THE ASSOCIATION BETWEEN CHRONIC DISEASES AND WORK PRODUCTIVITY AMONG PUBLIC HEALTH STAFFIN KOTA BHARU DISTRICT

by

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LIST OF ABBREVIATIONS

AOR	Adjusted Odds Ratio
BMI	Body Mass Index
CI	Confidence interval
COPD	Chronic Obstructive Pulmonary disease
CVD	Cardiovascular Disease
IQR	Interquartile Range
MC	Medical Certificate
MOH	Ministry of Health
MREC	Medical Research Committee
NCD	Non-communicable Disease
NHMS	National Health Morbidity Survey
NMRR	National Medical Research Register
OECD	Organisation for Economic Co-operation and Development
OR	Odds Ratio
PS	Power & Sample Size
ROC	Receiving Operating Characteristic
SD	Standard Deviation
SPS	Stanford Presenteeism Scale
SPSS	Statistical Package for Social Science
USDOH	United State Department of Health and Human Services
VAS	Visual Analog Scale
WHO	World Health Organization
WISBAR	Wisma Bebas Asap Rokok

ABSTRAK

HUBUNGKAIT ANTARA PENYAKIT KRONIK DAN PRODUKTIVITI KERJA DI KALANGAN KAKITANGAN KESIHATAN AWAM DI DAERAH KOTA BHARU

Produktiviti kerja kakitangan kesihatan awam adalah sama penting dengan tenaga buruh yang lain kerana mereka adalah individu yang terlibat dalam mempromosikan gaya hidup sihat serta kawalan dan pencegahan penyakit berjangkit dan tidak berjangkit. Secara tidak langsung, ianya menyumbang kepada pemerkasaan bangsa dan modal insan yang sihat sekali gus meransang pertumbuhan ekonomi di negara kita. Objektif kajian ini adalah untuk menentukan prevalen penyakit kronik dan hubungkaitnya dengan produktiviti kerja di kalangan kakitangan kesihatan awam di Daerah Kota Bharu. Kajian ini merupakan kajian keratan rentas dilakukan di kalangan 363 kakitangan kesihatan awam menggunakan senarai semak pro forma yang mengandungi data sosiodemografi, status penyakit kronik, data cuti tahunan dan cuti sakit perubatan serta mengukur tahap presenteeism menggunakan boring soal selidik *Stanford Presenteeism Scale*. Kajian itu menunjukkan prevalen dyslipidemia adalah 19.3%, hipertensi 16.0%, asma 12.7%, diabetes mellitus 11.6% dan penyakit radang sendi sebanyak 5.0%. Kira-kira 70% daripada kakitangan dilaporkan mempunyai produktiviti kerja yang rendah sepanjang tempoh satu tahun yang lalu. Terdapat 89% daripada kakitangan dilaporkan mempunyai kadar presenteeism tinggi, 62.5% ketidakhadiran, dan 1.4% kakitangan mempunyai rekod bilangan cuti sakit yang lebih tinggi. Analisis regresi logistik berganda menunjukkan dyslipidemia (AOR 11,86, 95% CI: 2.76, 50.50; p = 0.001), hipertensi (AOR 3.43, 95% CI: 1.13, 10.35; p = 0,029) dan kencing manis (AOR 5.40, 95% CI: 1.54, 18.99;

p = 0.009) mempunyai hubungkait yang ketara dengan produktiviti kerja yang rendah. Walau bagaimanapun, tidak ada hubungan yang signifikan didapati antara penyakit asma, radang sendi dan lain-lain penyakit kronik dengan produktiviti kerja. Kajian ini menunjukkan bahawa penyakit kronik boleh menyumbang kepada produktiviti kerja yang rendah dan memeberi kesan kepada kualiti program kesihatan awam.

Kata kunci Produktiviti kerja; kakitangan kesihatan awam; penyakit kronik; ketidakhadiran

ABSTRACT

THE ASSOCIATION BETWEEN CHRONIC DISEASES AND WORK PRODUCTIVITY AMONG PUBLIC HEALTH STAFF IN KOTA BHARU DISTRICT

Work productivity of public health staff is as much as crucial as other production labor force to ensure the empowerment of healthy nation, healthy human capitals thus contribute to high economic growth of our country since they are involved in promotion of healthy lifestyle, control and prevention of communicable and non-communicable diseases. The objective of this study was to determine the proportion of chronic diseases and its association with work productivity among public health staff in Kota Bharu District. This is a cross sectional study done among 363 public health staffs using pro forma checklist which consist of socio-demographic data, status of chronic diseases, annual and medical leaves data and measuring presenteeism level using Stanford Presenteeism Scale questionnaire. The study showed the prevalence of dyslipidemia was 19.3%, hypertension 16.0%, asthma 12.7%, diabetes mellitus 11.6% and arthritis 5.0%. About 70% of staffs reported to have low work productivity for the past one year. There were 89% of staffs reported with high presenteeism, 62.5% absenteeism, and 1.4% with high sickness absence. Multiple logistic regression analysis showed that dyslipidemia (AOR 11.86, 95% CI: 2.76, 50.50; p = 0.001), hypertension (AOR 3.43, 95% CI: 1.13, 10.35; p = 0.029) and diabetes mellitus (AOR 5.40, 95% CI: 1.54, 18.99; p = 0.009) were significantly associated with low work productivity. However, there was no significant association was found between asthma, arthritis and other chronic diseases with low work

productivity. This study demonstrated that chronic diseases can contribute to low work productivity affecting the quality of public health program.

Keywords Work productivity; public health staff; chronic disease; absenteeism

CHAPTER ONE: INTRODUCTION

1.1 Overview

Productivity is an important indicator because it reflexes the image of an organisation. Productivity is viewed with respects to its measurement, how it is affected and who will be affected by it.

1.1.1 Work productivity and its measurement

According to Organisation for Economic Co-Operation and Development [OECD] (2001), productivity is usually defined as a ratio of a volume measure or dimension of output to a volume measure or dimension of input use. Productivity also is a measure of the efficiency with which a country or organization use the resources or inputs to produce valuable outputs such as products or services. SPRING is an enterprise development agency under the Ministry of Trade and Industry of Singapore. They are responsible for developing and promoting an internationally-recognised standards and quality assurance infrastructure. According to them, measurement of productivity outcome plays an important role in organization. It helps to determine if the organization is progressing well and function as it supposed to be. It also provides information on how effectively and efficiently the organization manages its resources (SPRING, 2001). The most common forms of input measured in productivity are labor and capital (OECD, 2001).

Labor refers to all categories of employees or workers or even can be called as workforce in an organisation. Capital refers to physical assets such as machinery

and equipment, land and buildings that are used by the organisation in the production of goods or provision of services and products (OECD, 2001). We commonly focus on labor or workers' productivity measured. Achieving good governmental outcome is through developing high performing organizations or institutions. It can be achieved if workers having high and good work productivity which resulted on many factors including good health condition (Boles *et al.*, 2004). Productivity of workers can be measured in several ways such as from measuring the task completed by workers, gathering feedback from customers or clients, employer's prospective of evaluations, multidimensional evaluation from peers and subordinates, job's satisfaction and also level of productivity loss due to time off work (absenteeism) or reduced levels of productivity while at work (also known as presenteeism). In measuring health-related productivity loss, both absenteeism and presenteeism can be used to estimate the productivity losses among workers with underlying health conditions realistically (Mitchell and Bates, 2011).

1.1.2 Burden of chronic diseases

Epidemiologically, the burden of chronic diseases showed an increasing trend worldwide including in developing countries. World Health Organization described chronic diseases otherwise called non-communicable diseases (NCDs) as type of illnesses with long duration, slow progression, causing premature morbidity, dysfunction, reduced quality of life and it usually develop and progress over long periods. Centers for Disease Control and Prevention [CDC] (2013) categorized types of chronic disease as a group of cardiovascular disease (e.g., coronary heart disease, hypertension, and stroke), cancer, chronic respiratory disease (e.g. asthma, chronic obstructive pulmonary disease), diabetes, chronic neurologic disorders, arthritis or

musculoskeletal diseases and unintentional injuries. Smoking and the other four metabolic risk factors which consist of high blood pressure, high total cholesterol, elevated glucose, overweight and obesity being prioritized as important component need to be highlighted to improve populations' health in combating NCDs (CDC, 2013).

National Health Morbidity Survey done in 2011 showed that the national prevalence of known diabetes mellitus, hypertension and hypercholesterolemia were 7.2%, 12.8% and 8.4%. The overweight and obesity prevalence were 29.4% and 15.1%. Those prevalence as similar to Kelantan population with 8.0% for known diabetes mellitus, 11.1% for hypertension 31.5% for overweight and 16.2% for obese. Kelantan had lower prevalence of known hypercholesterolemia compared to national prevalence which was only 3.6%. The prevalence of known hypercholesterolemia, overweight and obese among government employee were reported higher compared to national and Kelantan population (11.9%, 34.2% and 20.1%). However, government employee showed lower prevalence in diabetes mellitus (6.0%) and similar in prevalence of hypertension (11.0%) as compared to national.

Obesity is related with many types of other types of chronic disease such as diabetes mellitus, hypertension, coronary heart disease, high blood cholesterol, complications of pregnancy, reproductive health complications, cancer, psychological disorders such as depression and increased surgical and anesthetist risk (Rodbard *et al.*, 2009). It was found that increasing body mass index strongly related with increasing risk of at least one of cardiovascular disease risk factor, arthritis and

other chronic health illness (Agaliotis *et al.*, 2013; Zaher *et al.*, 2009). More importantly, obesity is modifiable risk factors to the mentioned chronic disease.

1.2 Work productivity and chronic diseases

1.2.1 Association of chronic diseases and work productivity

Many studies have been done to show the effect of specific chronic diseases on the quality of life and work productivity (Serxner *et al.*, 2001; Solem *et al.*, 2013; Steiner *et al.*, 2004; Williams *et al.*, 2009). Workers' productivity is influence by many factors such as socioeconomic background, health status, and workplace environment, relationship with the employer or co-workers and salary satisfaction. Health and lifestyle-related factors play major role in the causality or underlying factors of productivity loss at work. Healthy workforce has been shown to have lower health care expenditures to be spent by the employer or government thus improves in organizations' productivity (Serxner *et al.*, 2001). Chronic diseases have been shown to have negative impact such as lowering the productivity level among workers. Workers with chronic diseases suffered more work-loss days per year, reported more absenteeism, having higher rate of presenteeism and also high sickness absence (Boles *et al.*, 2004; Janssens *et al.*, 2012; Kotlarz *et al.*, 2010; Tunceli *et al.*, 2005) .

1.2.2 Public health staff and productivity

Work productivity of public health staff is as much as crucial as other production labor force. This is because public health staffs involved in promotion of health and prevention of communicable and non-communicable diseases as well as environmental health. World Health Organization [WHO] Report 2006 on 'Working

Together for Health' described health workers or staff are people whose job it is to protect and improve the health of their communities . They are not just individuals but are integral parts of functioning health teams. Each member contributes different skills and performs different functions. Public health personnel play major function in monitoring health status, taken care of community health problems and health hazards in the community. They empower people about health issues, enforce laws and regulations and ensure occupational and environmental safety in the community. They also function in evaluate effectiveness, accessibility and quality of health services. Healthcare personnel are important promoters and role models for maintaining a healthy lifestyle for the general population.

Workers' productivity among public health staff can be affected by various factors including underlying chronic diseases and obesity. It is important since increasing literature showed chronic diseases have an important role in work productivity, hence economically (Abbate *et al.*, 2005; Sullivan *et al.*, 2008; Tunceli *et al.*, 2005). A healthy workforce is needed to ensure the success of all public health programs. Success of the programs run by the healthy public health care personnel will ultimately resulted in healthy nation, healthy human capitals and productive other labor force and high economic growth. At individual's level, chronic diseases deprived individual's health and productive potential, and macro economically lower the gross domestic product (GDP) and gross national income (CNI). With good health, human capital improves leading to increase productivity which positively affects economic growth rate. Economic growth cannot be sustained without improvements in productivity. Therefore it is essential to have healthier and productive public health staff.

1.3 Rationale of Study

A lot of study has been done on how specific chronic diseases affect the quality of life but we have limited local study on association of chronic diseases specific on work productivity among public health staff. Malaysia Ministry of Health has created a comprehensive module ('Modul *Intervensi Obesiti di Tempat Kerja*') in 2010 to promote healthy lifestyles in the workplace that supports the activities of the control of obesity and to produce healthy and productive employees. BMI also has been suggested as one of component in Key Performance Indicator (KPI) by Health Deputy Minister. This study perhaps will provide a baseline data for Ministry of Health and can be used in evaluation of the module with addition of more specific measurable outcome such as work performance measure example *LNPT (Laporan Penilaian Prestasi Tahunan*).

1.4 Scope of study

Literatures also have shown the significant association between health, underlying chronic diseases and work productivity (Paulose-Ram *et al*., 2012; Ricci and Chee, 2005; Robroek *et al.*, 2013; Serxner *et al.*, 2001). This research will look into the association between chronic diseases such as diabetes mellitus, hypertension, dyslipidemia, asthma, chronic obstructive pulmonary disease, arthritis, heart diseases, cancer and other health risk such as obesity and smoking can affect our work productivity. The work productivity measured were absenteeism, presenteeism and sickness absence.

This study will look for associations between selected chronic diseases, BMI and smoking with work productivity among public health staff using validated self-reported work productivity questionnaire.

CHAPTER TWO: LITERATURE REVIEW

2.1 Literature Review

2.1.1 Productivity of public health system

Productivity has become a major and critical factor in the strength and sustainability of an institutions' overall performance. Productivity is an average measure of the efficiency of production. In economic value, it usually expressed as the ratio of output to inputs. A common example in economics is labor productivity.

The World Health Organization (WHO) defined health system as "all the activities whose primary purpose is to promote, restore, or maintain health". Health services researchers always focused on the performance and productivity of the healthcare delivery system. Their efforts are part of a broader strategy to enhance the quality of medical and health care and thus improve patient outcomes (Handler *et al.*, 2001). In Malaysia, governments worked as the primary financier and main providers of health services. There is a need in maintaining the good health system for effective preventive and curative health care services to the population and to ensure it is equitable and efficient to the nation (Kruk and Freedman, 2008).

There is always strong significant interest in assessing the performance and productivity of health systems in developing countries with the great international health goals setting and additional development aid for health internationally (Kruk and Freedman, 2008). Measuring productivity of public health system performance is measuring the extent to which the system achieves its mission. It requires

measurement of each of the components of the system such as the credibility of the staff, labors' or workers' productivity, quality of services provided, patients' or client satisfaction and their relationships with each other (Handler *et al.*, 2001).

2.1.2 Work productivity and its measurement

Work productivity came with certain similar term such as work performance, work efficiency and work effectiveness (Abma, 2012; Kalleberg and Vaisey, 2005; Kessler *et al.*, 2003). Productivity can be measured in a number of ways depend on the area or sector. There is several ways in measuring it. There are also many factors associated work productivity such as socio demographic background, health status, interest or job satisfaction, nature of the job and it's multifactorial. Different researcher had different views and ideas on how they look at each factors depends on their field of interest. Literatures in sociology, psychology, health, business and economics have proven that the quality of a person's work has significant effect for workers' social, psychological and economic virtue.

Understanding health-related-productivity profiles is important to several areas of economic research. Investigations from the various disciplines are considered, in order to get a broad perspective on how productivity varies. Productivity is generally defined as a measure of the amount of output generated per unit of input. In industry, productivity measured as unit of production per unit of input involving their labor, capital, energy, material and services (O'Mahony and Timmer, 2009) . In the computer technology and industry, their productivity measured as the software's ability, functionality, complexity, quality and their

scalability (Anselmo and Ledgard, 2003). Public sector productivity is most often measured as workers' productivity (Linna *et al.*, 2010) . While in health sectors, productivity can be measured as service delivered, treatment intensity provided, patients' health outcome, change in life expectancy of the nation and measuring the effectiveness of health promotion program on how people practice healthy lifestyle.

World Health Organization stated in their report in 2006 that a healthy workplace is a workplace where all members work together to realize the vision of employees and the institution. A healthy workplace will motivate employees to continue to provide good service. Studies have found several factors that influence job performance and also the relationship between health and income, socio-demographic background, with the poorest sections of the population being the most vulnerable population in terms of low work productivity. There are also relation between educational inequalities, occupational class that attributed to working conditions and productivity (Robroek *et al*., 2013).

The combination effect of work and health determines an individual's work functioning. Measurement of health-related work productivity has been described by Abma in 2012 from two different aspect. The first aspect deals with the economic impact or consequences of health conditions, such as using self-reported loss of productivity in the workplace and on the second aspect, they deals with the reported limitations to fulfill the work demands. The two most common terms that has been used widely in describing work productivity are absenteeism and presenteeism. Absenteeism, generally defined as not showing up for scheduled work and

presenteeism is defined as the worker still come to work despite being ill (Johns, 2010).

Pelletier *et al.* conducted a study in 2004 on 500 workers in a wellness program to see the effect of change in health risk towards work productivity. They measured work productivity as the amount of work the person could do, usual days of workers accomplished their job, or days the person can do work as carefully as usual. They defined absenteeism as percentage of time workers missed from work due to their health problems and presenteeism as percentage of time impaired or decrease in quality of work while on the job.

Different types of self-reported questionnaires have been developed to measure the effects of health on quality and functioning of job and workplace such as Health and Labor Questionnaire (HLQ), Health and Work Performance Questionnaire (HPQ), Health and Work Questionnaire (HWQ), Health-Related Productivity Questionnaire-Diary (HRPQ-D), Work Limitations Questionnaire (WLQ), Work Productivity and Activity Impairment (WPAI), Work Productivity Short Inventory (WPSI), Worker Productivity Index (WPI) and Stanford Presenteeism Scale (SPS).

Stanford Presenteeism Scale (SPS) has been created and simplified by Koopman *et al.* in 2002 from 32 items to only 6 items to describe presenteeism. It was a useful assessment tool to be used in relating the workers' health and their productivity. They captured both dimension of avoidance of distraction in the process of doing work from question 1, 3 and 5 and achieving work outcome from question 2, 4 and 6 and how it being affected by poor health status either acute or

chronic diseases. They identified items that would be the most applicable to all types of occupations.

2.1.3 Factor associated with work productivity

Interest in the consequences of health or any type of diseases has expand in the past decade as epidemiologists working together with health economists and health services researchers to form the most suitable methods to restructure the allocation of health care resources (Kessler *et al.*, 2003). Creating a safer and healthy work environment is a top priority in many industries, organization or departments. Creating a healthier workplace the role of employers and workers organizations as keeping workers with chronic illness in work, and getting them back to work, can be seen as an investment in the nation's economic productivity and social cohesion (Robroek *et al.*, 2013).

Obesity thus has major affect in productivity losses in workplace. A study of associations between obesity and the probability of any absenteeism (number of days of work missed in the previous year) was done by Agency for Healthcare Research and Quality in United State. Obesity was defined as a body mass index of 30kg/m^2 or higher. They categorized the workers by six type of occupation which consist of manager, professional, sales, service, office and equipment operator. Other predictors included age, education, and race. They found that overweight workers were 32% more likely to have absenteeism ($p < 0.001$) than those of normal weight workers in overall occupations. Significant association also was found among obese and morbidly workers where they were 61% and 118% seeming to have absenteeism than

those of normal weight workers in overall occupations ($p < 0.001$). However obesity was not associated with a greater risk of absenteeism among managers, office workers, and equipment operators although significant association was found among morbidly obese workers (Cawley *et al.*, 2007).

A study among 341 employees from eight manufacturing companies in Kentucky was conducted using the Work Limitations Questionnaire WLQ. They measured the weight of workers and how it interfered with the worker's ability to perform job activities during the previous 2 weeks and found that obesity was significantly associated with loss in productivity. Demographic characteristics of gender, race and ethnicity, age, type of occupation and income were also compared. The productivity lost for the obese worker was 4.16 % significantly higher than the other group ($p<0.05$). The obese worker had the highest percentages of missed more than 2 weeks of work. Obese workers also experienced more health-related work limitations, specifically regarding time needed to complete tasks and ability to perform physical job demands compare to non-obese workers. They experienced 1.18 % more loss in productivity ($p<0.05$). However, none of the covariates (gender, race and ethnicity, age, type of occupation and income) were found to have significant association with work productivity (Gates *et al.*, 2008). Obese workers also reported to have 1.7 times risk of absenteeism than those who are not obese due to certain illness (Rodbard *et al.*, 2009). Cardiometabolic conditions and musculoskeletal diseases as consequences of obesity are the most frequent chronic diseases (Pelletier *et al.*, 2004) .

Study by Sullivan *et al.* in 2008 demonstrated the effect of obesity and cardiometabolic risk factors on medical expenditures and missed work days. Individuals with diabetes, dyslipidemia, or hypertension had significantly greater medical expenditures than those without the respective condition and obesity significantly exacerbated this effect. In addition, diabetes, dyslipidemia, and hypertension resulted in greater absenteeism which resulted in greater lost productivity and obesity significantly exacerbated the damaging effect on work productivity. Obesity significantly exacerbates the deleterious effect of diabetes, dyslipidemia, and hypertension on productivity loss in the United States. Obesity is preventable and in order to reduce the incidence and effect of cardiometabolic risk, the employers or managers should be aware of those conditions.

Managers should be aware also that chronic illnesses do not present as a single cause but rather a range of symptoms which contribute to a compromised health status. Looking at many types of chronic diseases such as type 2 diabetes mellitus, hypertension, and hypercholesterolemia are common chronic diseases that are extremely costly to our society in terms of health care expenditures, morbidity and mortality (Goetzel *et al.*, 2004) . The cost of sickness, work absence and staff turnover are key drivers for developing health improvement programmes and introducing health standards in the workplace (Doak, 2002). To be clear, even in large companies the cost of not having a proper health system, or poor health management system, is not reduced by being spread across a large workforce. In fact the cost of failing to address the issue can be very high and usually leads to a high rate of absenteeism (Serxner *et al.*, 2001). Also there may be presenteeism, where a worker comes in despite being in no fit state to work. They continue to work despite

being in poor health. Not only does this lead to a drop in performance, but it also pose a risk to productivity, quality and the effectiveness of the business itself.

Chronically ill workers may have problems in meeting job demands, they may experience physical, cognitive or sensory limitations, have fatigue or pain complaints or other disease symptoms. The combination of being overweight or obese with other chronic health condition will further amplify the magnitude of low work productivity such as absenteeism among workers (Howard and Potter, 2014).

Chronic disease such as diabetes mellitus leads to both macrovascular and microvascular complications that are responsible for most of the associated excess morbidity and mortality While macrovascular complications such as cardiovascular (atherosclerosis) disease and stroke are the most frequent cause of excess mortality, microvascular complications such as retinopathy, nephropathy and neuropathy are responsible for much of the excess morbidity (Fowler, 2008). It also reported that proliferative retinopathy and blindness occurred only among those who had already developed diabetes, predominantly among those who had diabetes for 10 years or more, indicating the specificity of this microvascular complication (Gong *et al.*, 2011). While the incidence of severe nephropathy only after a duration of diabetes of 15–20 years or more (Nelson *et al.*, 1988). Boyko *et al.* found in 2006 that commonly available clinical information has the ability to predict the development of diabetic foot ulcer over 1- and 5-year periods of time with a high degree of accuracy. Not only focusing on diabetes-related complications which can lead to decreased in quality of life and work productivity , studies conducted by the Institute for Social Research at the University of Michigan also found that individuals with diabetes has

significant higher body mass index and more other underlying chronic illnesses compared to those not having ($p < 0.05$). This study also demonstrated that individuals with diabetes mellitus not only had two more work-loss day but also suffered increased in work limitations about 5.4% ($p < 0.01$) in men and 6% in women ($p < 0.05$) (Tunceli *et al.*, 2005) . In view of that, the burden associated with diabetes from economic and social aspect is expected to increase as this disease become more prevalence in their society.

Epidemiological studies had also established a strong association between hypertension, coronary heart disease and work productivity. Hypertension is a major independent risk factor for the development of coronary heart disease, stroke, and renal failure (Rosendorff *et al.*, 2007). In 2007, study done by Heagerty also found that the rate of cardiac events was higher in the subjects with high blood pressure than in those with low blood pressure variability and the high night-time systolic blood pressure was associated with more than 50% excess risk of cardiac events. Data from this study, including a selected hypertensive population of mostly middle aged subjects without diabetes referred during the last 5 years to a specialist setting, indicate that advanced retinopathy is rarely observed and is related to ultrasonographic markers of cardiac and extracardiac target organ damage (Cuspidi *et al.*, 2005). In relation to work productivity, Howard and Potter (2014) demonstrated in their study that hypertension can directly related to workers absenteeism. Psychological distress, depressive feelings, feelings of shame or guilt, lack of coping or communicative skills, and non-supportive colleagues and employees may lead to further uncontrolled hypertension and indirectly contribute to work-related problems. This is why positive worker health condition leads to gains in

improved quality and good services, enhanced resilience and increase intellectual capacity thus increase work productivity (Boles *et al.*, 2004).

Osteoarthritis is the most common form of arthritis, affecting an estimated 27 million individuals in the United States (Kotlarz *et al.*, 2010) . Arthritis is a debilitating condition and is the leading source of pain among older (Sadosky *et al.*, 2010). The two forms of arthritis are osteoarthritis, which is caused by breakdown of joint cartilage, and rheumatoid arthritis, which is an inflammatory type of arthritis. In view of musculoskeletal pain as the effect of poor control arthritis, worker tend to take medical leave or can also resulted on workers absenteeism (Gignac *et al.*, 2014). Sadosky *et al.* (2010) demonstrated in their study that increasing OA severity (mild, moderate, severe), statistically significant differences ($p < 0.05$) were observed in increased pain scores (23.5, 50.2, 70.8, respectively), lower functioning outcomes, and a higher percent of overall work impairment due to OA (17%, 37%, 48%, respectively) but the interference with productivity was substantial in patients with severe OA. Time since first diagnosis increased with increasing OA severity: 4.6 years (95% CI: 3.8, 5.3) for mild OA, 5.9 years (95% CI: 5.2, 6.6) for moderate OA, and 7.2 years (95% CI: 6.0, 8.4) for severe OA ($p < 0.05$ for each pairwise comparison after adjusted for age and gender).

In 2010, Zhang and friends found that the average number of lost hours due to presenteeism ranging from 1.6 to 14.2 hours in 2 weeks duration among individuals with osteoarthritis or rheumatoid arthristis. One year after, McDonald *et al.* attest that arthritis associated with significantly lower levels of health-related quality of life. All pain conditions in arthritis were associated with higher levels of

work productivity loss. Musculoskeletal pain conditions were highly prevalent and associated with a significant burden and they conclude that good pain management may lead to improved productivity, benefiting both employers and workers.

If the arthritis can lower our work productivity due to the pain, chronic respiratory diseases such as asthma and chronic obstructive pulmonary disease also provided big impact on work. Asthma and other chronic respiratory disease control remain important issues in explaining poor outcome in quality of life thus indirectly effect work performance (Williams *et al.*, 2009). Increase awareness of the impact of respiratory disease may benefit workers and employers because preventive measures can be taken earlier. Employer has the responsibility in identifying those employees at risk so that the quality of work can be maintained (Williams *et al.*, 2009). The burden of disease costs associated with asthma is massive medical expenditures that include both direct and indirect costs. It is also associated with the loss of future potential earnings related to both morbidity and mortality. Hospitalization and medications were found to be the most important factors of direct costs while work loss accounted for the biggest percentage of indirect costs' factors (Bahadori *et al.*, 2009).

There was also study examined quality of life, worker productivity, and healthcare resource utilization among employed with and without COPD. They found that older workers with COPD reported significantly greater percentages of impairment while at work (presenteeism) overall work impairment (absenteeism and presenteeism combined) and impairment in daily activities (daCosta DiBonaventura *et al.*, 2012). There was also study that identifies the burden of workers suffered from

chronic obstructive pulmonary disease in the United States from the aspect of quality of life, work productivity, and health care resource use among employed adults ages 40–64 years. Workers with chronic obstructive pulmonary disease reported significantly lower health utilities, greater presenteeism and had overall work impairment than workers without chronic obstructive pulmonary disease. They also reported more mean emergency room visits and more mean hospitalizations. (Paulose-Ram *et al.*, 2012).

Other health-related effect in work productivity, Munir *et al*. provided an in-depth review of the impact of cancer and cancer-related issues on work ability for those patients who are still working during or following cancer treatment in 2009 . The study has shown that most types of cancers result in decreased work ability compared to healthy workers or those with other chronic diseases. Some cancer types have more decreased work ability than other types such as breast cancer compared to colorectal cancer. Reduced and impairment in work ability is associated with type of treatment such as chemotherapy, side-effects of the treatment especially fatigue and co-morbidity with other chronic health diseases. While fatigue has been reported part of treatment-related-symptom, it was also associated with less work productivity in such way that the symptom can interfere with the ability to complete the job tasks. Breast cancer survivors' workers reported a reduction in work productivity of 3.1% below the healthy worker does. There was also loss of 2.48 hours of work over two weeks of full time employment. Stages 1 and 2 were related to work limitations. Fatigue and hot flashes were significantly associated with work performance losses of 1.6% and 2.2% respectively (Lavigne *et al.*, 2008). Not only breast cancer, workers who suffered from brain tumors also being subjected to research related to

work productivity. There was association of symptom burden to work limitation among working survivors of malignant brain tumors. Those survivors were reported higher levels of work limitations and time off from work compare to the non-cancer workers. They also had negative problem solving orientation which directly can affect their job performance. Other symptoms such as fatigue, cognitive limitations and sleep disorder were independently associated with work limitations thus contribute to the low wok productivity (Feuerstein *et al.,* 2007).

Despite focusing on chronic diseases, smoking also can be seen as one of health risk and indirectly driven to work productivity. Burton *et al.* (2005) studied the association between health risks and percentage of work productivity loss. They found that ten out of 12 health risk factors studied were significantly associated with self-reported work limitations which involved lifestyle risk (smoking, physical activity, safety belt usage, relaxation medication), perception risk (life dissatisfaction, physical health, job dissatisfaction and stress) and biological risk (high blood pressure, high cholesterol and body mass index $\geq 30 kg/m^2$). They also described that each additional of one risk factor was associated with 2.4% reduce in productivity. However the association of smoking status itself towards productivity was found to be not significant.

Bunn III *et al.* (2006) had done a study in United State involving more than 30 000 employees from 147 companies from different organization in linking the smoking status with their work productivity by measuring absenteeism and presenteeism. They found that current smoker had higher absenteeism (6.7 days-

missed) compare to non-smoker (4.4 days-missed) or ex-smoker (4.9 days-missed) with $p = 0.006$.

2.2 Conceptual Framework

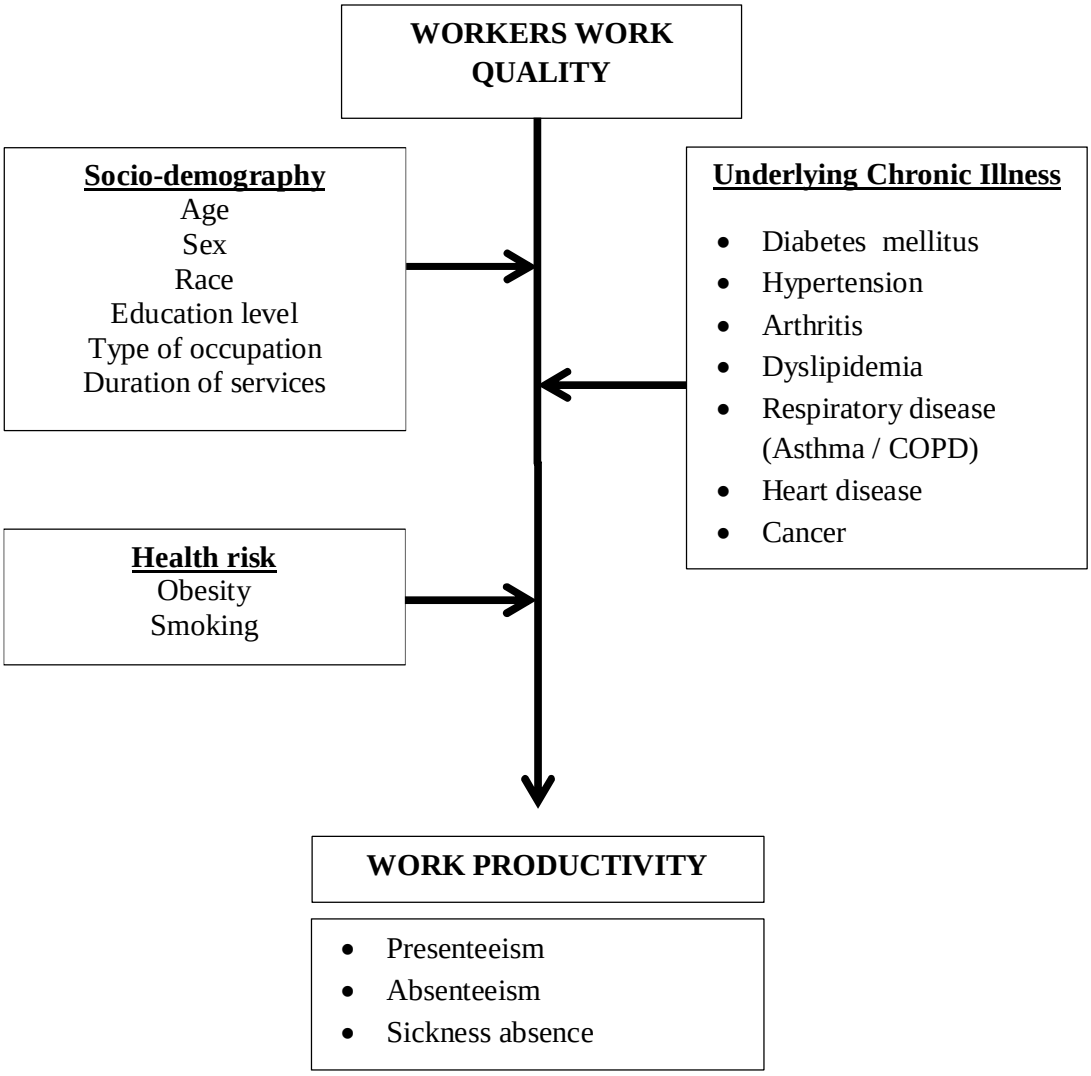

Figure 2.1: Conceptual framework of the study

CHAPTER THREE: OBJECTIVES & HYPOTHESES

3.1 Research Question

The study will investigate the following research questions:

1. What are the proportions of chronic diseases among public health staff in Kota Bharu District?
2. What are the distributions of work productivity among public health staff in Kota Bharu District.?
3. What are the association between chronic diseases and work productivity among public health staff?

3.2 General Objective

To study the proportion of chronic diseases and its association with work productivity among public health staff in Kota Bharu District.

3.3 Specific Objectives

3.3.1 Specific Objectives 1

To describe the proportion of chronic disease among public health staff in Kota Bharu District.

3.3.2 Specific Objectives 2

To describe the distribution of work productivity among public health staff with in Kota Bharu District.

3.3.3 Specific Objectives 3

To determine the association between chronic diseases and work productivity among public health staff in Kota Bharu District.

3.4 Research Hypothesis

There are association between underlying chronic disease and low work productivity among public health staff in Kota Bharu District.