International Journal of Advance Research in Medical Surgical Nursing

E-ISSN: 2663-2268
P-ISSN: 2663-225X
IJARMSN 2019; 1(1): 62-66
Received: 16-11-2018
Accepted: 18-12-2018

Emilio A Antang Jr
Nurse II, Bicol Medical Center, Naga City, Camarines Sur, Philippines

Man RN
Nurse II, Bicol Medical Center, Naga City, Camarines Sur, Philippines

Correspondence
Emilio A Antang Jr
Nurse II, Bicol Medical Center, Naga City, Camarines Sur, Philippines

Cardiovascular disease risk level and health-related quality of life of patients with pulmonary tuberculosis

Emilio A Antang Jr and Man RN

Abstract
Background: PTB has been linked with CVD. Although CVD patients are known to have impaired HRQOL, only few studies have examined HRQOL of PTB patients at risk of CVD.
Research Objective: The study aimed to determine the relationship of cardiovascular disease risk level and health-related quality of life of patients with pulmonary tuberculosis.
Method: A descriptive-correlational design was employed with 52 respondents in a tertiary hospital of Naga City, Camarines Sur who were PTB patients under categories III, IV and V without any underlying cardiovascular co-morbidities. Respondents completed two questionnaires: (a) WHO/ISH Risk Prediction Chart for Western Pacific Sub-Region B, and (b) Optum 36-Item Short Form Health Survey (SF-36v2). Pearson's Chi Square established the significant relationship of CVD risk level and eight (8) dimensions of HRQOL.
Findings: Respondents have low CVD risk except for ages 70 – 79 years old who have moderate risk. Respondents have below average HRQOL in the dimensions of physical, physical role, and emotional role functioning. CVD risk level has been found to have significant relationship with HRQOL in the dimensions of general health perception (p=.039), physical (p<.001) and emotional role functioning (p=.020).
Conclusions: PTB patients have low CVD risk level; however, individual risk factors progressively contribute to risk for CVD. PTB patients experiences a degree of limitation on performing physical activities and in the performance of their role due to concurrent physical limitation and emotional problems. Risk factors for CVD affects PTB patients primarily on the physical aspect and functioning of HRQOL.

Keywords: Cardiovascular disease risk level, health-related quality of life

Introduction
Primary care prevention of cardiovascular disease (CVD) is essential as it is the leading cause of death and disability and continues to be a major public health burden globally with its risk management playing an important role in primary care. Guidelines recommend lifestyle and medical interventions at high risk for cardiovascular diseases, however, it must consider the varying factors and underlying mechanisms on specific diseases that contribute to the development of a specific cardiovascular disease.
Tuberculosis as an infectious disease primarily affects the lung parenchyma which may also be transmitted to other parts of the body including the meninges, kidneys, bones, and lymph nodes. Tuberculosis has been linked with CVD, and its potential role to CVD was not surprising as many infections contribute to the pathogenesis of CVD. Pulmonary tuberculosis (PTB) is one of the most common infectious diseases encountered in clinical practice, more often in developing countries which continues to be a public health problem globally evidenced by the rise of morbidity and mortality that is closely associated with poverty, malnutrition, overcrowding, substandard housing, and inadequate health care.
Health-related quality of life (HRQOL) is a broad multidimensional concept comprising of subjective evaluations of health particularly on perceptions of physical and mental health, including health risks and conditions, functional status, and social support. Measuring it can help determine the burden of preventable disease, injuries, and disabilities, and can provide valuable new insights into the relationships between HRQOL and risk factors. Its questions have become an essential component of health surveillance and generally considered valid indicators of service needs and intervention outcomes (Hawaii Health Data Warehouse, 2014) [1].

Globally, CVD continues to alarm both developed and developing countries ranking first as the top cause of death globally wherein more people die annually from cerebrovascular diseases than from any other causes. An estimate of 17.7 million people died from cerebrovascular diseases in 2015 representing 31% of all global deaths, 7.4 million were due to coronary heart disease, and 6.7 million were due to cerebrovascular accident (CVA) or stroke where over three quarters of CVD deaths take place in low- and middle-income countries (WHO, 2017) [25]. Meanwhile, Mycobacterium tuberculosis is typically involved in PTB infecting 1% of the world's population in one year ranking one of the top 10 causes of death worldwide with 10.4 million cases, and 1.8 million people fell ill and died respectively in 2015 with over 95% of tuberculosis mortality occurred in low- and middle-income countries. 87% of new cases have been reported in 2015, yet cases have been fallen by an average of 1.5% per year since 2000 (WHO, 2016) [3, 5].

In the Philippines, CVD were identified as one of the top 10 leading causes of morbidity with 512,604 cases or a case rate of 532.9 per 100, 000 populations and the number one cause of mortality with a case of 5, 287 deaths or 21.9% of total deaths (Department of Health, 2012) [4]. Meanwhile, PTB was identified among the top 10 causes of morbidity in 2010 with morbidity accounting to 322 cases per 100,000 population and mortality of 13 cases per 100, 000 population (WHO, 2015).

Although rigorous awareness campaign on the consequences of poorly managed diet and comorbidities have been conducted, cases of CVD and PTB are still prevalent among the population through the years. Several studies have reported the relevance of the HRQOL of patients with CVD. In the study of Rancic *et al* in 2012, it showed that HRQOL of patients who had acute myocardial infarction was very impaired one month after the attack. In addition, several studies have shown that an increase in the number of risk factors for CVD is associated with a gradual decrease in HRQOL. Although CVD patients are known to have impaired HRQOL, only few studies have examined HRQOL of patients at risk of CVD. Among these studies is the study of Hyeong-Lee *et al* in 2015 which showed that HRQOL in patients at high risk for CVD is associated with impaired HRQOL.

The study is to measure the CVD risk level and HRQOL of patients with PTB. HRQOL can be an important measure on the impact of CVD in an individual with PTB, considering the influence of comorbidity of acute infectious disease. Following sustained incidence of pulmonary tuberculosis cases, reports of discontinued treatment, recurrence and hospital consultations, it is of best interest to place them under study. Determining the impact of the CVD risk level and HRQOL in patients with PTB will be beneficial in the future delivery of health care services. As an outcome, a hope that a greater emphasis will be marked on the significance of risk assessment, prevention, and early detection of CVD and holistically management PTB by the inclusion of risk assessment in order to determine individuals at high risk. In such way, comorbidity and adverse outcomes may be averted, and no life will be put at stake due to external factors and failure to recognize risks at an earlier stage.

Methodology

Design and Sample

A descriptive-correlational design of research was employed to determine the demographic profile of the respondents, presence or absence of diabetes, smoking status, mean systolic blood pressure, the category of PTB and history of previous PTB treatment. It was also used to determine the CVD risk level and HRQOL of the respondents and their relationship. Fifty-two (52) patients with an admitting diagnosis of PTB categories III, IV, and V in the different medical wards of Bicol Medical Center randomly selected through systematic sampling. Excluded PTB patients were those under categories 0, I and II, and ages below 40 years old and those who had underlying cardiovascular comorbidities.

Data Gathering Instrument

The researcher adopted two standardized questionnaires to collect the needed data and facilitate measurement of research variables: World Health Organization/International Society of Hypertension (WHO/ISH) Risk Prediction Chart for Western Pacific Sub-Region B and Optum 36-Item Short Form Health Survey (SF-36v2).

The World Health Organization/International Society of Hypertension (WHO/ISH) Risk Prediction Chart for Western Pacific Sub-Region B were used as encouraged for maximum use and dissemination with acknowledgment of World Health Organization as the source of the material. A request to secure and distribute Optum 36-Item Short Form Health Survey (SF-36v2) questionnaires was made and thereby granted a license to distribute the questionnaires with a PRO CoRE software and activation key to analyze the gathered data. A license to distribute the Optum 36-Item Short Form Health Survey (SF-36v2) on English and translated versions in Cebuano and Tagalog language was given with a validity good for one (1) year subjected to terms and conditions to be used for a maximum of 100 respondents. The researcher adopted the questionnaires in accordance with the purpose of the study and to gather valid and reliable information.

The questionnaires were divided into two major parts. The first part comprised the respondents' biophysical profile such as age and gender, presence or absence of diabetes, smoking status and mean systolic blood pressure. It also included the level of the 10-year estimation of CVD risk of the respondents. Additional data on the category of pulmonary tuberculosis and history of previous pulmonary tuberculosis treatment were also obtained in the first part. The second part consisted the respondents' HRQOL exploring eight (8) dimensions: vitality, physical functioning, bodily pain, general health perceptions, physical role functioning, emotional role functioning, social role functioning, and mental health.

Data Gathering Procedure

The investigation conforms with the principles outlined in the Declaration of Helsinki. A license was first secured for reproduction and use of the English and translated versions of Optum 36-Item Short Form Health Survey (SF-36v2). A letter of approval was then requested from the Dean of the Graduate school to conduct data gathering procedure.

The researcher then submitted a letter to conduct the study to the Chief Training Officer of Bicol Medical Center and training officer of the Nursing Department.

A signed consent was obtained before gathering the data from the respondents. The first part of the questionnaires was collected through an interview and obtained the mean systolic blood pressures before and after the interview. The second part of the questionnaires was given to the patient and significant others after careful instructions were given. The questionnaires were then retrieved on the later part of the day.

Data Analysis

The descriptive and correlational analysis was applied to treat the data gathered in the study. Mean was used to present the CVD risk level in terms of age, gender, presence or absence of diabetes, smoking status, mean systolic blood pressure, treatment status on PTB. Mean also was used to present the HRQOL in terms of vitality, physical functioning, bodily pain, general health perceptions, physical role functioning, emotional role functioning, social role functioning and mental health using the OPTUM PRO CoRE Software provided with the questionnaires. Finally, Pearson's Chi-Square Test determined the relationship of CVD risk level with the respondents' HRQOL. The data was analyzed using the IBM Statistical Package Social Science (SPSS) version 20 software with a 5% level of significance used for all hypothesis tests.

Results

The CVD risk level, the demographic, and biophysical characteristics of the respondents in terms of the risk predictors used were shown in Table 1. All age groups of the respondents have low CVD risk level except those patients aging 70-79 years old having moderate CVD risk level; respondents generally have low CVD risk level respective to the predictors used to determine the level of CVD risk.

Health-related quality of life of patients with PTB is shown in Table 2. The dimensions of Vitality, Bodily Pain, General Health Perception, Social Role Functioning, and Mental Health showed average HRQOL. On the other hand, the dimensions of Physical Functioning, Physical Role Functioning, and Emotional Role Functioning showed below average HRQOL.

The Pearson Chi-Square Test determined the relationship of CVD risk level and HRQOL as shown in Table 3. There was a significant relationship between the CVD risk level and HRQOL of patients with PTB in terms of Physical Functioning ($p = <.001$), General Health Perception ($p = .039$), and Emotional Role Functioning ($p = .02$).

Discussion

In this study, the results indicated a low CVD risk level in terms of age, sex, presence or absence of diabetes, smoking status, mean systolic blood pressure, the category of PTB and history of previous PTB treatment except for respondents aging 70 – 79 years old with moderate risk. This finding has been supported by the study of Hinkle and Cheever (2014) [8] who explained that normal anatomic and functional changes lead to decreased myocardial contractility, prolonged systole, and delayed conduction, thus, stressful physical and emotional conditions especially that occurs suddenly may have adverse events on the aged person. However, it has been observed that respondents with the pre-determined risk factors obtained higher mean scores than other respondents. Sex impacts the developmental programming of blood pressure and cardiovascular risk as emphasized in the study of Intapad *et al.* (2014) [9]. Respondents who have smoked obtained higher scores than those who haven't smoked which is supported by the study of Messner and Bernhard (2014) [10] that smoking plays an active role not only in the initiation of CVD but also contributes significantly to cause disease progression and fatal cardiovascular outcomes. It was also emphasized in the study of Bundy *et al.* (2017) [11] that reducing systolic blood pressure to levels below currently recommended targets significantly reduces the CVD risk and all-cause mortality. The study of Chen *et al.* (2015) [12] also presented that elevated glycosylated hemoglobin (HbA1C) levels were associated with increased risks of CVD and death caused by early endothelial dysfunction and progressive vascular inflammation that lead to cardiovascular events. Respondents with Category IV PTB have higher risk of developing cardiovascular disease among the three categories of PTB wherein a study conducted by Atif *et al.* (2012) [13] presented that relapse of PTB (Category IV) might be due to poor glycemic control due to interaction of certain PTB drug interactions and malnutrition, contributing to a higher risk of developing CVD. These studies support the implication that patients with predetermined risk factors have a higher risk of developing CVD.

The study also examined the HRQOL of the patients with PTB. Several studies have examined the contributing effect of HRQOL to the development of CVD. Among these studies are the studies of Kubzanksy and Thurston (2015) [14], they have concluded that vitality may protect against risk of coronary heart disease (CHD); Wermeling *et al.* (2012) [15] presenting a higher number of both cardiovascular and non-cardiovascular comorbidities associated with decreased health status including bodily pain; Backe *et al.* (2017) [16] concluding that physical functional limitations and psychological distress highlight special needs among individuals experiencing daily functional limitations; Andreakou *et al.* (2016) [17] depicting emotional burden strongly correlates with HRQOL scores and adversely affects depressive symptomatology in a caregiver caring for a relative with a chronic disease.

The study has shown that the dimensions of physical functioning, general health perception, and emotional role functioning correlates with the CVD risk level of PTB patients. The results have been in congruence with the results on the studies of Chomistek *et al.* (2013) [18] that a combination of low physical activity and prolonged sitting augments the risk of CVD; Ko and Boo *et al* (2015) that gaps between perceived health and actual cardiovascular disease risk should be disclosed to optimize cardiovascular health; and Gianaros *et al.* (2014) [19] suggesting that cognitive regulation of emotion might relate to cardiovascular disease risk.

Table 1: CVD Risk Level According to Characteristics Used in Risk Prediction

Risk Factors		Weighted Mean	SD
Age	40 – 49	1.05	.213
	50 – 59	1.13	.342
	60 – 69	1.58	.165
	70 – 79	2.00	.000
Sex	Male	1.27	.732
	Female	1.13	.352
Smoking Status	Smoker	1.31	.758
	Non-Smoker	1.06	.243
Mean Systolic Blood Pressure	<120 mmHg	1.08	.272
	120 – 129 mmHg	1.20	.422
	130 – 139 mmHg	1.20	.477
	>140 mmHg	1.64	1.206
Comorbid Status of Diabetes	With Diabetes	1.60	1.265
	Without Diabetes	1.14	.354
Pulmonary Tuberculosis Category	Category III	1.00	.000
	Category IV	1.29	.716
	Category V	1.00	.000
History of Previous Pulmonary Tuberculosis Treatment	New Patient	1.00	.000
	Previously Treated Patient	1.27	.688
AWM	1.23	52	.645

Legend: AWM = Average Weighted Mean

Table 2: Health-Related Quality of Life of Patients with Pulmonary Tuberculosis

Dimension	NBS
Vitality	49.73
Physical Functioning	39.35
Bodily Pain	46.20
General Health Perception	45.91
Physical Role Functioning	35.27
Emotional Role Functioning	34.35
Social Role Functioning	44.38
Mental Health	52.48

Legend: NBS = Norm-Based Score

Table 3: Relationship of Cardiovascular Disease Risk Level and Health-Related Quality of Life of Patients with Pulmonary Tuberculosis

Dimension	Asymp. Sig. (2-sided)
Vitality	.616
Physical Functioning	.000
Bodily Pain	.842
General Health Perception	.039
Physical Role Functioning	.175
Emotional Role Functioning	.020
Social Role Functioning	.822
Mental Health	.456

Level of Significance:.05

Conclusion

Majority of patients with PTB have low CVD risk level which indicates that they have minimal risk of developing CVD. However, individual risk factors for the development of CVD progressively contribute to the level of CVD risk. Healthcare providers need to continue to monitor PTB patients under their care with predetermined risk factors of CVD to minimize the risk of CVD development.

Patients with PTB experiences a degree of limitation on performing physical activities and in the performance of their role due to concurrent physical limitation and emotional problems. Healthcare providers need to assist PTB patients in the performance of physical activities and their roles provided that they are assisted towards attaining independence on the performance of these activities.

Most of the affected dimensions pertains to the physical dimensions of HRQOL, thus risk factors for CVD affects patients with PTB primarily on the patient's physical aspect and functioning of HRQOL. Healthcare providers need to plan in monitoring and addressing the risk of CVD and HRQOL dimensions affected sustain if not improve to a higher level of independence among patients with PTB.

Implications for Practice

- Holistic management by considering cardiopulmonary effects of PTB.
- HRQOL as an important measure on the impact of CVD and PTB.
- Benefits outweigh in CVD surveillance and prevention while managing PTB.

References

1. Hawaii Health Data Warehouse, 2014. Retrieved February 7, 2017 from Hhdw.org. n.p.
2. World Health Organization, 2017. Cardiovascular Diseases (CVDs). Retrieved July 31, 2017 from http://www.who.int/mediacentre/factsheets/fs317/en/
3. World Health Organization, 2016. Tuberculosis (TB). Retrieved November 28, 2016 from http://www.who.int/mediacentre/factsheets/fs104/en/
4. Department of Health, 2012. Philippine Health Statistics 2012. Retrieved November 28, 2016 from www, doh.gov.ph
5. World Health Organization, 2016. Global Tuberculosis Report 2016. Retrieved July 31, 2017 from http://www.who.int/tb/publications/global_report/en/
6. Natasa Rancic *et al*, Health-Related Quality of Life in Patients after the Acute Myocardial Infarction. Open Medicine, 2013; 8(2). Retrieved February 17, 2017 from www. link.springer.com/article/10.2478/s11536-012-0118-5

7. Hyeon-Young Ko *et al*, Health-Related Quality of Life and Cardiovascular Disease Risk in Korean Adults. Korean Journal of Family Medicine. 2015; 36(6):349. Retrieved February 19, 2017 from http://dx.doi.org/10.4082/kjfm.2015.36.6.349
8. Janice Hinkle, Kerry Cheever. Brunner and Suddarth's Textbook of Medical-Surgical Nursing. 13th edition page 586. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins, 2014.
9. Suttira Intapad *et al*, Sex Differences in the Developmental Origins of Cardiovascular Disease. Physiology. 2014; 29(2):122-132. Retrieved January 18, 2018 from http://dx.doi.org/10.1152/physiol.00045.2013
10. Barbara Messner, David Bernhard, Smoking and Cardiovascular Disease: Mechanisms of Endothelial Dysfunction and Early Atherogenesis. Arteriosclerosis, Thrombosis, and Vascular Biology, 2014; 34(3):509-519. Retrieved January 19, 2018. from https://doi.org/10.1161/ATVBAHA.113.300156
11. Bundy *et al*, Systolic Blood Pressure Reduction and Risk of Cardiovascular Disease and Mortality. JAMA Cardiology. 2017; 2(7):775. Retrieved January 24, 2018 from http://dx.doi.org/10.1001/jamacardio.2017.1421
12. Yun-Yu Chen *et al*, The Impact of Diabetes Mellitus and Corresponding HbA1c Levels on the Future Risks of Cardiovascular Disease and Mortality: A Representative Cohort Study in Taiwan. PLOS ONE, 2015; 10(4):e0123116. Retrieved January 18, 2018 from http://dx.doi.org/10.1371/journal.pone.0123116
13. Muhammad Atif *et al*, Health-Related Quality of Life (HRQoL) in Co-Morbid Tuberculosis Relapse Patient: A Case Report from Malaysia. Tropical Journal of Pharmaceutical Research August. 2012; 11(4):651-655. Retrieved January 19, 2018 from http://dx.doi.org/10.4314/tjpr.v11i4.17
14. Laura Kubzansky, Rebecca Thurston. Emotional Vitality and Incident Coronary Heart Disease. Archives of General Psychiatry, 2015; 64(12):1393. Retrieved February 2, 2018 from http://biosocialmethods.isr.umich.edu/wp-content/uploads/2015/01/kubzansky-etal-vitality.pdf
15. Pauline Wermeling *et al*. Both Cardiovascular and Non-Cardiovascular Comorbidity Are Related to Health Status in Well-Controlled Type 2 Diabetes Patients: A Cross-Sectional Analysis. Cardiovascular Diabetology, 2012; 11(1):121. Retrieved February 6, 2018 from http://dx.doi.org/10.1186/1475-2840-11-121
16. Ingebog Flaten Backe *et al*. The Relationship Between Physical Functional Limitations, and Psychological Distress: Considering a Possible Mediating Role of Pain, Social Support and Sense of Mastery. SSM - Population Health, 2017; 4:153-163. Retrieved February 3, 2018 from http://dx.doi.org/10.1016/j.ssmph.2017.12.005
17. Maria Andreakou *et al*. Assessment of Health-Related Quality of Life for Caregivers of Alzheimer's Disease Patients, 2016. Retrieved February 4, 2018 from https://www.hindawi.com/journals/ijad/2016/9213968/
18. Andrea Chomistek *et al*. Relationship of Sedentary Behavior and Physical Activity to Incident Cardiovascular Disease. Journal of The American College of Cardiology. 2013; 61(23):2346-2354. Retrieved February 2, 2018 from http://dx.doi.org/10.1016/j.jacc.2013.03.031
19. Peter Gianaros *et al*. An Inflammatory Pathway Links Atherosclerotic Cardiovascular Disease Risk to Neural Activity Evoked by the Cognitive Regulation of Emotion. Biological Psychiatry. 2014; 75(9):738-745. Retrieved February 4, 2018 from http://dx.doi.org/10.1016/j.biopsych.2013.10.012