio-demographic and smoking situation were analyzed by t-test.

RESULTS

There were no differences of the characteristics between smokers and no-smokers on patient's profile, socio-demographics, TB symptoms and smoking knowledge. Remarkably, the data obtained did not show the high smoking rate in the study sites. Those results were not consisting with the previous studies. However, interestingly, the data indicated that the smoking rate of the family members and friend of smokers were higher than those who are socially close to non-smokers. The results showed that smoking behavior might be influenced by their parents' and close friends' smoking habits.

CO level which was detected by Smokelyzer was clearly high among smokers in respondents. However, Smokerlyzer detected high CO level among non-smokers in a few cases. It was considered that the cause influenced by heavy air pollution or using charcoal. It was a kind of the limitations of the Smokelyzer. Moreover, TB patients usually diagnose by microscopy sputum test. The results of sputum test showed the high negative rate among all respondents.

General characteristics

Majority (83.3%) of smokers were male; and 16.7% were female (Table2). Among smokers, most of them (male: 70.6%, female: 80%) were under 50 years old. 37.7% of smokers and 44% of non-smokers were not working.

Table 5 Smoking knowledge test

	Smoker		Non-smoker		*p*-value
	Number	%	Number	%	
People have free choice whether or not to smoke					
Correct answer	43	71.7	154	75.9	0.510
Everyone know how bad smoke is					
Correct answer	51	85	159	78.3	0.257
Just a few cigarettes a day can't hurt					
Correct answer	11	18.3	37	18.2	0.984
'Light' cigarette are less harmful					
Correct answer	15	25	52	25.6	0.923
It's easy to stop smoking, if people want to quit					
Correct answer	48	80	154	75.9	0.546
Cessation medication do not work					
Correct answer	33	55	106	52.2	0.704
Once a smoker, always a smoker					
Correct answer	7	11.7	43	21.2	0.098
Smoker may die earlier, but all they lose are a couple of unpleasant years at the end of life					
Correct answer	54	90	172	84.7	0.302
Environmental tobacco smoke may be a nuisance, but it is not deadly					
Correct answer	51	85	150	73.9	0.074
Tobacco is good for the economy					
Correct answer	8	13.3	39	19.2	0.296
We have already solved the tobacco problem					
Correct answer	10	16.7	31	15.3	0.793
The tobacco industry no longer markets to kids or, undermines public health efforts					
Correct answer	12	20	56	27.6	0.238
One out of two Filipino makes is a smoker					
Correct answer	52	86.7	174	85.7	0.852
Smoking only causes cancer of the lungs					
Correct answer	45	75	132	65	0.148
Every cigarette contains,					
a) 7,000 chemicals and 70 known carcinogen					
b) 700 chemicals and 7 known carcinogen					
c) 70 chemicals and 70 known carcinogen					
Correct answer	34	56.7	126	62.1	0.451

TB symptoms

There were no differences of TB symptoms between smokers and non-smokers (data not shown). However, 65% of smokers and 71% of non-smokers were smear negative cases.

According to the data obtained (Table 3), there was no significant differences between smokers and non-smokers whether their family members smoking or not. 61.7 of smokers have had family members who were smoker but 48.3% of non-smoker's family members were smoking. Also the question about whether close friend was smoking or not, 83.3% of smoker had the smoking friend; and 61.1% of non-smokers have smoking friend ($\chi 2$= 32.8, P=1.0 P<0.05). Both data showed that the smoker's rate was higher than non-smoker's.

Moreover, regarding the ban on smoking, there were also no significant differences between smokers and non-smokers; but around 90% of smokers and no-smokers took the smoking ban at the health facility ($\chi 2$= 138, P=5.66, P<0.05). In question about have you received smoking prohibit information from friends was 40% of smokers and 22% of non-smokers said 'yes' ($\chi 2$= 71.76, P=2.43, P<0.05) and in question from your family members was 71.7% of smokers and 27.6% of non-smoker answered 'yes' ($\chi 2$= 54.0, P=1.97, P<0.05) Most of smokers were warned to stop or reduce the amount of tobacco by their family members for economic or

health reasons. Another question for just smokers about why do you smoke, 33.3% of smokers simply answered *"I like smoking"* but 45% of smoker said *"I cannot stop smoking"*.

This section applied only for smokers. The data showed (Table 4) that almost all (95%) smokers were daily smoker; and only 5% of smokers were not daily smoker. Interestingly, 73.3% of smoker attempted to stop smoking for some reasons in the last 2 weeks; and 96.7% of smokers were willing to stop smoking. The data showed that almost all (98.3%) of smokers were smoking manufactured tobacco; and 71.7% of the smokers consumed more than PHP400/month. Roughly estimate, the smokers can buy at least 7 packs (140pcs tobacco) of month and 5pcs tobaccos are smoking per day.

Smoking knowledge test

This test was done in order to find out the differences of knowledge about tobacco smoking between smokers and non-smokers. It consists of 17 questions.

According to the result (Table 5), the average point of smokers was 9.2 and non-smokers was 9.5 points. There were no significant differences between two groups and nearly equal distribution of correct and also wrong answer rate in both groups.

DISCUSSION

The prevalence of tobacco is generally higher among those living in urban, having less education and staying in low economic groups, and people with less knowledge about effects of smoking. The study findings were not consistent with those studies. High rate of smoking were not always confined to the poorest groups. For example, in Bosnia and Herzegovina, Georgia, Latvia, Philippines, Russian federation and Ukraine, even in the richest population group smoking in men was more common than not (i.e. the prevalence was above 50%). In nine countries from both low- and middle- income groups, the poorest men were at least two times more likely to smoke than the richest ones even after controlling for these factors. The magnitude and direction of socioeconomic inequality varies substantially between countries. It is conventional wisdom that smoking levels are highest in poorest groups; but it is not always the case as shown in our study. Particularly in women and in middle income countries, we observed a significant pattern of pro-poor inequality – risk of smoking was higher in the wealthiest population groups.

Smokelyzer (piCO$^+$ bedfont Scientific Ltd., Upchurch, UK) is a useful tool in terms of clarification of the smoking status of each patient. The CO level describe that non-smoker (0-6ppm), Danger zone (7-10ppm), Smoker (11ppm and above). In this study, the CO level was categorized 0-10ppm as a non-smoker and 11ppm and above as a smoker. The median of CO level among smokers was 8.5ppm; and non-smoker's was 3ppm in this study. The data mentioned that CO levels were significantly higher in smokers than in non-smokers. However, the Smokerlyzer showed high CO level which was more than 11ppm among 5 non-smokers. Exhaled CO was increased after inhalation of diesel exhaust particulates. High Co level in non-smokers might be affected by those factors; so it is needed to use the Smokerlyzer under certain condition that is not affected by those factors.

The salaries of respondents were under PHP 21,000 (≒US$390) per month; and tobacco expenditure per month was PHP 326; and per year was PHP 3,916.80 (US92.27) per smoker in this study. From this, we calculate that roughly 2% of family expenditure was spent for tobacco. According to World Bank Report 2014, the Philippines is currently classified 'Lower-Middle income country; and average family income 2014 was PHP 235,000 (≒US$5,020) per year and PHP 19,583 (≒US$418) per month. Poverty incidence among Filipinos in the first semester of 2015 was estimated at 26.3 percent [10].

Recently, the interval between wealth and poverty has been widening among the people in the country even within urban area; also many people in this area are working in informal sector. The job in this sector is often physically exhausting with low wages and insecurity. Poor rural households in China were reported to spend over 10% of their total household expenditures on cigarettes [11]. Tobacco expenditure has negative impact on the household income especially for the people who live in poverty.

Regarding the education, 46.7% of smokers and 40% of non-smokers did not finish their compulsory education in this study. The educational system in the Philippines was six-year elementary school and four-year senior high school, total 10 years compulsory education. As a reference, the educational system was changed in 2012 in the Philippines which is called 'K-12 system'. This is a new curriculum that covers kinder garden and total 12 years of basic education [12]. However, this new

educational system is not applying for this criteria because inclusion in this study was 18 years and above.

Primary school participation net enrolment ratio in male was 87.9% and 89.5% in female. Secondary school participation net attendance rate male was 55.1% and 70% in female in 2008-2012 [13]. The school attendance rate among respondents in the study site was lower than in national data. The tuition fee in the public schools is free in the Philippines; but children need the transportation or meal expenditures to attend the school. Moreover, many children in economically underprivileged area are expected to work by their family rather than studying in order to support their household income.

The results in this study showed a high unemployment rate among respondents compared to the report Philippine statistics authority. The unemployment rate in this country was 6.5% in Metro Manila (NCR) was 8.2% in 2015[10]. Most of the people in these areas basically came from outside of Manila to seek better job; but our data indicated that they were not able to do so.

The data obtained showed that there were no significant differences in symptoms between smoker and non-smokers, however, some previous studies clearly showed that TB patients who are smoking increase the risk of TB symptoms seriously such as cough, dyspnea, cavity lesions in the lung, positive sputum culture, and drug resistance [14, 15]. Moreover, smoking TB patients are more likely spread TB to the others [16]. Thus, the finding in this study is not consistent with the study above.

However, the states of disease depending on the individual self-reported may be difficult to measure their symptoms just asking by a questionnaire. Another tool for objectionably and quantitatively measuring symptoms is needed. Remarkably, the results showed that 73.3% of smokers attempted to stop smoking and also 96.7% of them are willing to stop smoking but failed which was considered caused by nicotine dependence. In cessation, quit rates are lower in the poorest groups and for those living in socially disadvantaged areas [17].

CONCLUSION AND RECOMMENDATION

The aim of this study was to identify the characteristics of smoker and non-smokers among TB patients in underprivileged area of Metro Manila, the Philippines. There were no significant differences on patient's profile, characteristics, TB symptoms, smoking situation and knowledge test between smokers and non-smokers; but the data indicated that the low-educational background, low-income and, high unemployment rate among the respondents. Remarkably, the results showed that the smoking behavior might be influenced by their parent's and close friend's smoking habits. Moreover, majority of the smokers were willing to quit smoking and tried to do but almost all them failed. As a mentioned above, smoking cessation intervention is needed for not only TB patients who are smokers but also their family members and friends.

WHO mentioned that the keys for reducing the smoking rate are 1) Awareness of the dangers of tobacco, 2) Graphic warnings pack warnings, 3) Bans on tobacco advertising, 4) Taxes discourage tobacco use, 5) Illicit trade of tobacco products and good monitoring tracks the extent and character of the tobacco epidemic and indicates how best to tailor policies [18]. Those comprehensive approaches as above by the government and health organizations are needed for reducing the smoking rate among TB patients. Some studies show that the smoking cessation intervention by health professionals who have accurate knowledge during TB treatment which is known as Directly Observe Treatment Short-course (DOTS) is effective to highly reduce the smoking rate because DOTS currently takes at least 6 months; and this is a good opportunity to take smoking cessation advice during their treatment. The data obtained from this study is useful to better understand the problem in the study area.

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