Predictors of Health Care Seeking Pace Among Newly-Diagnosed Pulmonary Tuberculosis Patients In Cebu City, Philippines: A Cross-Sectional Study

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Research article

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Abstract

Background Tuberculosis remains a major public health dilemma in the Philippines. While free and effective TB diagnosis and treatment have been made available since 1996, a number of patients still delay accessing them resulting to increased TB mortality and community transmission. This study is aimed at determining the significant variables that can predict a TB patient's pace in seeking appropriate health care. Methods A descriptive, correlational cross-sectional survey was done to 127 newly-diagnosed TB patients from 10 government-owned TB DOTS facilities in Cebu City. Participants were categorically grouped into Prompt Health Seekers and Delayed Health Seekers using a norm-referenced median dichotomy. Descriptive and inferential analysis utilized included Chi-square Test, Pearson's Correlation and Discriminant Analysis. Results A mean health care seeking delay of 59 days (median=49) was recorded. Most of the participants experienced unexplained cough which they perceived as only slightly dangerous. 38% of them reported not knowing any symptom related to TB while 39% were not aware of the free public TB services. Most patients have made 2-3 prior health recourses, mostly through self-medication, before finally contacting a DOTS facility. Marital status (p=0.004), the number of symptoms experienced (p=0.000), first symptom experienced (p=0.016), perceived dangerousness of all symptoms experienced (p=0.009), perceived dangerousness of the first symptom experienced (p=0.001), perceived social stigma (p=0.035) and, perceived social support (p=0.002) were found to be significantly associated with the patients' health care seeking pace. Extending to multivariate analysis, five independent variables namely marital status (p=0.037), number of symptoms experienced (p=0.018), perceived dangerousness of all the symptoms experienced (p=0.028), perceived social stigma (p=0.026) and, perceived social support (p=0.001) can significantly predict the patients' health care seeking pace. Conclusion A considerable health care seeking delay of 59 days was documented, especially among those with lower perception of social support, higher perception of social stigma and those who do not currently have partners. Patients who experienced more symptoms and those who view these symptoms as less dangerous were, however, likely to seek immediate health care. Reducing health care seeking delays through intensified health information campaigns, strengthening social support systems and reducing social stigma is recommended.

Background

Tuberculosis (TB), a bacterial infectious disease, has become a major public health dilemma which prompted the World Health Organization (WHO) in 1993 to pronounce it as a worldwide public health crisis. Nineteen years after, tuberculosis still remains an enormous global burden with 8.6 million new TB cases and 1.3 million TB-related mortalities [1]. Following the human immunodeficiency virus, the disease ranked second as the primary cause of mortality related to an infectious disease globally [1].
Locally, the Philippine TB scenario is parallel to the global pandemic with an incidence rate as high as 322/100,000 population [1]. In 2010, TB holds the sixth spot in the ten leading causes of death in the country accounting to 5.1% of the total deaths [2]. WHO ranked the Philippines ninth among the countries with high TB prevalence worldwide and the highest in Southeast Asia. An estimated 324,000 Filipinos

living with tuberculosis, resulting to more than 14,440 recorded mortalities in 2015 [3].
To address the growing concern, the Philippine Department of Health (DOH) through the National Tuberculosis Control Program (NTP), has employed the WHO-endorsed Directly Observed Treatment Shortcourse (DOTS) Strategy in 1996. While the DOH recorded impressive treatment success rates reaching national targets, case detection rate for all forms of TB is only at 82% below the 90% national target. Case detection rate by region also varies from 46% to 114% [2]. This means that although the DOTS strategy has been effective in treating TB cases, there are still a number of missed TB patients who were either delayed in diagnosis or not diagnosed at all.
Delays in the diagnosis and treatment of TB cases are major impeding factors in TB control. Diagnostic deferral of pulmonary tuberculosis can accelerate the progression to a more extensive disease [4], increase the risk of complications and mortality [5] and contribute to the increased transmission of tuberculosis in the community [6]. WHO affirms that around ten to fifteen individuals will be infected by a person who has untreated tuberculosis [1].
While there has been no agreed definition of what can be considered an acceptable length of health care seeking delay in the Philippines, DOH has proposed that cough for two weeks, without underlying risk factors is the appropriate time to seek health care [2]. Literature review on studies done on diagnostic delay from 1995-2004 also pointed out that a 2-3 week delay is acceptable as patient delay in the TB control point of view [7].
A plethora of key patient factors and health system-related variables have been attributed to the delays in TB diagnosis and treatment. Factors such as patient's socioeconomic status, distance between the patient's residence and the health service provider, social stigma, level of disease awareness, personal perception of the disease, severity and seriousness of the disease, and health personnel attributes are just a few [8]. Identifying, analyzing and addressing the numerous factors that are contributory to patient and system delay are essential in order to devise and formulate strategies for all partners involved in tuberculosis control [8].
With these considerations, this study is embarked to assess the length of health care seeking pace among newly-diagnosed TB patients in Cebu City and identify which among the 26 variables clustered into 7 groups: 1) Socio-demographic Profile (age, gender, educational attainment, marital status, employment status, income, history of smoking), 2) Symptom-related variables (symptoms experienced, perceived dangerousness of symptoms experienced), 3) Accessibility to TB DOTS Facility (distance to TB DOTS facility, travel time to DOTS facility), 4) Cognition-specific Variables (knowledge on TB symptoms, knowledge on someone with TB, awareness of available TB services), 5) Prior Health Recourses, 6) Intrapersonal Variables, 7) Social Influence has a significant relationship and can therefore predict their health care seeking pace (HCSP).

Methods

Study Design

The study employed a descriptive correlational cross-sectional survey design.

Study Sites

The study was conducted in ten (10) DOH-recognized and NTP-affiliated public TB DOTS facilities in Cebu City, a highly-ubanized city located in Central Philippines. Site selection was done through stratified random sampling by randomly choosing two facilities from each of the five health areas. Complete enumeration of all TB patients enrolled to DOTS treatment in the 10 facilities from March to June 2017 was then be employed to determine the study's final respondents and sample size.

Study Population

127 eligible research respondents participated based on the criteria that they were newly-diagnosed bacteriologically-confirmed or clinically-diagnosed pulmonary TB cases 15 years old and above. Newly-diagnosed TB patients are those "who have no previous history of anti-TB medication intake or have taken TB medications for less than one month". The study excluded patients less than 15 years old since in the Philippine context, they are referred to as TB in children who follow a totally different diagnostic algorithm and protocol in comparison to adults aged 15 years old and above [2]. Patients who were accidentally diagnosed to have tuberculosis, those who did not present any symptoms during contact with the TB DOTS facility, extrapulmonary TB patients, and those who have had history of treatment for more than 2 months were also excluded. In addition, only patients currently enrolled to TB DOTS treatment for less than 56 days were used in the study to ensure fresh recall of the details surrounding the health care seeking encounter and to minimize recall bias.

Research Instrument

The researcher utilized a combination of a researcher-made and a standardized questionnaire. The tool was translated to the local Cebuano dialect for easy comprehension. Pre-testing and back translation was also done to ensure validity and

reliability. Comments from the pre-testing respondents were collected and incorporated to the instrument as deemed appropriate.

Study Limitations

The present study have limitations. First, the data gathering procedure used in measuring HCSP was through self-reporting which implies a recall bias. To minimize this problem, the study specifically asked first about the onset of the first symptoms (most commonly cough) and the specific date of their first TB DOTS facility consultation/ encounter. The researcher also used a local calendar listing the main national celebrations and holidays vis-à-vis the dates when the sputum collection and TB treatment was done as indicated in the TB Registry, in order to clearly refresh the patient's memory of the date of appearance of the first symptoms. Second, the measurement of distance from the patients' residence to the TB DOTS facility is merely through estimation due to lack of appropriate technology. Third, because of budgetary constraints, the number of sample facilities were limited to only two per health area.

Data Analysis

The study participants were categorically grouped into Prompt Health Seekers and Delayed Health Seekers. Since there is no agreed definition of what can be considered an acceptable length of health care seeking delay in the Philippines, the generated median value was used to dichotomize the participants into two classifications, analogous to a previous study [9]. Using the norm-referenced median dichotomy to classify the participants, the statistical treatments included both descriptive and inferential. The Microsoft Excel was used to determine frequency counts, percentages, central tendency measures, dispersion measures, and measures of location while the Statistical Package for the Social Sciences version 15.0 was used in the univariate computation of Chi-square Test of Independence and Pearson's Coefficient of Correlation, and the multivariate Discriminant Analysis.

Results

Socio-demographic Profile

As reflected in Table 1, of the one hundred twenty-seven (127) TB patients who participated in the study, majority were males (71%), aged 19-40 years old (46%), have had at least secondary education (74%) with 25% of them graduating high school, has a spouse/partner (64%) and are employed (52%) (Complete set of raw data stored in Additional File 1). About 46% of the respondents fall under the fourth income class quintile receiving a monthly income within the range of Php 8,333.26 to Php 20,833.25. On average, the monthly income of the patients is pegged at Php 7,896.83 which is way below the poverty threshold of Php 9,064 [10]. In regards to smoking history, 58% of the respondents reportedly quitted smoking.

Symptom-related Characteristics

75% of the respondents experienced unexplained cough for more than 2 weeks followed by weight loss (55%), fatigue/ malaise (51%), chest/ back pain (42%) and loss of appetite (35%). However, only two of the five top presenting symptoms were respiratory-specific symptoms (cough and chest pain). On their perception as to the dangerousness of the symptoms they experienced, patients regard them as slightly dangerous with a mean of 2.44. Results further show that although unexplained cough, weight loss, fatigue/malaise and chest/back pain were the top presenting symptoms, the respondents only view them as slightly dangerous. Only bloody sputum (hemoptysis) and pulmonary TB-consistent chest radiographic result were perceived as very dangerous while shortness of breath/difficulty of breathing (dyspnea) as moderately dangerous. Grouping the respondents according to the number of symptoms experienced, more than half of the patients belong to the group with a few (1-3) symptoms. Patients with seven or more symptoms only account for 10% of the total respondents. On average, patients experienced 4 symptoms. Unexplained cough also placed on the top spot as the first symptom prompting health care seeking. It is interesting that unexplained cough ranked on the top spot of the symptoms that prompted health care albeit the fact that patients view the symptom as slightly dangerous.

Accessibility to DOTS services

The average reported distance from the respondents' residence to the TB DOTS facility is 736 meters. Stratifying them to three categories, 50% of the respondents live within the 500 meter radius from the TB DOTS facility. The average travel time to the facility is 13 minutes with majority of the respondents (88%) living less than 30 minutes away.

Cognition-related characteristics

38% of the repondents reported not knowing any TB-related symptoms, while 42% of them revealed knowing unexplained cough as a hallmark symptom of tuberculosis. Two (2) symptoms is the average number of TB-related symptoms known by the respondents. 57% of them do not know someone who has TB while 39% of them also declared that they were not aware of the availability of the public TB services prior to their first contact with the TB DOTS facility.

Prior Health Recourses

Only 2.4% of the respondents have not resorted to any form of health recourse prior to contact with the DOTS facility. 51% of them resorted to self-medication of unprescribed, over-the-counter drugs; 25% took market-available food supplements, and; 24% visited traditional health providers such as *herbolaryos, hilots* and faith healers. Although the data does not represent a majority, the huge proportion of patients patronizing non-medical health options is not negligible.

The number of prior health recourses made ranged from 1 to 6 health recourses with an average of 2.65~3. Most of the patients made an average of 1.34 medically-related health recourses compared to less than one non-medical health recourse (Mean 0.75). 31% of those who engaged in medically-related recourses, opted to directly visit a private medical clinic with general practitioner as attending physician.

Consequently, the study also analyzed which health facilities were accessed first before the other, based on 1) the type of facility (clinic vs government-recognized health facility) and 2) the ownership of the facility (public or private). 46% of the patients went first to government-recognized health facilities compared to the 35% who went first to

clinics. In terms of ownership of health facility, 44% of the patients went to a public health facility/clinic first in contrast to the 38% who accessed a private health facility/clinic first.

Intrapersonal Variables

With a weighted mean score of 3.55, respondensts view the services of the facility as Very Effective. The respondents also have a low perception of social stigma with a weighted mean of 2.86. Dissecting into the four subcomponents of social stigma perception, 1) alienation ($\bar{x}$= 3.14), 2) stereotype endorsement ($\bar{x}$= 2.73) and 3) perceived discrimination & social withdrawal ($\bar{x}$= 2.78) are classifiable as slightly low based on their weighted mean. Stigma resistance, the fourth component, recorded a non-reverse-coded mean of 4.04 classifiable as slightly high. The respondents also have a slightly high perception of social support with a weighted mean score registering at 4.18. Looking into the subcomponents of social support, 1) appraisal support (($\bar{x}$= 4.32), 2) belonging support (($\bar{x}$= 4.07), and 3) tangible support ($\bar{x}$= 4.16) are all classifiable as slightly high.

Social Influence

74% of the patients reported that they were influenced by their immediate family members to seek care to the TB DOTS Facility. Local health staff and media were also identified by 10% and 5% of the patients, respectively, as their primary driver for seeking health care.

Table 1. Respondents' Profile and Characteristics

Variables	Category	Total (n=127)	
		Freq	%
Gender	Male	90	71%
	Female	37	29%
Age *Mean 41* *SD ± 16.01* *Range 17-80*	Adolescent (15-18)	5	4%
	Young Adult (19-40)	59	46%
	Middle Adult (41-65)	53	42%
	Elderly (66- onwards)	10	8%
Educational Attainment	Elementary Level	23	18%
	Elementary Graduate	10	8%
	High School Level	28	22%
	High School Graduate	32	25%
	College Level	23	18%
	College Graduate	11	9%
Income Level *Mean Php 7,896.83* *SD ± Php 5,010.96* *Range Php 500-30,000*	Quintile 1 (Less than Php 3,333.33)	27	21%
	Quintile 2 (Php 3,333.33—4,999.99)	4	3%
	Quintile 3 (Php 5,000- 8,333.25)	36	28%
	Quintile 4 (Php 8,333.26- 20,833.25)	58	46%
	Quintile 5 (Php 20,833.26& above)	2	2%
Marital Status	***Without Partner***	***46***	***36%***
	Single	41	32%
	Divorced/Annuled/Separated	1	1%
	Widowed/Widower	4	3%
	With Partner	***81***	***64%***
	Married	65	51%
	Cohabitating	16	13%
Employment Status	Employed	66	52%
	Not Employed	61	48%
History of Smoking	Never Smoked	46	36%
	Quitted Smoking	74	58%
	Current Smoker	7	6%
Symptoms Experienced	***Respiratory-Specific Symptoms***		
	Unexplained cough	95	75%
	Chest/ back pain	53	42%
	Bloody sputum	33	26%
	Shortness of breath/ difficulty of breathing	31	24%
	PTB-consistent CXR***	18	14%
	General Symptoms		
	Weight loss	70	55%
	Fatigue/ malaise	65	51%
	Loss of appetite	44	35%
	Unexplained fever	43	34%
	Night sweats	30	24%
Perceived Dangerousness of Symptoms Experienced	***Respiratory-Specific Symptoms***	**Mean**	**Classification**
	Unexplained cough	2.19	SD
	Chest/ back pain	2.38	SD
	Bloody sputum	3.51	VD
	Shortness of breath/ difficulty of breathing	2.97	MD

Classification *1.0-1.75 –Not Dangerous (ND)* *1.76-2.50-Slightly Dangerous (SD)* *2.51-3.25-Moderately Dangerous (MD)* *3.26-4.0- Very Dangerous (VD)*	PTB-consistent CXR***	3.67	VD
	General Symptoms		
	Weight loss	2.29	SD
	Fatigue/ malaise	2.19	SD
	Loss of appetite	2.22	SD
	Unexplained fever	2.47	SD
	Night sweats	1.86	SD
Symptom First Experienced	Unexplained cough	81	64%
	Unexplained fever	4	3%
	Weight loss	17	13%
	Loss of appetite	3	2%
	Shortness of breath/ difficulty of breathing	6	5%
	Fatigue/ malaise	6	5%
	Bloody sputum	0	0%
	Chest/ back pain	6	5%
	PTB-consistent CXR*	4	3%
	Night sweats	0	0%
Symptom that Prompted Health Care Seeking	Unexplained cough	60	47%
	Unexplained fever	3	3%
	Weight loss	4	3%
	Shortness of breath/ difficulty of breathing	6	5%
	Fatigue/ malaise	4	3%
	Bloody sputum	26	20%
	Chest/ back pain	12	9%
	PTB-consistent CXR*	12	9%
Number of TB Symptoms Experienced *Mean 3.79~4 symptoms* *Mode 2 symptoms*	Experienced a few (1-3 symptoms)	64	51%
	Experienced some (4-6 symptoms)	50	39%
	Experienced a lot (7 or more symptoms)	13	10%
Distance to TB DOTS Facility *Mean & SD 736m ± 911 m* *Range 5-4000 m*	Less than 500 meters	64	50%
	500 meters to 1000 meters	39	31%
	More than 1000 meters	24	19%
Travel Time to TB DOTS Facility *Mean & SD 13 mins ± 9 mins* *Range 1-40 mins*	Less than 30 minutes	112	88%
	30 minutes to 60 minutes	15	12%
Respondents' Awareness of TB-related Symptoms	None	48	38%
	Unexplained cough	53	42%
	Bloody sputum	40	31%
	Weight loss	32	25%
	Chest/ back pain	25	20%

	Fatigue/ malaise	24	19%
	Unexplained fever	17	13%
	Shortness of breath/ difficulty of breathing	13	10%
	Night sweats	10	10%
	Loss of appetite	9	7%
Knowledge of Someone with Tuberculosis	Knowledgeable	55	43%
	Not Knowledgeable	72	57%
Awareness of Available TB Services *Mean 2:13* SD 1.16*	Not Aware	49	39%
	Slightly Aware	40	31%
	Moderately Aware	10	8%
	Fully Aware	28	22%
Prior Health Recourses ***Number of Prior Health Recourses Utilized*** *Mean: 2.65* *SD: ± 1.22* *Range: 1-6* **First Health Recourse** *Mode: Self-Medication* *Category: Non-Medical* *Frequency: 53* *Percentage: 42%* ***Number of Non-Medical Health Recourses Utilized*** *Mean: 0.75* *SD: ± 0.78* *Range: 0-3* ***Number of Medical Health Recourse Utilized*** ***Mean:*** *1.34* *SD: ± 0.98* *Range: 1-4* ***First Medical Health Recourse*** *Mode: Visited a private medical clinic with general practitioner as attending physician* *Frequency: 40* *Percentage: 31%*	***Non-medical Health Recourses***		
	a. Self medicated using unprescribed, over-the-counter drugs	65	51%
	b. Took food supplements available in the market	32	25%
	c. Visited and sought care to traditional health providers such as herbolaryos, hilots and faith healers	30	24%
	d. Used and took home remedies (eg decoctions and herbal medications)	25	20%
	a. Visited and sought care to alternative providers such as massage therapists, spa establishments, reflexologists or naturopathists	18	14%
	Medical Health Recourses		
	b. Visited and sought care to a public health center	59	46%
	c. Visited and sought care to a private medical clinic with a general practitioner as medical provider	38	30%
	d. Visited and sought care to a public hospital	29	23%
	e. Went to a laboratory/diagnostic facility	19	15%
	f. Visited and sought care to a private hospital	12	9%
	g. Visited and sought care to a private medical clinic with a specialist as medical provider	10	8%
	Did not do anything	3	2.4%
Type of Facility First Visited	Clinic	45	35%
	Govt.-recognized Health Facility (Health Center or Hospital)	59	46%
	Did not go to either	23	18%
Ownership of Clinic/Facility First Visited	Private	48	38%
	Public	56	44%

	Did not go to either	22	17%
Primary Social Influence for Seeking Health Care	***Family***		
	Immediate Family Member	94	74%
	Relative/s	6	5%
	Immediate Social Circle		
	Friend/s or Peer/s	3	2%
	Workmate/s	3	2%
	Classmate/s Schoolmate/s	1	1%
	Media (TV, Radio,etc)	6	5%
	Local health & other institutional policies		
	Local Health Staff	13	10%
	Local protocol/ordinances	1	1%
Perceived Treatment Efficacy *Category 1.0-1.75 –Not Effective (NE)* *1.76-2.50- Slightly Effective (SE)* *2.51-3.25- Moderately Effective (ME)* *3.26-4.0- Very Effective (VE)*		Mean 3.55	Category VE
Perceived Social Stigma *Mean: 2.86* *Category: Slightly Low* *Category* *1.0-1.83 –Extremely Low* *1.84-2.66- Moderately Low* *2.67-3.49- Slightly Low* *3.50-4.33- Slightly High* *4.34-5.17- Moderately High* *5.18-6- Extremely High*	*Subcomponents*	Mean	Category
	Alienation	3.14	Slightly Low
	Stereotype Endorsement	2.73	Slightly Low
	Perceived Discrimination & Social Withdrawal	2.78	Slightly Low
	Stigma Resistance (reverse-coded)	4.04	Slightly High
Perceived Social Support *Mean: 4.18* *Classification: Slightly High* *Category* *1.0-1.83 –Extremely Low* *1.84-2.66- Moderately Low* *2.67-3.49- Slightly Low* *3.50-4.33- Slightly High* *4.34-5.17- Moderately High* *5.18-6- Extremely High*	Subcomponents	Mean	Category
	Appraisal Support	4.32	Slightly High
	Belonging Support	4.07	Slightly High
	Tangible Support	4.16	Slightly High

Respondents' health care seeking pace (HCSP) and their classification

The mean health care seeking pace (HCSP) is 59.05 days. The shortest is 1 day while the longest is more than a year. The generated median HCSP is 49 days. The median HCSP, utilized as the reference point, dichotomized the respondents into two categories, 1) Prompt

Health Seeker whose HCSP range is 1-49 days, and 2) Delayed Health Seeker HCSP range is 50-367 days. 51% of the respondents were classified as prompt health seekers while 49% of them delayed health seekers.

Table 2. Respondents' Health Care Seeking Pace (HCSP)

Health Care Seeking Pace	Category	Range	Freq	%
Mean 59.05 ± 50.42 Days Range 1-367 Days Median 49 Days IQR 25 Days*	Prompt Health Seeker	1-49 Days	65	51%
	Delayed Health Seeker	50-367 Days	62	49%
	Ideal Health Seeker**	1-14 Days	10	8%

**Q2=49; Q3=74*

***Based on DOH-advocated HCSP of 14 days or less for people presumptive of TB*

Relationship of the respondents' profile and characteristics and their health care seeking pace

Analysis shows that among the variables, one sociodemographic variable, four symptom-related variables and two intrapersonal variables yielded significant relationship to the respondents' HCSP using univariate analysis. The symptom-related variables are 1) number of symptoms experienced (p= 0.000); 2) first symptom experienced (p=0.016); 3) perceived dangerousness of all the symptoms experienced (p=0.009), and; 4) perceived dangerousness of first symptoms experienced (p=0.001). Marital status, that is the presence of a marital or cohabitating partner, (p=0.033) as well as intrapersonal variables, namely 1) perceived social stigma (p=0.035) and 2) perceived social support (p=0.002) were also significantly associated with the respondents' HCSP.

Table 3. Univariate Correlation Matrix of Respondents' Profile & Characteristics and their Health Care Seeking Pace

Variable	Test Statistic	Statistical Value	P-Value
Socio-demographic Profile			
Gender	Chi-square	2.52	0.112 ns
Age	Pearson r	-0.019	0.833ns
Educational Attainment	Chi-square	5.606	0.346 ns
Employment Status	Chi-square	0.622	0.430 ns
Marital Status	Chi-square	4.062	0.044*
Income	Pearson r	-0.012	0.896ns
History of Smoking	Chi-square	0.909	0.635 ns
Symptom-related Variables			
Symptoms Experienced			
a. Number of Symptoms Experienced	Pearson r	0.336	0.000 **
b. First Symptom Experienced	Chi-square	17.269	0.016 *
c. Symptom that prompted HCS	Chi-square	2.818	0.901 ns
Perceived Dangerousness (PD) of All Symptoms experienced	Pearson r	0.232	0.009 **
a. PD of First Symptom	Pearson r	0.288	0.001 **
b. PD of Symptom that prompted HCS	Pearson r	0.172	0.053 ns
Accesibility to DOTS Facility			
Distance to DOTS Facility	Pearson r	-0.053	0.553ns
Travel Time to DOTS Facility	Pearson r	0.154	0.083ns
Cognition-specific Variables			
Knowledge on TB Symptoms	Pearson r	0.036	0.686ns
Knowledge of someone with TB	Chi-square	0.439	0.507 ns
Awareness of available TB services	Pearson R	0.091	0.309ns
Prior Health Recourses			
Type of prior health recourse mostly utilized (medical vs non-medical)	Chi-square	7.442	0.059 ns
Type of first prior health recourse	Chi-square	2.931	0.231 ns
Number of prior health recourses	Pearson r	0.89	0.321ns
Type of First health facility visited (Clinic vs Health Facility)	Chi-square	2.241	0.326 ns
Ownership of First health facility visited (Public vs Private)	Chi-square	0.756	0.685 ns
Intrapersonal Variables			
Perceived Treatment Efficacy	Pearson r	-0.063	0.483ns
Perceived Social Stigma	Pearson r	0.187	0.035 *
Perceived Social Support	Pearson r	-0.273	0.002 **

Social Influence	Chi-square	1.665	0.645 ns

ns – not significant

** –significant at α = 0.05*

*** – highly significant at α = 0.01*

Significant Predictors of Health Care Seeking Pace

Although the univariate correlation analysis yielded significant relationships between the seven (7) variables, when extended to multivariate discriminant analysis, only five (5) independent variable (marital status, number of symptoms experienced, perceived dangerousness of all the symptoms experienced, perceived social stigma and perceived social support) came out as the predictors of HCSP. The over-all Wilks' Lambda Score is also computed showing that 81.5% of the variation in the dependent variable cannot be explained by the model at significant p-value of 0.004.

Table 4. Test of Equality of Group Means between Prompt and Delayed Health Care Seekers

Variables	Wilks' Lambda	F-value	Level of Significance (*p*)
Marital Status	0.965	4.469	0.037*
Number of Symptoms Experienced	0.955	5.745	0.018*
First Symptom Experienced	0.980	2.502	0.116ns
Perceived Dangerousness of All Symptoms Experienced	0.961	4.966	0.028*
Perceived Dangerousness of First Symptom Experienced	0.999	0.091	0.763ns
Perceived Social Stigma	0.960	5.079	0.026*
Perceived Social Support	0.905	12.755	0.001**

ns – not significant

** –significant at α = 0.05*

*** – highly significant at α = 0.01*

Discussion

Utilizing the standards provided by different literatures: 2-3 weeks [7]; 28.7 days [11]; 2 weeks (Chinese Ministry of Health) [12] as well as the 2 weeks (14 days) ideal health care seeking pace advocated by DOH [2], there is a considerable delay in the respondents' health care seeking pace at 59 days. In fact, only 10% of the respondents

sought care within the 14-day timeline recommended by DOH. Extended diagnostic and treatment lags like this present serious negative repercussions to the patient as well as the community as these delays can hasten the progression to more complex illness [4], escalate the risk of complications and mortality [5] and amplify TB transmission to the community [6]. The generated median HCSP is also long at 49 days, similar to the results found in Hongkong [13]. However, this is shorter than in Ethiopia, 43 weeks [6] and France 68 days [14], and longer than in Zimbabwe 36 days [15] and China 6 days [9]. This delay in health seeking might be due to a number of factors ranging from socioeconomic status, distance to health services, social stigma, personal perception of the disease and severity and seriousness of the disease [8].

In terms of gender, the proportion of men afflicted by the disease is higher compared to women. Similarly, DOH noted that while both sexes are at risk of contracting tuberculosis, the infectious illness is more prevalent among males [2]. Reasons for this imbalance might include greater prevalence of TB associated with men or it may indicate a persistence of personal barriers, societal inequities and health system challenges disproportionately influencing timely TB diagnosis among women [8]. Less specific clinical TB presentations are also more common among women i.e. fewer characteristic symptoms, such as blood in sputum [8] which may cause such gender disparities. However, gender is not found to be a significant predictor of HCSP in contrast to a study in Nigeria [16]. Income, tagged in many studies [12, 17, 18] as a good predictor of patient delay, was not a significant determinant in this study. While the majority of the respondents (63%) are living below the poverty threshold whose income falls below Php 9,064 [10], it did not seem to have an effect on their health care seeking. Furthermore, the results also negate the findings of studies stating that HCSP is dependent on the influence of other patient socio-demographic variables such as age [13, 16, 19, 32], educational attainment [12, 18, 20] and employment [13, 21] and history of smoking [22]. It can be implied that health care seeking goes beyond sociodemographic elements and that other factors may have a more powerful influence over a decision to seek health care.

Accesibility variables namely 1) distance to DOTS facility (p=0.553) and, 2) travel time to DOTS facility (p=0.083) have also no significant relationship to the patients' HCSP.

Patients living near or far from the TB DOTS facility may have equal risk of delaying their HCSP, a finding that is different to some published studies [16, 23, 24, 25]

Cognition specific variables such as 1) knowledge on TB symptoms (p=0.686); 2) knowledge of someone with TB (p=0.507), and; 3) Awareness of available TB services (p=0.309) were also not significantly associated with HCSP. Although several literatures identified knowledge of TB symptoms [18, 21, 26] and awareness of available TB services [5, 27, 28] as fundamental variables with a huge impact on how patients seek health care, it is not the case in Cebu City. It is alarming however to note that only 2 tuberculosis-related symptoms were known by the respondents. 39% of them also declared not being aware of available free public TB services prior to their first contact with the TB DOTS facility. Public dissemination of correct TB information and the availability of TB DOTS services might either be too low or that the efficiency of information penetration to these intended population was poor. Paradoxically, TB DOTS facilities were reported to be located less than 1 kilometer and less than 30 minutes from the patients' residence, an advantage that could have been used to intensify health education and information dissemination.

Prior health recourses variables such as 1) type of prior health recourse mostly utilized (p=0.059), 2) type of first prior health recourse (p=0.231), 3) number of prior health recourses made (p=0.321), 4) type of first health facility visited (p=0.326), and 5) ownership of first health facility visited (p=0.685) have no significant relationship to a patients' HCSP. Therefore, prompt and delayed health care seeking may be observed in patients regardless of whether they made prior recourses on their symptoms, negating the findings of previous studies [6, 8, 15, 16, 18, 23]. Although variables under prior health recourses did not seem to influence HCSP, the huge proportion of patients patronizing non-medical health options is alarming. The high utilization rates for non-medical choices may suggest that there could be 1) poor information dissemination on the available medical services; 2) presence of deeply-founded cultural & traditional beliefs, 3) poor awareness on the effect of non-medically suggested alternatives, and; 4) presence of economic barriers that hinder patients from accessing appropriate scientific treatment. Multiple health recourses were also made prior to contact with the TB DOTS facility, placing an impact to the total length of health seeking and diagnostic delays, as revealed in many studies [8, 11,

21, 29]. Most of the first health recourse made is still self-medication, implying a widely-accepted culture of self-medication among Cebuanos, a relatively easy access to pharmaceutical drugs or a pervasive poor knowledge on ill-effects of self-medication. Self-medication for TB-related symptoms is highly correlated with patient delay [6, 15, 18]. Inappropriate and unprescribed use of antibacterial medications especially those that are used for treatment of tuberculosis also predisposes patients to develop drug-resistant tuberculosis [2].In terms of medical recourses, 31% of the respondents opted to visit a private medical clinic with general practitioner as attending physician at least once prior to reaching a TB DOTS facility. Most Filipinos still associate the private sector with better quality of services [30]. Comparing the respondents' first choice of facilities, 46% of the patients went first to government-recognized health facilities compared to 35% who went first to stand-alone clinics. The results were different from a study in Ethiopia [6], which noted that most of presumptive TB cases opted to go to clinics that lack diagnostic facilities than health centers and other health facilities. Patients may have more trust on established health facilities as their first choice versus stand-alone clinics probably due to the comprehensiveness of their medical services or because of the facility's capacity to accept government-subsidized health insurance, e.g. PhilHealth. In terms of ownership of health facility, 44% of the patients went first to a public health facility/clinic in contrast to the 38% who accessed a private health facility/clinic first. The high preference to public health services as first choice may indicate a high trust towards public health service or it might be plain economics knowing that public health services in the Philippines are almost, if not at all, free-of-charge. The health cost usually drives Filipinos to ultimately prefer public services over their private counterparts, even though they view the latter as better [30].

79% of the respondents declared family as their primary influencer to health seeking. Kin-based opinions still account a huge weight in a Filipino patient's decision making, similar to a study in Uganda [31]. However, social influence ($p=0.645$) has no bearing on health care seeking delays.

Marital status, that is, presence of a marital or cohabitating partner ($p=0.033$) is the only sociodemographic variable that showed a significant relationship with the patient's HCSP. Cross tabulation was done showing that more respondents without partners tend to

delay seeking care (55%). Consequently, respondents who were married and/or currently cohabitating during the time of contact with a TB DOTS facility tend to seek earlier medical care (63%). It may be deduced that patients who had partners during their contact with the TB DOTS facility were likely to engage in prompt health seeking behaviors than those who do not, negating earlier studies [32,33]. The respondents' partners probably provided an additional push, be it in the form of physical, psychological or emotional support, for them to seek consultation and treatment.

Four symptom-related variables showed a significant relationship to the patient's HCSP, namely, the 1) number of symptoms experienced (p= 0.000); 2) first symptom experienced (p=0.016); 3) perceived dangerousness of all the symptoms experienced (p=0.009), and; 4) perceived dangerousness of first symptoms experienced (p=0.001). Analysis shows that as the number of symptoms increases, the likelihood that the patient delays seeking health care also increases. Therefore, the number of symptoms has a deterring and delaying power over HCSP. Some patients wait for the appearance of more symptoms before they are convinced to have themselves checked. Waiting for the appearance of many symptoms causes further delays in the diagnosis and treatment. Another perspective that might be considered in this analysis is to look at the HCSP as the variable that affects the appearance of the number of symptoms. As the patient, regardless of the reason, delays diagnosis and treatment, the number of symptoms he experiences also increases. This corroborates with the findings of many studies that delaying diagnosis and treatment may pose additional symptomatic burden to the patients, accelerate risk towards developing a more advanced disease [4, 34] and increase the possibilities of complications and mortality [5,34].

Another finding showed that most of the respondents who had 1) unexplained fever (100%), 2) shortness of breath (83%), 3) chest/ back pain (83%) and pulmonary tuberculosis-consistent chest X-Ray (75%) as their first symptom were classified as prompt health seekers. Most of the respondents who had fatigue/ malaise (100%) as the first symptom, on the other hand, were classified as delayed health seekers. The type of symptom first experienced by the patient might influence his HCSP. Shortness of breath, chest/ back pain and pulmonary tuberculosis-consistent chest X-Ray are respiratory specific

symptoms while unexplained fever and fatigue or malaise are general symptoms. The results somehow affirm the results of previous studies that presence of less specific symptoms are associated with longer delays (13; 35].

The increased perception in the dangerousness of all the symptoms experienced (p=0.007) also increases the likelihood of delay as did the increase in the perceived dangerousness of the first symptom (p=0.001). This implies that increased perception of dangerousness is a deterrent to prompt health care seeking, a finding that runs in contrast to other studies [28]. Some patients equate the perception of danger in the symptoms they experience with intense fear of having a severe disease, a possibility of prolonged hospitalization or risk of incurring additional financial expenses. These discouraged them from accessing appropriate health care, as evidenced by an anecdotal statement made by one patient: *"Mahadlok ko sa akong sintomas pero mas mahadlok ko mupakonsulta kay basin og nay makit-an nga grabe nga sakit. Makagasto pa unya ug dako ang akong pamilya"*. (Translation: "I'm afraid of my symptoms but I am more afraid of seeking consultation because I might find out that I have a complicated illness. My family might spend a huge amount of money because of this.")

Intrapersonal variables 1) perceived social stigma (p=0.035) and 2) perceived social support (p=0.002) were also significantly associated with the respondents' HCSP. Perceived social stigma (*r*-value of 0.188) has a weakly positive correlation with HCSP. Because the data gathering instrument used measures the respondents' level of internalized stigma, it is surmised that higher internalized internal stigma translates to longer HCSP. The finding suggests that high perception of social stigma among TB patients prevents them from seeking timely medical care. The findings further verify results of many studies (8, 12, 21]. Health seeking is hampered by the presence of social stigma because it can inflict damage to the person's social status, social relationships and even income source [36].

Analysis of the data also revealed that perceived social support (*r*-value=-0.278) has a weakly negative correlation with HCSP, implying that an increase in the level of the patient's perceived social support decreased the tendency to delay HCSP. Patients with high levels of social support are highly likely to engage in prompt health care seeking behaviors

[37]. As reflected in Table 1, perceived social support in Cebu is high implying that patients' circles such as partners, family, friends and the community might have been explicitly supportive making it tangible to the patient. In the Philippine society, the Filipino virtue ethics is richly "relationship-oriented" which is established on the two basic foundations of the country's culture, *"loob"* which is interpreted as "relational will" and *"kapwa"* which is better understood as "together with the person" [38], which may have a relative impact on the patients' perceived assessment of social support. The high perception of social support may also explain the relatively low perception of stigma among the respondents.

Extending to multivariate analysis using discriminant analysis, only five (5) independent variable (marital status, number of symptoms experienced, perceived dangerousness of all the symptoms experienced, perceived social stigma and perceived social support) came out as the predictors of HCSP. The results further strengthen the concept that a supportive, non-stigmatizing and accepting social environment, is fundamental to promoting positive health seeking behaviors among presumptive of TB patients. The presence of a physically tangible source of support such as a spouse or a partner further reinforces this health promoting social environment. This confirms the findings in literatures where explicit social support from social relationships and social networks serve as a potent starting point and driver for a causal flow of positive health outcomes [39]. The relationship between the number of symptoms and HCSP implies that patients do wait for the appearance of more symptoms before making contact with TB DOTS facilities. A higher perception of danger over the symptom experienced also derails further action which may be associated with intrapersonal and psychological impacts of apprehension or fear to health care seeking

Conclusion

There is a considerable delay (59 days) in the HCSP among TB patients in Cebu City using both the norm-referenced median dichotomy (49 days) and the DOH advocated timeline of 14 days. Patients who delay seeking health care are those with lower perception of social support, higher perception of social stigma and those who do not currently have partners (single, widowed/widower, divorced/separated/annuled). Moreover, patients who have

experienced more symptoms and those who view these symptoms as less dangerous are patients who would readily seek health care. Reducing health care seeking delays through intensified health information campaigns, strengthening social support systems and reducing social stigma is highly recommended.

Abbreviations

CXR- Chest Radiograph (X-Ray)

DOH- Department of Health

DOTS- Directly Observed Treatment Shortcourse

HCSP- Health Care Seeking Pace

NTP- National Tuberculosis Control Program

Php- Philippine Peso

TB- Tuberculosis

TB DOTS Facility- Tuberculosis Directly Observed Shortcourse Facility

WHO- World Health Organization

Declarations

Ethics Approval and Consent to Participate

The Vicente Sotto Memorial Medical Center (VSMMC) Ethics Review Committee granted the approval of the conduct of the study through VSMMC-ERC-O-2017-017. As part of the ethical protocol, respondents were asked to sign an informed consent written in both English and local Cebuano dialect, indicating their agreement to participate in the study. On the other hand, legal Parents/ Guardians of respondents below the age of 18 years old were required to co-sign an assent form together with the respondent, in compliance with Philippine national laws. It was be emphasized during this phase that the study results will be kept confidential and their anonymity will be of prime consideration. The respondents were also given liberty to withdraw at any point of the study.

Consent for publication

Not applicable

Availability of data and materials

All data generated or analysed during this study are included in this published article and its supplementary information files.

Competing Interests

The author declares that he has no competing interests.

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The funding source of this study is purely derived from the author's personal finances.

Author's contribution

The author is the sole investigator of this study from conception, analysis, interpretation and the development of this manuscript.

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Not applicable

Additional Files

Additional File 1. Research Complete Data.

File Formal .xls

Complete Tabulated Raw Data both grouped and ungrouped.

References

1. World Health Organization. *Global tuberculosis report 2013*: country profiles. WHO Library Cataloguing-in-Publication Data. Retrieved January 5, 2017 from http://www.who.int/tb/publications/global_report/gtbr12_annex2.pdf

2. Department of Health. *National Tuberculosis Control Program Manual of Procedures Fifth Edition*. 2014
3. World Health Organization. *Global tuberculosis report 2016*. WHO Library Cataloguing-in-Publication Data. Retrieved March 4, 2017 from http://reliefweb.int/sites/reliefweb.int/files/resources/gtbr2016_main_text.pdf
4. Ward, H.A., Marciniuk, D.D., Pahwa, P. & Hoeppner, V.. Extent of pulmonary tuberculosis in patients diagnosed by active compared to passive case finding. *The International Journal of Tuberculosis and Lung Disease.* 2004; 8(5):593-597.
5. Odusanya, O. & Babafemi, J.. Patterns of delay amongst pulmonary tuberculosis patients in Lagos, Nigeria. *BMC Public Health*. 2004. Retrieved December 29, 2017 from http://www.biomedcentral.com/1471-2458/1/18
6. Yimer, S., Holm-Hansen, C., Yimaldu, T., and Bjune, G.. Health care seeking among pulmonary tuberculosis suspects and patients in rural Ethiopia: a community-based study. *BMC Public Health*. 2009. Retrieved January 28, 2017 from: http://www.biomedcentral.com/1471-2458/9/454
7. Lambert M.L. &Van der Stuyft, P. Delays to tuberculosis treatment: shall we continue to blame the victim? *Tropical Medicine International Health*. 2005; 10:945-6. Retrieved January 21, 2018 from http://onlinelibrary.wiley.com/doi/10.1111/j.1365-3156.2005.01485.x/full
8. World Health Organization. Diagnostic and treatment delay in tuberculosis. Cairo, Egypt. 2006
9. Zhao, X., Yang, P., Gai, R., Mei, L., Wang, X. & Xu, L. Determinants of health care-seeking delay among tuberculosis patients in Shandong Province, China. *European Journal of Public Health*. 2014; 24(5):757
10. Philippine Statistics Authority. Statistical Tables on Family Income and Expenditure Survey (FIES) from the results of 2012 FIES. 2013. Retrieved March 8, 2017 from https://psa.gov.ph/content/2012-fies-statistical-tables
11. Sreeramareddy CT, Panduru KV, Menten J, Van den Ende J. Time delays indiagnosis of pulmonary tuberculosis: a systematic review of literature. *BMC Infectious Disease*.

2009; 9:91.

12. Li, Y., Ehiri, J., Tang, S., Li, D., Bian, Y., Lin, H.,... Cao, J.. Factors associated with patient and diagnostic delays in Chinese TBpatients: a systematic review and meta-analysis. *BMC Public Health*. 2013. Retrieved January 11, 2017 from http://www.biomedcentral.com/1741-7015/11/156
13. Leung, E.C.C., Leung, C.C., Tam, C.M. Delayed presentation and treatment of newly diagnosed pulmonary tuberculosis patients in Hong Kong. *Hong Kong Medical Journal*. 2007; 13(3). Retrieved February 23, 2017 from http://www.hkmj.org/system/files/hkm0706p221.pdf
14. Tattevin, P., Che, D., Fraisse, P., Gatey, C., Guichard, C., Antoine, D., ... Bouvet, E.. Factors associated with patient and health care system delay in the diagnosis of tuberculosis in France. *The International Journal of Tuberculosis and Lung Disease*. 2012; 16(4): 510-515. Retrieved January 14, 2017 from www.ingentaconnect.com/content/iuatld/ijtld/2012
15. Takarinda, K., Harries, A.D., Nyathi, B., Ngwenya, M., Mutasa-Apollo, T., Sandy, C.. Tuberculosis treatment delays and associated factors within the Zimbabwe National Tuberculosis Programme. *BMC Public Health.* Retrieved January 17, 2017 from http://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-015-1437-7
16. Ukwaja, K., Alobu, I., Nweke, C., Onyenwe, E.. Healthcare-seeking behavior, treatment delays and its determinants among pulmonary tuberculosis patients in rural Nigeria: a cross-sectional study. *BMC Health Services Research.* 2013; 13:25. Retrieved January 4, 2017 from http://www.biomedcentral.com/1472-6963/13/25
17. Rasanathan, K., Sivasankara Kurup, A., Jaramillo, E., Lonnroth, K. The social determinants of health: key to global tuberculosis control. *International Journal of Lung Diseases*. 2011; 15(6): S30-S36. Retrieved January 4, 2017 from http://docserver.ingentaconnect.com/deliver/connect/iuatld/10273719/v15n6x2/s9.pdf
18. Storla, D.G., Yimer, S., Bjune, G.A.. A systematic review of delay in the diagnosis and treatment of tuberculosis.*BMC Public Health.* 2008; 8:15 doi:10.1186/1471-2458-8-15. Retrieved December 30, 2016 from http://www.biomedcentral.com/1471-2458/8/15

19. Zerbini, E., Chirico, M.C., Salvadores, B., Amigot, B., Estrada, S. & Algorry, G. Delay in tuberculosis diagnosis and treatment in four provinces of Argentina. *The International Journal of Tuberculosis and Lung Disease*. 2008
20. Gebeyehu, E., Azage, M., Abeje, G.. Factors Associated with Patient's Delay in Tuberculosis Treatment in Bahir Dar City Administration, Northwest Ethiopia. *BioMed Research International*. 2014 Retrieved January 4, 2017 from http://dx.doi.org/10.1155/2014/701429
21. Osei, E., Akweongo, P., Binka, F.. Factors associated with DELAY in diagnosis among tuberculosis patients in Hohoe Municipality, Ghana. *BMC Public Health*. 2015. Retrieved January 4, 2017 from http://search.proquest.com/central/docview/1780735428/A1C066FDD0E84D59PQ/3?accountid=141440
22. Bam, T.S, Enarson, D.A., Hinderaker, S.G., Bam, D.S.. Longer delay in accessing treatment among current smokers with new sputum smear-positive tuberculosis in Nepal. *The International Journal of Tuberculosis and Lung Disease*. 2012; 16(6):822–827. Retrieved January 9, 2017 from http://dx.doi.org/10.5588/ijtld.11.0678
23. Cambanis, A., Yassin, M., Ramsay, A., Squire, S.B., Arbide, I., Cuevas, L.. Rural poverty and delayed presentation to tuberculosis Services in Ethiopia. *Tropical Medicine and International Health.* 2005; 10(4):330–335. Retrieved January 12, 2017 from http://onlinelibrary.wiley.com/doi/10.1111/j.1365-3156.2005.01393.x/full
24. Lin, X., Chongsuvivatwong, V., Geater, A., Lijuan, R. The effect of geographical distance on TB patient delays in a mountainous province of China. *The International Journal of Tuberculosis and Lung Disease*.
25. Tripathy, J.P., Srinath, S., Naidoo, P., Ananthakrishnan, R., Bhaskar, R.. Is physical access an impediment to tuberculosis diagnosis and treatment? A study from a rural district in North India. *The International Union against Tuberculosis and Lung Disease, Public Health Action*. 2013; 3(1).
26. Saifodine, A., Gudo, P.S., Sidat, M., Black, J.. Patient and health system delay among patients with pulmonary tuberculosis in Beira city, Mozambique. *BMC Public Health*.

2013; 13:559. Retrieved January 17, 2017 from http://www.biomedcentral.com/1471-2458/13/559

27. Hoa, N.P., Chuc, N.T.K., & Thorson A.. Knowledge, attitudes, and practices about tuberculosis and choice of communication channels in a rural community in Vietnam. *Health Policy*. 2009; 90(1):8-12. Retrieved January 21, 2017 from https://www.cap-tb.org/sites/default/files/documents/Gender.KAP.VietNam.pdf
28. Auer, C., Sarol Jr, J., Tanner, M., Weiss, M.. Health seeking and perceived causes of tuberculosis among patients in Manila, Philippines. *Tropical Medicine and International Health*. 2000; 5(1). Retrieved August 12, 2017 from http://onlinelibrary.wiley.com/doi/10.1046/j.1365-3156.2000.00615.x/full
29. Sabawoon W., Sato H. & Kobayashi Y.. Delay in the treatment of pulmonary tuberculosis: a report from Afghanistan. *The Japanese Society for Hygiene, Environmental Health and Preventive Medicine.* 2011
30. Department of Health. *National objectives for health Philippines, 2011-2016*. Health Policy Development and Planning Bureau (HPDPB). 2012
31. Kaawa-Mafigiri, D.. Social networks and social support for tuberculosis control in Kampala, Uganda. *ProQuest Information and Learning Company*. 2007
32. Pehme, L., Rahu, K., Rahu, M., and Altraja, A.. Factors related to health system delays in the diagnosis of pulmonary tuberculosis in Estonia. *The International Journal of Tuberculosis and Lung Disease*. 2007
33. Zhou, C., Chu, J., Geng, H., Wang, X. & Xu, L.. Pulmonary tuberculosis among migrants in Shandong, China: factors associated with treatment delay. *BMJ Open*. 2014. doi:10.1136/ bmjopen-2014-005805
34. Almeida, C.P., Skupien, E.C. & Silva, D.R.. Health Care Seeking Behavior and Patient Delay in Tuberculosis Diagnosis. *Cadernos de Saúde Pública, Rio de Janeiro.* Retrieved January 28, 2017 fromhttp://www.scielo.br/scielo.php?pid=S0102-311X2015000200321&script=sci_arttext

35. Meyssonnier, V., Li, X., Shen, X., Wang, H., Li, D.Y., Liu, Z.M.,... Gao, Q.. Factors associated with delayed tuberculosis diagnosis in China. *European Journal of Public Health*. 2013. 23(2):253,257.

36. Atre, S., Kudale, A., Morankar, S., Gosoniu, D., Weiss, MG.. Gender and community views of stigma and tuberculosis in rural Maharashtra, India. Glob Public Health. 2011; 6(1):56-71. Retrieved October 1, 2017 from https://www.tandfonline.com/doi/abs/10.1080/17441690903334240

37. Hargreaves, J., Boccia, D., Evans, C., Adato, M., Pettricrew, M., Porter, J.. The Social Determinants of Tuberculosis: From Evidence to Action. *American Journal of Public Health.*

38. Reyes, J.. *Loob* and *Kapwa*: An Introduction to a Filipino Virtue Ethics. Asian Philosophy. 2011; 25(2). Retrieved December 18, 2017 from http://dx.doi.org/10.1080/09552367.2015.1043173

39. Glanz K, Rimer B, Viswanath K.. Health Behavior and Health Education, theory, research and practice, 4th *Jossey-Bass a Wiley Imprint*. 2008.

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