THE IMPACT OF NIGHT SHIFT WORK ON HEALTH AND SOCIAL LIFE AMONG TECHNICAL EMPLOYEES IN GLOBAL RAIL MALAYSIA SDN BHD AND RAPID RAIL SDN BHD IN MRT KAJANG LINE

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OPEN UNIVERSITY MALAYSIA

2021

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A Final Year Project submitted in fulfilment of the requirements

for the degree of

Bachelor of Science in Project Management with Honours

Open University Malaysia

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ABSTRACT

Shift work is considered necessary especially to industries that provides 24/7 services to the community. In particular, night shift can have negative impact on health and well-being of the employees as it can cause disturbance of the normal circadian rhythms, causing significant alterations of sleep and biological functions including disturbances to eating habits, which in long run can increase the risk of hypertension, diabetes and obesity. Employees working on night shift have more difficulties to lead a healthy social life with many of them found difficult to be there for their families especially when it comes to social gatherings among family members. After some time, this will affect the marital relationship, care of children and social contacts. The aim of this paper is to analyse whether the night shift work has any impact on the health and social life of technical employees in Global Rail Sdn Bhd and Rapid Rail Sdn Bhd in MRT Kajang Line. To analyse the data in this study, SPSS Statistics 21 was used. The findings conclude that night shift has significant influence to sleep deprivation and obesity among the respondents. This study could help the MRT or rail industry in designing policies and creating cultures that could encourage their employees to lead a better healthy lifestyle and health regime so that the night shift does not lead to negative impact to the employees' health and social life.

KESAN SHIF MALAM KE ATAS KESIHATAN DAN KEHIDUPAN SOSIAL DI KALANGAN PEKERJA TEKNIKAL DI GLOBAL RAIL SDN BHD DAN RAPID RAIL SDN BHD DI LALUAN MRT KAJANG

ABSTRAK

Kerja shif dianggap sebagai satu keperluan terutama kepada industri yang memberikan perkhidmatan 24/7 kepada komuniti. Shift malam terutamanya memberikan impak yang negatif ke atas kesihatan dan kesejahteraan pekerja memandangkan ianya boleh menyebabkan gangguan ke atas irama normal sirkadian, perubahan ketara pada tidur dan fungsi biologi termasuk gangguan pada tabiat pemakanan yang dalam jangka masa panjang boleh meningkatkan risiko hipertensi, diabetes dan obesiti. Pekerja yang bekerja pada syif malam menghadapi lebih banyak kesukaran untuk menjalani kehidupan sosial yang sihat dengan ramai daripada mereka sukar untuk berada bersama keluarga mereka terutamanya apabila ia melibatkan perhimpunan sosial di kalangan ahli keluarga. Selepas beberapa lama, ini akan menjejaskan hubungan suami isteri, penjagaan anak dan hubungan sosial. Matlamat kertas kerja ini adalah untuk menganalisa sama ada kerja syif malam memberi kesan kepada kesihatan dan kehidupan sosial pekerja teknikal di Global Rail Sdn Bdd dan Rapid Rail Sdn Bhd di MRT Laluan Kajang. Bagi menganalisa data dalam kajian ini, SPSS Statistics 21 telah digunakan. Dapatan kajian merumuskan bahawa syif malam mempunyai pengaruh yang signifikan terhadap kekurangan tidur dan obesiti dalam kalangan responden. Kajian ini dapat membantu industri MRT atau keretapi dalam mereka bentuk dasar dan mewujudkan budaya yang boleh menggalakkan pekerja mereka menjalani gaya hidup sihat dan rejim kesihatan yang lebih baik supaya syif malam tidak membawa kesan negatif kepada kesihatan dan kehidupan sosial pekerja.

ACKNOWLDEGEMENT

I would like to express my profound gratitude to my family, especially to my wife who provide me with unfailing support and encouragement throughout my years of study and through the process of researching and writing this project paper. This accomplishment would not have been possible without them.

I also would like to take this opportunity to express my gratitude to my supervisor, Zahrun Nizam bin Adam @ Ahdani for his guidance.

THANK YOU

BADRUL HISHAM BAHARI
26 DECEMBER 2021

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CHAPTER 1: INTRODUCTION

1.0 Introduction

The working time is the key issue in an organisation in which the organisation needs to balance between the key output and the human capabilities. For the past decades, there is an increasing need to have a 24 hour shift (Costa, 2010) due to the society's needs for service and operations to be provided around the clock continuously (RR & MJ, 1997). The term 24/7 is an expression where both consumers and producers at the same time, require the availability of service and products and the producers to be able to produce or provide the product and service possible at any time of day and night.

There are various working schedules that were adopted by the organisation to cater for the need to have 24/7 service. Some organisations adopt overtime in which they allow the employees to work beyond the normal working hours. Some organisations use the shift working pattern in which the working hours are extended to evening and night hours and over the weekend. By doing shift schedule, the organisation can cover production or service for 24 hours without having to pay the employee overtime.

Most of the countries that have high number of workers work on 24/7 shift, have their economies that rely heavily on industries where shift work is necessary, such as manufacturing, retail and hospitality sectors (Lee et al., 2007). Other than these industries, shift work is considered necessary and indispensable to ensure continuity of care in healthcare and customer service industry. The need to have workers work around the clock, 24/7 also are due to these reasons: the society's needs for service and emergency cover, technical need for maintaining continuous process industries and economic need for offsetting plant obsolescence (Harrington, 2001).

According to (Harrington, 2001), shift work is where the employees work in a period between 6 to 12 hours of work at a time and they will alternate on two, three or four shifts in any 24 hour period. Conventionally, the three shifts start at 0600, 1400 and 2200 but there can be few variations on the shift pattern. Some of the shift patterns require the employees to work on the four - day work and two- day off, some on two- day shifts, some only work only at nights while others rotate through all three shifts.

The shift work pattern has become more prevalent and popular now among employees due to the high demand for flexibility and productivity in workforces in modern world. A decade ago, it might only be seen in manufacturing or healthcare industry but the increase in demand for services and pleasure has extended into the 'white collar' worker. E-commerce for example, has businesses that open 24/7 and thus, lead to the need of having 24/7 services for most retail and service companies (Harrington, 2001).

According to a study conducted by the International Labour Office Geneva in 2007, shift work is widely adopted in China, Korea and Malaysia. The same situation is also true for the Americas, as well as Mauritius, Senegal and Tunisia in Africa (Lee et al., 2007). Interestingly, the study also concluded that around 15% - 24% of employees in those countries work in night shift (Lee et al., 2007).

Nowadays, almost 20% of European Union employees are working night shift, as compared to an average of 10% a decade ago. Countries like China and Chile have seen a large percentage (38%) works outside of the standard business hours (De Cordova et al., 2016). The trend is similar around the world and UK has also seen the number of night shift employees risen by more than 250,000 in the past 5 years (Malleret T, 2018).

1.1 Background

This research paper is based on two companies, Global Rail Sdn Bhd (GRSB) and Rapid Rail Sdn Bhd (RRSB) which are involve with the operation of the mass rapid train (MRT) line between Sungai Buloh to Kajang. These two companies are responsible for the operation and maintenance of high voltage power distribution to the MRT line. They are to ensure that there is no interruption to the high voltage power that can affect the MRT's service to the public. The nature of the contract requires both companies to have their technical and operation employees to work on two rotating shifts that cover 24-hour operation. Although the MRT line stop its operation at 12 midnight, these technical employees are required to be on the clock 24/7. The preventive and scheduled maintenance work is normally carried out after midnight to ensure that the maintenance jobs do not interrupt the service of MRT during peak hour.

The technical employees of both RRSB and GRSB work on a four-day shift pattern in which each team (consists about 12 technical employees) will cover the morning shift from 7:00 a.m. to 7:00 p.m while another team (also consists of 12 technical employees) will cover the night shift from 7:00 p.m. to 7:00 a.m. Each team will work for 4 days, and they will be given two days off. With this work pattern, their off day and rest day do not necessarily fall on Saturday and Sunday like normal hour employees. In each day, there shall be at least 4 teams in each shift that will cover the MRT line from Sungai Buloh to Kajang.

1.2 Problem Statement

This shift pattern arrangement has been adopted by the companies for the last five years but for the last one year, the HR Managers of both companies noticed that almost 50% of the employees seek treatment for high blood problem, diabetes related and fatigue issues from their panel clinics. From the record, the frequency of treatment for these illnesses has escalated by 20% as compared to the last 2 years and the medical cost that the company must bear due to these illnesses has also increased tremendously. The increase in cost due to hypertension and diabetes is consistent with the written parliamentary reply by Ministry of Health presented in Dewan Negara in December 2019 where it stated that the cost of covering the treatment of chronic patients at government facilities is estimated at RM3.2 billion (Code Blue, 2019).

Besides direct medical cost incurred by the companies, it is noted that the number of medical leave taken by these employees have also risen. According to the record from HR Department, between 2016 to 2017, there are only 2 employees on average to take medical leave in a week but the number has increased to 4 employees per week from 2018 to quarter one 2021.

The HR Department has also notice that the employees who work on shifts have seen drastic change in their physical appearance. Most of the employees have gained significant weight and are currently in the overweight and obese category. Although their exact Body Mass Index (BMI) are not being measured, their weight increase can be seen from the comparison made in their first day reporting picture in HR record and their current physical appearances. The overweight issue has some impact in their daily working life, with issues related to productivity, absenteeism as well as the level of discrimination that people can face at work, the likelihood of being employed with obesity and opportunities for promotion and progression (Pinfold & Borneo, 2007).

The HR Manager concur with the study made by Pinfold & Borneo, (2007) in the sense that they agree that the opportunity for promotion and progression is likely to be given to employees who are in the category of obese because obese employees normally are less active and this will impact their performance especially if they have to deal with jobs that require a lot of physical movement and technical skills.

Working on night shift has adverse impact on employees' personal wellbeing, most notably in their social and family life. Most of them complaint about the time they got to spent with their families. This is especially true for employees whose spouse are working on normal shift. As the shift pattern for technical employees in RRSB and GRSB is scheduled in such a way that their off day and rest day do not fall on Saturday and Sunday, this would be harder for them to manage family errands with their family during the weekend.

They would miss family's functions, which are normally done over the weekend. Due to these impacts to their personal lives, there are few who express that the night shift arrangement has

taken a strain in their marriage. One study by (Nea et al., 2018) prove that the impact is true. According to the researchers, a mismatch of routine with those around the employees resulted in difficulty in maintaining relationship and some found that missing social gatherings was difficult for them. The study concluded that difficulty tending to the needs of the family are due to the tiredness related to shift work.

All these issues face by the employees working on night shift has negative impact to the companies. As more and more employees fall under the category of overweight and obese, there will be more employees who have high tendency to illnesses associated with obesity like diabetes, hypertension, insulin resistance and increase in risk of the metabolic syndrome (Wannamethee & Atkins, 2015). The higher number of employees with these diseases mean that the medical cost for the company will increase.

Employees who are on night shift also has complaint about sleep deprivation. As their sleep pattern has been altered, they have difficulty in maintaining sleep. According to studies, sleep deprivation will always be associated with slower reaction time and increased number of micro sleep, anxiety, and depression. In terms of work, it can affect the ability to make sound judgement especially in jobs that requires attention to detail (Sanches et al., 2015).

Do these problems that HR is facing has anything to do with night shift? Or is it related to their own lifestyle? Therefore, it is imperative for GRSB and RRSB to study what are the impact that night shift has on their employees and what they can do to minimise these impacts to the companies. Hence, the aim of this paper is to study the impact that night shift has on the technical employees in GRSB and RRSB and what are the preventive or proactive strategies that can be taken to minimise the cost implication to the companies.

1.3 Research Objectives

The objectives of this study are as follows:

i) To identify whether night shift work has impact on the health of technical employees in Rapid Rail Sdn Bhd (RRSB) and Global Rail Sdn Bhd (GRSB);
ii) To identify whether night shift work has impact on social life of technical employees in Rapid Rail Sdn Bhd (RRSB) and Global Rail Sdn Bhd (GRSB).

1.4 Research Questions

Based on the research objectives, five research questions are being proposed to address and fulfil the objective of this study. The questions are as follows:

i) Does night shift work have an impact on hypertension of technical employees of GRSB and RRSB in MRT Kajang Line?
ii) Does night shift work have an impact on diabetes of technical employees of GRSB and RRSB in MRT Kajang Line?
iii) Does night shift work have an impact on sleep deprivation of technical employees of GRSB and RRSB in MRT Kajang Line?
iv) Does night shift work have an impact on obesity of technical employees of GRSB and RRSB in MRT Kajang Line?
v) Does night shift work have an impact on social life of technical employees of GRSB and RRSB in MRT Kajang Line?

1.5 Significant of study

This research is significant to identify what are the impact of working on nights shift have on technical employees' health and personal wellbeing and how these effects can affect the organisations in the long run.

The organisations could take advantage of this research by looking at which initiatives or planning that could be done to minimise the impact to the organisations, both in terms of monetary costs and employees' motivation to work. Perhaps the organizations could make some improvements on their current policies and standard operating procedures or to have more activities that could tackle the impact to the employees.

This study will also explore some of the strategies that could be used by other organizations that are adopting night shift as part of their work schedule to ensure that the jobs assigned to the employees could be done effectively without compromising the health and personal wellbeing of the employees. Without taking any steps in minimising the impact of working on night shift to the employees' health and wellbeing, the industry will be facing serious repercussion in terms of containing the escalating health cost and at the same time looking after the employees' benefit.

1.6 Definitions of Terms

The table below shows a definition of terms frequently used throughout this study

Table 1: Definition of Terms

TERMS	**DEFINITION**
Night Shift employees	Night shift employees referred to those employees whose work schedules involved a work period between midnight and 6 am at least once per month for more than one year (Sun et al., 2018)
Sleep deprivation	Getting less than the needed amount of sleep, which, for adults, ranges from seven to nine hours of sleep per night (Suni E, 2021)
Psychological well-being	Combination of positive emotional states such as happiness and functioning with optimal effectiveness in life (Deci & Ryan, 2008)

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The effect of night shift has been researched from multiple perspectives within the literature. There are two approaches in which this research mainly derives – from personal and organisational effect but most of the research examine the effect of night shift on individuals from a variety of perspectives. These perspectives for the personal effects of night shift was categorised under several themes : physical health (hypertension and diabetes), sleep deprivation, obesity and psychological well-being (Matheson et al., 2014). Exposure to continuous light during the night, frequent snacks, little physical activity, nocturnal eating habits and nocturnal physical activities are among the possible triggering factors for these problems.

In this study, there is one independent variable (IV) that is being used which is the night shift while for dependant variables (DV), five variables shall be used – physical health (hypertension and diabetes), sleep deprivation, obesity and social life.

2.2 Dependant variable (DV)

Physical health (hypertension and diabetes).

Hypertension and diabetes are global public health issue (Ong KL et al,.1999) strongly associated with chronic diseases such as myocardial infarction, stroke, heart failure, and renal failure. It is estimated that 6% of deaths worldwide are due to high blood pressure (Wolf-Maier K et al., 2004).

According to National Health and Morbidity Survey (NHMS) 2019 by Ministry of Health Malaysia, there are more adults in Malaysia suffered from hypertension as of 2019 at 6.4 million people, or at least 30%, with only half of them are aware that they have high blood pressure. The same study also concluded that the prevalence rate of diabetes in adults has increased in

Malaysia from 13.4% in 2015 to 18.3% in 2019, with diabetes defines as having sugar levels of 7.0 mmol/L or above.

Factors like high sodium intake, obesity from high levels of dietary intake, drinking, smoking, lack of physical activities, stress and age are speculated to be the cause to hypertension (Kim, C.H & Han, J.S, 2006). Aside from these factors, shift work, particularly the night shift is also associated with hypertension (Yeom JH, et al., 2017). The same findings are shared by Manohar et al., 2017, Mohd Nazri Bin et al., 2008 and Park et al., 2019.

According to these researches, the disruption of circadian rhythm and autonomic balance resulted from lack of sleep and poor quality sleep and it makes blood pressure difficult to control and reduces insulin sensitivity and worsens insulin resistance. A study by Park et al., 2019 found that night shift workers have a problem with controlling blood pressure in patients who were are currently on medication for hypertension. Night shift can affect the patterns of activity and rest, including changes in sleep pattern and physical activities, which can induce sleep deprivation. Chronic sleep deprivation interferes with blood pressure control by increasing blood pressure and heart rate, increasing sympathetic nerve activity, and exacerbating physical and psychosocial stress as well as inducing water retention. Long-term exposure to these factors can bring about structural abnormalities such as left ventricular hypertrophy, ultimately causing difficulty in controlling hypertension (Gangwisch JE, 2014 & Brum MC,et.al, 2015).

There are few studies that show the relationship between night shift work and the increased risk of type 2 diabetes. One of the largest studies by Pan et al., found that rotating night shift work is associated with diabetes incidence in 177,184 American nurses from Nurses' Health Study I and II. Similarly, research by Vimalananda et al. in the Black Women's Health Study with 28, 041 participant's detected association between night shift work and diabetes incidence. Three other Japanese studies by Kawakami et al., Suwazomo et al., and Morikawa et al.,also show that the increased risk in diabetes resulted from night shift does not affect women but also men.

Shan et al., 2018 in their study found that the rotating night shift and related unhealthy lifestyles contribute the possibility of the increased risk of type 2 diabetes. The night shift will alter the sleep and circadian rhythms that play important roles in daily metabolic function, by regulating patterns of energy expenditure and hormones involved in energy metabolism such as leptin, ghrelin, thyrotropin, insulin, and melatonin.

This disruption of sleep and circadian rhythms could contribute to insulin resistance, impaired glucose regulation, and development of type 2 diabetes. Besides these reasons, stress related shift work may lead to increased appetite, weight gain and glucose intolerance, may also contribute to the development of diabetes in shift worker (Hansen et al., 2016).

Sleep deprivation

Sleep plays an important part in health and well-being of the individual. Sleep is controlled by the Supra Chiasmatic Nucleus (SCN) of the hypothalamus, endogenous clock which controls the production of melatonin, a hormone that induce sleep. Darkness prompts the pineal gland to start producing melatonin while light causes the production to stop (Gillette MU & Tischkau SA, 1999). As a result, melatonin helps to regulate circadian rhythm and synchronize the sleep-wake cycle with night and day.

It is recommended that a healthy adult need to sleep between seven to nine hours a day. However, night shift results in conflict between a days oriented circadian physiology and requirement for work and sleep at the wrong biological time of day (Kaliyaperumal et al., 2017) and anything below 5 hours of night sleep will lead to acute sleep deprivation. Because of the disruption of the biological clock, night shift work is always associated with reduced sleep duration and poor quality of sleep. The night shift workers, even though sleeping more on their days off, did not regain the sleep deficit produced by the working days. Sleep debt may be due to many reasons, mainly the presence of light during the time for sleeping, the increased temperature and an altered cortisol secretion (Brum et al., 2020)

Night-shift workers accumulate a sleep ‘‘debt’’ over successive night shifts. Many keep a diurnal schedule on days off and start their night shifts in a sleep-deprived state. After the shift, these workers often try to sleep during the day at a time that coincides with the circadian peak in wakefulness and therefore may have poor quality or insufficient sleep. The incompatibility between circadian patterns and work demands contributes to sleep deprivation and increased homeostatic drive. Volitional (e.g., recreational or social activities) and non-volitional activities (e.g., family and household responsibilities) may also contribute to sleep deprivation.

Mahan et.al (1990) observe that night shift workers have reduction in their sleep length from two different approach. The first approach focused in the temporal placement if the night workers' sleep during daytime hours being out of phase with the 24-hour cyclic behaviour of various physiological functions. This Chrono biological approach to night shift work suggests that workers suffer mainly from insomnia-like symptoms, which result when there is a major phase change in the normal sleep-wake cycle. Sleep reductions among night workers are viewed as a physiological response to the inversion of the sleep-wake cycle.

This response occurs when night workers attempt to sleep at times contrary to a biological constitution, which dictates, they should be awake and active. Likely primary symptoms of such a disturbance may be sleep-onset insomnia, frequent waking during the sleep period, and difficulty staying asleep.

The second approach looked at reduction of sleep among night shift worker as multidimensional phenomenon. Whereas the chronobiological explanation emphasizes the actual time-of-day one sleeps, the sleep deficit approach proposes that sleep length is affected by a variety of variables. However, social factors are viewed as a primary determinant of reduced sleep length in permanent night-shift workers. Night workers who sleep during daytime hours are compelled to modify their sleep behaviour in an effort to maintain social obligations which are often constrained by the demands of a diurnally oriented society.

Night workers are viewed as voluntarily reducing their sleep period to engage in the many activities traditionally bounded by the 9:00 AM to 5:00 PM social daytime schedule. These activities often include (a) spending time with family, (b) participating in day-to-day responsibilities, such as food shopping, food preparation, banking, seeking medical care, and (c) engaging in leisure activities with friends. Environmental factors such as noise, light, and heat may also contribute to reductions in workers' sleep time.

Few studies were conducted to show the association of night shift and sleep deprivation and these studies also found that sleep deprivation is related with decreased attention and alertness, with impaired memory and decision making, slower reaction time and increase of microsleep during wakefulness.

Among the profound studies were by Sanches et al., 2015, Kaliyaperumal et al., 2017 and Hansen et al., 2016 and few interesting conclusions were made by all these research on the effect of sleep deprivation. They found that as a result from restriction of sleep duration, fatigue will kick in and concentration will decrease. As a result from this, the cognitive defects will increase and will lead to compromised health and safety at work. Poor concentration will hinder the employees' efficiency, decision making capacity and will lead to increase in error rates.

Kaliyaperumal et al., 2017 in their studies found better cognitive ability was reported by people who have not exposed to sleep deprivation, altered circadian rhythm and extended shift work duration. Lower level of scores was observed in general intellectual ability, maths, response inhibition, attention, simple reaction time and working memory. In a meta-analysis done by Monk TH & Buysse DJ, 1989, the authors found that tasks requiring high level of continuous monitoring or tasks that require learning procedures appear to be more vulnerable to acute sleep deprivation.

Sanches et al., 2015 in their study concluded that acute sleep deprivation because of night shift will reduce the ability to concentrate, slurred speech and greater number of errors in executions. In addition, simple tasks were performed more slowly, revealing decreased fine motor skills. The reduction in these abilities, will affect the overall performance of an employee and will probably hinder their opportunity for promotion.

Obesity

Obesity poses a major public health problem and its prevalence is rising globally (Ng et al.,2013). The World Health Organization (WHO) defines overweight and obesity as persons having Body Mass Index (BMI) equal to or greater than 25 and 30, respectively. In a report issued in February 2020, WHO said obesity has reached epidemic proportions globally, with at least 2.8 million people dying each year as a result of being overweight or obese. The figures are grim in Malaysia too. According to the World Population Review 2019, Malaysia has the highest prevalence of obesity among adults in Southeast Asia at 15.6%, followed by Brunei 14.1%, Thailand 10% and Indonesia 6.9%. The National Health and Morbidity Survey (NHMS) 2019 findings meanwhile showed that 30.4% of adults in Malaysia were overweight and 19.7% obese. This number has an upward trend if compared to 2011 in which only 29.4% were overweight and 15.1% were obese (Malaymail.com).

The prevalence of obesity worldwide has doubled from 6.4% in 1980 to 12.0% in 2008 (Stevens et al., 2012) while a report from WHO in 2019 stated that Malaysia has the highest rate of obesity and overweight among Asian countries with 64% of male and 65% of female population being either obese or overweight. Overweight and obesity estimated to be responsible for 3.4 million deaths and 3.9% of years of life lost globally.

A study by (Sun et al., 2018) concluded that night shift workers had increased risk of overweight and obesity between 6% to 170% as compare to day time or normal shift workers. Part of the reasons for the increase of risk is due to the changes in lifestyle, including sleep deficiency and decrease in physical activity during leisure time, all of which have been linked to weight gain and obesity.

Most of the studies conducted on the association between night shift and obesity use BMI as the assessment of body composition. However, BMI does not distinguish between overweight due to muscle or fat tissue. In addition to using BMI, a study by (Peplonska et al., 2015) use waist to hip ratio (WHR) as a measurement for overweight and obesity in which WHR of more than 0.85 cm is considered not healthy.

In any measurement they use, they concluded that abdominal obesity was associated with a high frequency of current night duties and cumulative hours of night shift work. It means that more intense and prolonged night shift is associated with central obesity (presence of access fat in the abdomen).

(Lowden et al., 2010) in their literature review identified several unhealthy features of the eating behaviour that affect night workers, these including meal irregularity, higher animal fat, carbohydrate and protein intake coupled with lower dietary fibre consumption, and frequent snacks taken during the night shift. A few studies reported higher total energy consumption (Morikawa et al., 2008) or later time of the last meal (Geliebter et al., 2000 & Peplonska et al., 2015) among night shift workers compared to daytime workers. (Peplonska et al., 2015) also sighted that night shift workers also found to be less involved in sports or recreational activity and this reason is one of the potential reasons as to why risk of obesity is more prevalence in night shift worker as compared to day shift worker.

Social life and psychological well-being

Social life, according to Cambridge dictionary, are activities that people do with other people, for pleasure, when they are not working. When they perform these activities, they will perform the activities with a sense of happiness and the feeling of happiness is inter-related with the psychological well-being (Pulido et al., 2020). Psychological well-being is conceptualised as some combination of positive emotional states such as happiness and functioning with optimal effectiveness in life (Deci & Ryan, 2008). According to Huppert, 2009, psychological well-being is about lives that goes well and lives that have the combination of feeling good and

functioning effectively. People with high psychological well-being often feel happy, capable, well supported and satisfied with their lives.

There a few studies conducted to show the impact that night shift has on employees' social life. According to (F. Alsharari, 2019) in his study, the effect of night shift work on social life is driven by the employees' concern on their inability to maintain social relationships while working night shift. These employees according to the study, experience social isolation and disengaged relationship as a result from working on night shift. The study also found that the female employees were almost twice as likely to experience psychological effect and interruption of social life of night shift compared to male employees, which might due to the additional responsibilities in their home that prevent them from having adequate sleep or rest during the day.

However, there are other studies that found that not only night shift affects female employees' social lives; male employees also faced the same problem. This can be seen from a study conducted by (Ibrahim Al Ameri, 2017) in which 51.8% of the participants are male. The study concluded that about half of the participants have very weak quality of life, which indicates a bad impact of night shift upon the physical, psychological and social status. The study indicates that the impact of night shift on social life does not only affect the female employees but male employees too. This study is consistent with a study done by Fossum et al., 2013) which concluded that working on night shift may be associated with conflict between work and family/social life.

A study by Dunifon et al. found a surprising conclusion where the study revealed that night shift schedules negatively impact relationship stability, common among couples with children. Another important finding showed that married men of five years or less with at least one child, working on night shift, experience separation or divorce up to six times more than men working on day shifts. Mothers in the same category are three times more likely to experience separation or divorce. However, no other study could be found to support this finding especially a study done within an Asian's context.

2.3 Independent variable

Night shift

There were many studies conducted on the impact of shift work with health, job performance and psychological well-being and these research do not only look into the night shift and its impact but also on the shift work as well. These researches explored a variety of shift-work characteristics including shift length, weekly hours and compresses working week, overtime working, night work and fixed or rotating shift, rest and break opportunity as the company's characteristics of shift work that have an impact on employee performance, well-being and health (Dall'Ora et al., 2016)

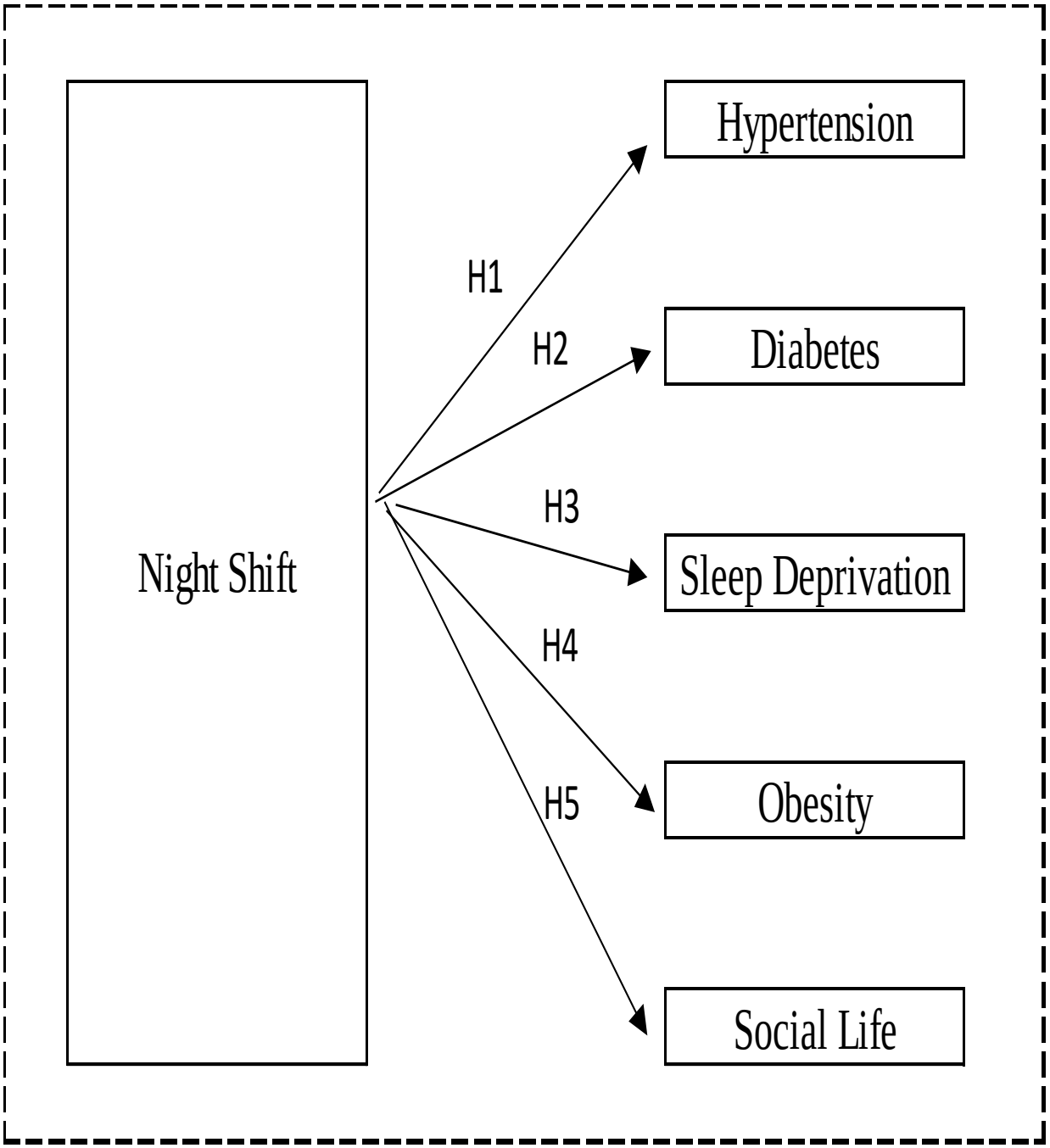
According to (Dall'Ora et al., 2016), majority of these studies were related to healthcare sectors, predominantly in nursing, other industries were chemical, police, mining, transport, automotive and manufacturing. Below are the findings from research done by Dall'Ora et al., 2016:

i. Working 12-hour shift is associated with higher burnout (Estryn-Behar et al. 2012)
ii. All shifts more than 9 hours resulted in poor quality service (Stimpfel and Aiken 2013)
iii. Working 2 consecutive night shifts was associated with perceptual and motor ability, when compared to those working 4 consecutive nights (Chang et al. 2011)
iv. More nurses working rotating shifts had high levels of acute fatigue compared to those working fixed shifts (Han et al. 2014)

This study will focus on rotating night shift for technical employees who are providing their technical expertise and service in the rail industry, particularly in the Mass Rapid Rail industry and no study has been found in this capacity so far.

2.4 Research framework

Table 2 – Research Framework



The above table is the framework for this research in which the independent variable is night shift while the dependant variables are hypertension, diabetes, sleep deprivation, obesity and social life.

The statement of hypothesis for this study are:

H1 : Night shift has significant impact on hypertension among technical employees of GRSB and RRSB in MRT Kajang Line.

H2 : Night shift has significant impact on diabetes among technical employees of GRSB and RRSB in MRT Kajang Line.

H3 : Night shift has significant impact on sleep deprivation among technical employees of GRSB and RRSB in MRT Kajang Line.

H4 : Night shift has significant impact on obesity among technical employees of GRSB and RRSB in MRT Kajang Line.

H5 : Night shift has significant impact on social life among technical employees of GRSB and RRSB in MRT Kajang Line.

CHAPTER 3: RESEARCH METHODOLOGY

3.0 Introduction

Research methodology is one of the crucial parts of every research work. All organizations want knowledgeable and experienced employees in their organization to improve organizational position as well as working excellence, but different independent factors generally hamper the psychology of customer service executives which might lead to decrease of the employee retention rate in contact centres (Alavi et al., 2018).

Identification of these factors are essential because most of the employees are not getting proper job satisfaction and this will generally negatively affect the customer service industry. For that reason, identification of various independent factors is essential to recognise the exact reasons for turnover intention in the organisation. In this chapter, we will gather various information from primary sources and analyse those data to validate and to have reliable outcome from this research.

3.1 Research Design

The research design of this study was quantitative and structured questionnaires used to as research instrument. A total 70 respondents from operational department were involved in this research. The case study confined to current technical employees who work on night shift in GRSB and RRSB. Technical employees in this context are those who have to attend to any breakdown or problem related to the high and low voltage power along the MRT line between Sungai Buloh to Kajang.

A letter was sent out to the HR Manager from both companies, requiring their assistance in providing information on all the affected employees. 70 names were provided by them, and all were invited to participate in the research. Coincidently, all participants are male.

The questionnaires to the participants were structured in Bahasa Malaysia since all of them are Malay and more proficient in that language. This was also done to avoid any misinterpretation of the questionnaires. However, the set of questionnaires in English is attach as appendix 1, for reference. The participants were given one week to complete the questionnaire and all 70 of them responded to the questionnaire.

There were seven (7) parts in this questionnaire. The first section is Part A which contained 7 questions on the demographic detail of the respondents, which include age, years of service, are they smokers and how many times per week they exercise. Part B focus on the independent variable which is the night shift while part C to part G focus on the dependant variables which are hypertension, diabetes, sleep pattern, obesity and social life. The questionnaires were developed by altering several questionnaires related to each of those sections in previous research and there were also new questions developed by the researcher specially to achieve the objectives of this study. Every item uses a simple yes and no answer or multiple questions.

3.2 Data collection method

Data collection is an important portion of every research project, and in this research, the researcher selected both primary and secondary research statistics. A survey strategy has been devised in this research to collect primary data from the respondents. An online survey was created using Google Forms and the link was distributed by email and WhatsApp to respondents. The quantitative method has been selected because statistical analysis will help the researchers to find the influence between dependent and independent variables.

The researcher has requested for permission from the HR Manager of GRSB and RRSB before the questionnaires were distributed. The same permission was also requested from the Head of Operation from both companies. The researcher has presented to them the aim and the intended outcome of the research, and any suggestion resulted from the study shall be shared with them for the betterment of the company.

The Google Form questionnaires were distributed by the way of WhatsApp application and via email. A clear introductory cover letter about the purpose of the study was attached with the questionnaire for respondents' better understanding on the research. Approximately 15 to 20 minutes were required to complete the questionnaires.

3.3 Data analysis method

The data generated was numeric. The researcher used statistical tools to identify and measure the extent of the impact between night shifts and the dependant variables – hypertension, diabetes, sleep deprivation, obesity and social life. The researcher used SPSS version 21 to analyse the independent and dependent variables.

Regression

Regression analysis is a powerful method that permits the researcher to statistically study the influence between the numerous variables of interest (Draper & Smith, 2014). The key point here is to understand the influence that the independent variables have on a singular one, which is technically the dependent variable.

Correlation

In statistical evaluation, correlation analysis is used to investigate the connection between two variables, specifically its strength. It permits the researcher to understand if there is a connection between the variables, which are usually quantitative in nature (Lee & Choi, 2007).

This method of analysis will help determine if there is a correlation between the various responses received from the participants.

CHAPTER 4: DATA ANALYSIS AND INTERPRETATION

4.0 Introduction

The data collected in this research were coded and analysed using SPSS version 21. The outcome shall be analysed and separated into numerous parts such as demographic analysis, normality test, reliability test, correlation test and regression test.

4.1 Respondent Demographic

This section offers an investigation of the demographic features of the respondents like age, years of service in either GRSB or RRSB, whether the respondents are smoker, how long they exercise in a week. The questions on race and gender were not asked as the targeted respondents are all Malay and male.

The participants of this study are the technical employees from GRSB and RRSB who are managing the technical aspect of MRT Kajang Line. The researcher received 70 completed questionnaires, which can be used.

Table 3 shows the frequency for each demographic profile.

Table 3: Demographic profile

		Frequency	Percentage (%)
Age	20-25 years old	6	8.6
	26-30 years old	29	41.4
	31-35 years old	16	22.9

		Frequency	Percentage (%)
	36-40 years old	7	10.0
	41-45 years old	4	5.7
	> 45 years old	8	11.4
	Total	70	100.0
Years of service	< 2 years	8	11.4
	2 – 5 years	38	54.3
	> 5 years	24	34.3
	Total	70	100.00
Smoker or non smoker	Smoker	34	48.6
	Non Smoker	36	51.4
	Total	70	100.0
Hours spent exercising in a week	No exercise	19	27.5
	< 1 hour	24	34.8
	1-3 hours	15	21.7
	> 3 hours	12	17.4
	Total	70	100.0
Number of years working on shift	< 2 years	13	8.6
	2 – 4 years	37	52.9
	> 5 years	20	28.6
	Total	70	100
Number of days in a week working on night shift	4 days	58	82.9
	5 days	5	7.1
	6 days	1	1.4
	< 4 days	6	8.6
	Total	70	100.0

In relation to their age, most of the respondents are in the age category of 26 to 30 years old with 29 respondents (41.4%) trailed by age category of 31 to 35 years old with 16 respondents (22.9%). The third highest category in term of age is more than 45 years old with 8 respondents (11.4%) followed by respondent in the age category of 36 to 40 years old and the smallest would be in the age between 20 to 25 years old 6 respondent (8.6%). Most of these respondents have around 2 to 5 years of working experience in either GRSB or RRSB (54.3%), followed by more than 5 years' experience (34.3%) and the least have worked less than 2 years (11.4%).

Out of 70 respondents, 51.4% of them are non-smoker while the remaining 48.6% are smoker. 52.9% of the respondents have worked on night shift between 2 to 4 years while 28.6% have been on night shift for more than 5 years. Only 8.6% have been on night shift for less than 2 years. Majority of them (82.9%) are working on night shift for 4 days in a week and only 1.4% respondent out of the 70 respondents are working for 6 days of night shift in a week.

4.2 Respondents' feedback on independent variables questionnaires:

Table 4 : Feedback on respondents' response to independent variable questionnaire

Part B- Questions on night shift pattern			
Questions	< 2 years	2-4 years	>4 years
Q1 : How long have you been working on night shift?	13(18.6%)	37 (32.9%)	20 (28.6%)

Part B- Questions on night shift pattern			
Questions	4 days / week	5 days / week	<4 days / week
Q2 : How many days in a week do you work on night shift?	58 (82.8%)	6 (8.6%)	6 (8.6%)

Part B- Questions on night shift pattern			
Questions	Yes	No	Not Sure
Q3 : Do you also work on day shift?	70 (100%)	Nil	Nil

The survey reveals that majority of the respondents (32.9%) have been working on night shift between 2 to 4 years while only 18.6% work on night shift for less than 2 years. 82.8% of them are working on night shift for 4 days per and all of them are also working on day shift which means they are on a rotating shift pattern.

4.3 Respondents' feedback on dependent variables questionnaires:

Table 5 : Feedback on dependant's response for DV questions (Part C – G)

Part C- Questions on hypertension			
Questions	Yes	No	Not Sure / Not relevant
Q1: Do you have hypertension	11 (15.7%)	45 (64.3%)	14 (20%)

Q2: If yes, do you get hypertension while working in GRSB / RRSB?	10 (14.7%)	36 (52.9%)	23 (33.8%)
Q3: If yes, are you currently on medication?	14 (17.4%)	29 (42%)	30 (43.5%)
Part D – Questions on diabetes			
Questions	Yes	No	Not Sure / Not relevant
Q1: Do you have diabetes	10 (14.3%)	54 (77.1%)	7 (10%)
Q2: If yes, do you get hypertension while working in GRSB / RRSB?	7 (10.3%)	52 (76.5%)	10 (14.7%)
Q3: If yes, are you currently on medication?	9 (13.2%)	35 (51.5%)	25 (36.8%)

From the survey, it can be deduced that majority of the respondents do not have either hypertension nor diabetes but for those who have these two illnesses, more than half had it while working in GRSB or RRSB. However, it is interesting to note that those who have hypertension or diabetes are not currently on medication.

Part E- Questions on sleep deprivation			
Questions	Yes	No	Not sure
Q1 : Have you ever fall asleep while working on night shift?	39 (55.7%)	31 (44.3%)	nil

	< 2 times / shift	2-4 times/ shift	> 4 times / shift
Q2: How often do you fall asleep while working on night shift	37 (53.6%)	24 (34.8%)	8 (11.6%)
	Yes	No	Not sure
Q3: Do you have to take caffeine just to stay awake?	30 (42.9%)	40 (57.1%)	Nil

From the survey, it can be deduced that 55.7% of the respondents have fallen asleep while working on night shift but they only fall asleep for less than 2 times per shift, and it can also be concluded that 57.1% do not have to take caffeine just to stay awake. It can be concluded that although majority of the respondents admit having fallen asleep while on night shift, this does not indicate a sleep deprivation issue as it only happens for less than 2 times in a shift.

Part F- Questions on obesity			
Questions	Normal	Overweight	Obese
Q1: What is your current BMI?	28 (40%)	23 (32%)	20 (28%)
	Yes	No	Not sure
Q2: Is your weight increase while working in GRSB / RRSB?	50 (71.4%)	30 (28.6%)	Nil
Q3: Do you overeat while you work on night shift?	36 (51.4%)	34 (48.6%)	Nil

Part F shows that 40% of the respondents' BMI are under the normal category and total of 60% belong to the overweight and the obese category. It is interesting to note that an alarming 71.4% of the respondents gain their weight while working in GRSB / RRSB and 51.4% of the respondents admit to overeat while working on night shift.

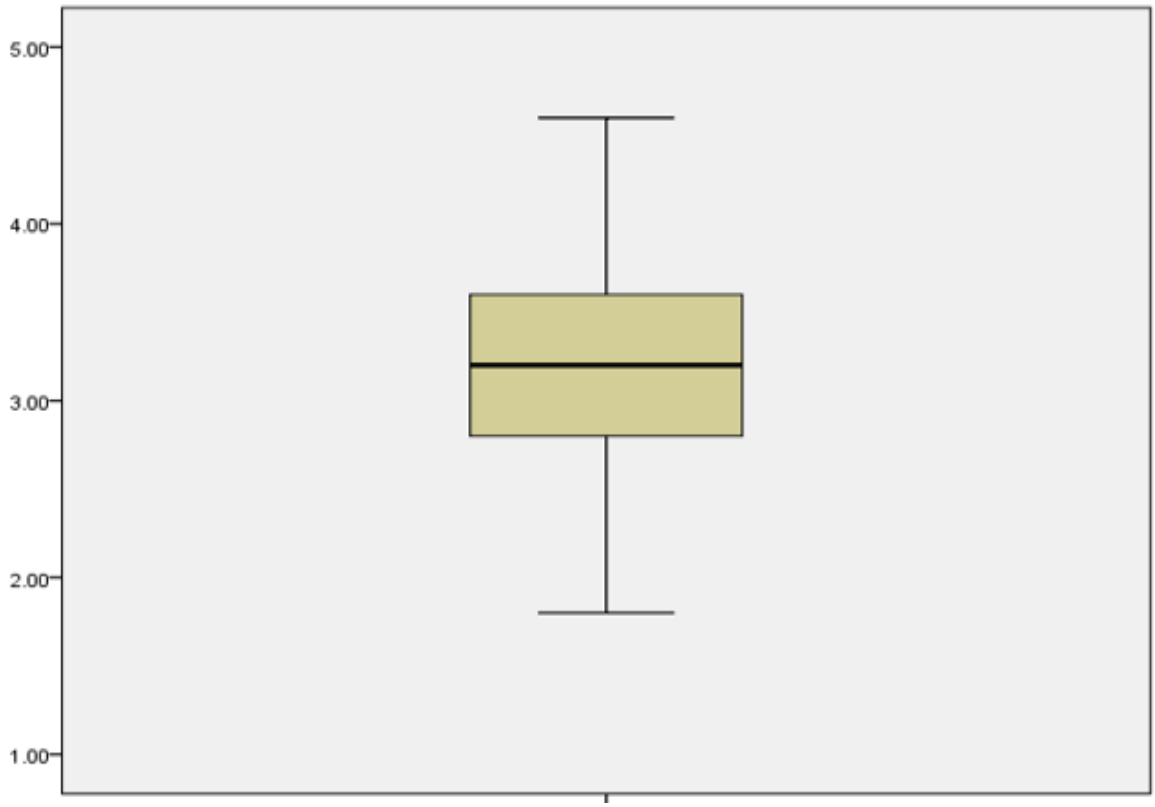
Part G- Questions on social life			
Questions	Yes	No	Sometimes
Q1: Does night shift has impact on the relationship with your family / friends?	35 (50%)	17 (24.3%)	18 (25.7%)
Q2: Are you still able to fulfill your family / children / spouse 's needs while working on night shift?	37 (52.9%)	10 (14.3%)	25 (35.7%)
Q3: Are you still able to maintain your routine social activities while working on night shift? (eg: sport / recreation / family gathering)	35 (50%)	14 (20%)	23 (30%)

Night shift has impact on the relationship with family and friends, according to 50% of the respondents. 52.9% of the respondents however said that they are still able to fulfil the children's or spouse's needs while working on night shift. Half of the respondents also said that they are still able to maintain their routine social activities like sport, recreation and family gathering while working on night shift.

4.2 Normality Test

The normality test is used to see if the data set is well-modelled by a normal distribution represented by a bell curve or whether the data produced a skewed shape. The researcher used the frequency distribution, boxplot and Q-Q plot (quantile-quantile plot) to check normality visually (Akrm & Alwahab, 2015)

Based on the test done on normality, the result produced a boxplot diagram as per below.



The boxplot indicates that the normality looks normal as it sits on the centre and no outliers or unreliable respondents are present in the boxplot diagram.

4.3 Pearson Correlation Coefficient

Pearson correlation coefficient is a measure of strength between two variables, which represented by *r*. The closer the *r* value to +1 or -1, the stronger the strength between the variables.

Negative coefficient means that both variables are in a negative relationship, which is, when one variable increases, the other will decrease and positive coefficient means that when one variable increase, so does the other variables (Min, 2015). Hair et al. (2011) suggested the rules of the coefficient range and the strength of association as shown in Table 6.

Table 6 : Rule of thumb for coefficient range

Coefficient range	Strength of association
±0.91 to ± 1.00	Very Strong
±0.71 to ± 0.90	High
±0.41 to ± 0.70	Moderate
±0.21 to ± 0.40	Small but definite relationship
±0.01 to ± 0.20	Slight. Almost negligible

Table 7 : Correlation Analysis

		Shift	Hypertension DV	Diabetes DV	SleepDeprive DV	BMI DV	SocialLife_DV
Shift	Pearson Correlation	1	.195**	-.600**	-.441**	-.345**	-0.11
	Sig. (2-tailed)		0.006	0	0	0	0.926
	N	70	70	70	70	70	
Hypertension	Pearson Correlation	.195**	1	-.264**	0.071	-0.127	-0.007
	Sig. (2-tailed)	0.006		0	0.319	0.072	0.957
	N	70	70	70	70	70	70
Diabetes	Pearson Correlation	-.600**	-.264**	1	.393**	.457**	0.121
	Sig. (2-tailed)	0	0		0	0	0.317
	N	70	70	70	70	70	70
SleepDeprive	Pearson Correlation	-.441**	0.071	.393**	1	.298**	-0.168
	Sig. (2-tailed)	0	0.319	0		0	0.165
	N	70	70	70	70	70	70
Obesity	Pearson Correlation	-.345**	-0.127	.457**	.298**	1	-0.217
	Sig. (2-tailed)	0	0.072	0	0		0.071
	N	70	70	70	70	70	70
SocialLife_DV	Pearson Correlation	-0.011	-0.007	0.121	-0.168	-0.217	1
	Sig. (2-tailed)	0.926	0.957	0.317	0.165	0.071	
	N	70	70	70	70	70	70

A Pearson correlation analysis was conducted to examine if there is a relationship between all DVs to the IV which is night shift. From the table, the results revealed that all the DVs except for social life have significant relationship with IV which is night shift (p value less than 0.05).

Based on the rule of thumb of the coefficient range, hypertension has slight positive relationship with night shift with R value 0.195. Diabetes on the other hand has a moderate negative relationship with night shift with R value of -0.600 while sleep deprivation and obesity has a small negative relationship with night shift with R value of -0.441 and -0.345 respectively.

Table 8: Coefficient analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
	(Constant)	1.662	0.465		3.573	0		
	Hypertension	-0.056	0.069	-0.067	-0.813	0.417	0.583	1.715
	Diabetes	-0.022	0.05	-0.029	-0.434	0.664	0.884	1.132
	Sleep Deprivation	0.317	0.073	0.358	4.364	0	0.587	1.703
	Obesity	0.102	0.057	0.467	1.78	0	0.743	1.347
	Social Life	-0.04	0.144	-0.039	-0.279	0.783	0.653	1.245

Table 8 indicates that there is positive significant influence between sleep deprivation (p=0.000, β=0.358) and obesity (p=0.000, β=0.467) with night shift. However, there is no significant influence between hypertension (p=0.417, β=-0.056), diabetes (p=0.664, β=-0.22), and social life (p=0.783, β=-0.039) with night shift.

Hence, based on the finding the researchers are accepting hypothesis H3 and H4 and fail to accept hypothesis H1, H2, and H5. The researcher can conclude that night shift has significant impact on sleep deprivation and obesity among technical employees of GRSB and RRSB in MRT Kajang Line.

CHAPTER 5: DISCUSSIONS AND RECOMMENDATIONS

5.1 Summary of main findings

This paper studies the impact of night shift on health and social life among technical employees in Global Rail Sdn Bhd and Rapid Rail Sdn Bhd in MRT Kajang line. In this section, the overview of each chapter will be summarized.

In the first chapter, the researcher introduced the financial and non-financial implications of night shift to an organization. While there could be many impacts to employees and the company arising from night shift. The purpose of the research was to see to what extend night shift work have influence on employees' health and social life. The researcher also explained why night shift has become a norm nowadays and why there are more employees involve in night shift as compare to a decade before.

Chapter two consists of literature review. Based on historical studies from academicians and past researchers, the researchers briefly explained the concepts of each independent, and dependent variables. Past evidences in theories, relationship and concepts suited to this study is adopted and forms the foundation and objective of the current research.

Subsequently chapter three explains the research methodologies i.e. how the data was collected, the sampling size, the instruments, measurements and methods of analysis. Summarily, this study's sample size was 70 technical employees working in Global Rail Sdn Bhd and Rapid Rail Sdn Bhd. Consequently, in chapter four, the researcher analyzes the data collected using SPSS version and translate it into demographic and correlation analysis.

Finally, in chapter five, the researcher concluded the research by amplify the limits of this research and went on further to suggest recommendations for future studies.

5.2 Discussion on analysis result

From the data analysis, it has been concluded that night shift has significant impact on sleep deprivation and obesity among technical employees in Global Rail Sdn Bhd and Rapid Rail Sdn Bhd. The rest of the hypothesis are being rejected. The rejected hypothesis are:

H1 : Night shift has significant impact on hypertension among technical employees of GRSB and RRSB in MRT Kajang Line.

H2 : Night shift has significant impact on diabetes among technical employees of GRSB and RRSB in MRT Kajang Line.

H5 : Night shift has significant impact on social life among technical employees of GRSB and RRSB in MRT Kajang Line.

From the demographic analysis, majority of the respondents (41.4%) are in the category of 26 to 30 years old and 51.4% of the respondents are non-smoker. Only 27.5% of the respondents do not exercise at all in a week while the remaining 72.5% have some sort of exercise in a week. These categories of respondents are the ones who shape the outcome of the study, which will be highlighted later.

The paper conclude that night shift has significant impact on sleep deprivation of technical employees in Global Rail Sdn Bhd and Rapid Rail Sdn Bhd and they have to take caffein in order to stay awake all night. Majority of them fall asleep at least 2 times in a shift. When probed further majority of the employees do not take any nap on their rest time. One way to cope with the deprival from sleep is to nap during nighttime work.

Napping during night shift is associated with lower levels of sleepiness during work, maintenance of alertness and performance and can compensate for the short length of sleep at home. A study by Borges et.al (2008) shows that a nap, whether taken during the first (between 00:00 and 03:00h) or second (between 03:01 and 06:00h) part of the night shift was effective in reducing the perceived level of sleepiness.

Although the quality of naps taken during the final half of the night shift was better than when taken during the first part of the night shift, napping itself caused a reduction in performance, which, may have been caused by sleep inertia, thereby increasing the risk of both incidents and accidents. Thus, napping during the night shifts was found to be an effective way of maintaining alertness during night work

Among the effect of sleep deprivation is increase in hunger and appetite (Kim et al., 2015) where the study concluded that people will consume more calories when sleep-deprived due to increased hunger and decreased satiety. This is consistent with the data collected by the researcher where 51.4% of the respondents said that they over-eat while they are on night shift. It shows that when they are sleep deprived, they will eat more. It is also consistent with a research done by (Hogenkamp et al., 2013) demonstrate that overnight wakefulness, a condition that is typically observed in night shift workers, increase both feelings of hunger and plasma ghrelin levels the following morning.

It is interesting to note that sleep deprivation has a direct relationship with obesity as proven by this study. This is also concurred with a study done by Sang B.K (2013). According to the researcher, there are four reasons for this. First, shift work causes disturbances to the circadian rhythm; in particular, sleep rhythm and sleep duration both play a critical role. Second, dysregulation of the autonomic nervous system and activation of the HPA axis have an impact on the incidence of obesity.

Third, sleep has a major influence on metabolic hormones that regulate energy balance; sleep restriction decreases blood leptin levels that suppress appetite and increases ghrelin levels that promote appetite. Fourth, lack of sleep decreases melatonin levels, causing metabolic dysfunction, which results in increasing insulin resistance, pro-inflammatory cytokine levels, oxidative stress, and hormonal changes, ultimately leading to obesity.

The paper also conclude that night shift has significant influence on obesity among technical employees in Global Rail Sdn Bhd and Rapid Rail Sdn Bhd. One of the reasons is the lack of exercise among the employees. From the study, it can be seen that 62.3% of the respondents either do not exercise at all in a week or they exercise less than an hour per week. It is recommended that an adult needs to have at least 150 minutes per week for moderate-intensity aerobic activity (like brisk walk) and 75 minutes per week for vigorous-intensity activity (like jogging) to have substantial health benefits.

When questioned further, these group of employees admit that they do not frequently exercise because their shift pattern hinders them from doing so. They also did not practice any physical activity outside their occupation because they did not have enough time or because they felt too tired after their night shift. Some of them do not even engage in any physical activity even when they have time to exercise because fatigue associated with the nature of their work. It is not surprising that 60% of the respondents are in the category of overweight and obese. 51.4% of the respondents also stated that they tend to over-eat while they are on night shift. All these habits (lack of exercising and over-eat) lead to overweight and obesity issue.

A study by Samhat et.al (2020) among nurses in Lebanon showed that night shift work affects eating habits and food choices and leads, as a result, to unhealthy eating patterns among the respondents. They found that irregularity in meal timing, excessive snacking during night and consumption of high-fat and high sugar foods were common among them. About 78.2% of respondents did not take their meals at regular times. After their night shift, they did not take their breakfast because of a lack of appetite.

They went directly to bed and had their first meal only after waking up. That irregularity in meals timing contributed to a reduction in the number of complete meals consumed during the day and to an increase in the number of snacks consumed during night. They also found that the most consumed snacks during night were high fat and high sugar foods such as sweets and potato chips. Only a minority of the respondents tended to snack on fruits and stress is the main reason for which night shift respondents usually crave for high fat and high sugar foods during their work.

What seems interesting in their study is that, the majority of respondents brought home-made meals with them for dinner while only 29.6% regularly consumed fast food. These later did so not by preference for that type of food but by obligation because they did not always manage to take foods with them at work. The study also concluded that some night workers eat fast food at night not because they like it but because it is the most common type of food easily obtained overnight.

A study by Peplonska et. Al (2015) found that such factors as unhealthy dietary habits, low recreational physical activity, sleep deprivation, and disruption of the circadian rhythm have been proposed as the potential causes for overweight and obesity among employees on night shift. There are several unhealthy features of the eating behaviour that affect night employees, these including meal irregularity, higher animal fat, carbohydrate and protein intake coupled with lower dietary fibre consumption, frequent snacks taken during the night shift and the higher total energy consumption or later time of the last meal among night shift workers compared to daytime workers.

This study rejected three other hypotheses in which it can be concluded that night shift does not has significant impact to hypertension, diabetes and social life. The demographic of the respondents might have some influence on the result. 88.6% of the respondents are below 45 years old where 41.4% of them are in the age category of 26 to 30 years old, which is considered as young people.

Few studies have concluded that hypertension is more prevalent in older people - 45 years and above (Buford, 2016). This is supported with a study done by Omar M.A, et.al (2016) which concludes that the prevalence of young adult (between age of 18 to 40 years old) in Malaysia was 17.3% which is considered low. The study also pointed out that worldwide, the prevalence of hypertension in the year 2000 among adults aged 20 to 29 years were 12.7% in men and 7.4% in women rising to 18.4% and 12.6%, respectively, in 30- to 39-year old. The estimated prevalence of hypertension among those aged 18 to 39 years in the United States (2011–2012) was 7.3% (Omar M.A et.al). All these studies indicate that the younger the person is, the lesser the possibility of them getting hypertension. Part of the reasons is that blood vessels naturally harden with age, losing their elasticity, making it easier for older people to develop high blood pressure.

The respondents in this study also stated that night shift does not has significant influence on their social life. This may be due to that fact that they can still have social gathering or family outings when they are on leave or on their day off. After some time working on rotating shift, these employees are able to adapt to the lifestyle.

5.3 Contribution of the study

The study helps to understand what are the impact of working on night shift, particularly in the MRT or rail industry that provide technical service 24/7 to the community. However, the findings of this study should not merely be constraint to the rail industry but also to other service industry, particularly those that involve shift pattern.

One of the initiatives that could be done by the companies that adopt work shift pattern is to impose a compulsory medical check-up for all employees and the company to subsidise part of the cost.

By having an annual medical check-up, the employee will have better understanding on their health status, and they will take prevention measures in ensuring their health is not compromised. Many of employees do not even bother to know their health status and will only react once they have an illness. Besides making annual check-up compulsory, the companies can also arrange for periodic health talk on topics like diabetes, hypertension and obesity. Suitable activities and weight loss intervention programs should be incorporated into the company and community. It is best if the companies could also set a proper rest area for the employees to winding up after their shift ends. Pool table or even onsite gym will be a good place for the employees to exercise. The rest area should also have pantry with endless supply of coffee as study indicates that caffeine, at commonly used daily doses consumed at appropriate time, reduces sleepiness and performance during night shift work hours.

Both managers and person in charge with the working time organization, as well as employees involved, must be adequately informed on the possible negative effects of shift work. The former must understand which could be the negative consequences of shift work on employee's health and performance, productivity, absenteeism, and company costs, in order to plan the best possible countermeasures in terms of work organization and workers management. The latter must understand which troubles and disorders are more related to shift and night work and what are the best coping strategies to prevent or limit them, in particular with reference to sleep habits, diet, physical fitness, and leisure times.

All these impacts must be made known to the employees. People will not engage in health-promoting behaviour without being aware of the seriousness of the risk they are facing. In addition, it often takes a trigger or outside stimulus to promote a person to take action in making sure they are in good health. It has been evidenced that good social support from co-employees and supervisors at work, as well as from family members, is able to significantly improve adaptation and tolerance to night shift.

Moreover, counselling and training on how to cope best with irregular working hours have to be delivered at individual and group levels through educational programs, dealing with improving self-care coping strategies, in particular as concerns sleep hygiene (tight scheduling of sleeping hours, use of naps, arrangements to avoid disturbances), abuse of medicaments or caffeinated drinks, diet, stress management, off-job activities, and exposure to bright light. As for stimulant substances, caffeine is most commonly used to counteract sleepiness, having a quick onset of action and a sufficiently long effect. As such, it is good if the company could provide free coffee dispenser to the employees to keep them awake during their night shift.

It is obvious that careful considerations must be put in place when scheduling the shift schedule, especially when it involves the employees' health and well-being. There are thousands of different shift schedules, which may have a quite different impact on employees' health and safety, with reference to the amount of night work, timing and duration of shifts, length of shift cycle, speed and rotation of shifts, and position and length of rest days.

Therefore, shift schedules should be designed according to some ergonomic criteria, recognized to be suitable to lessen stress and limit adverse effects on health and well-being by avoiding or minimizing circadian disruption and accumulation of sleep deficits and fatigue, such as:

a) Limit night work as much as possible;

b) Avoid a large number of consecutive night shifts;

c) Prefer quickly rotating (every 1-3 days) shift systems to slowly rotating (i.e. weekly or longer) ones and to permanent night work (for social reasons);

d) Prefer clockwise rotation (morning/afternoon/night) to the counter clockwise (afternoon/morning/night) rotation;

e) Set the length of shifts according to psychophysical demands;

f) Avoid morning shifts that start too early;

g) Set an adequate number of rest days between shifts, particularly after night shifts;

h) Keep the shift system as regular as possible;

i) Allow flexible working time arrangements according to worker's needs and preferences.

However, it should also be taken into account that one size does not fit all, as the arrangement of the shift schedules should be tailored to the specific job demands, personal characteristics, socio-economic conditions, and cultural background of the involved employees. This also requires the employee's participation in the whole process of designing and implementing the shift schedules, not only because of their direct experience of the problems, but also to promote good motivation for adopting the most convenient coping strategies that are able to limit, as much as possible, significant perturbations of their health and social life.

Moreover, further useful countermeasures can be adopted concerning additional rest breaks for meals and naps, supplementary rest-days or holidays to improve recovery, better canteen facilities and social services (i.e. transport, school, and shop hours), training and rehabilitation courses for shift workers, periodical transfer to day work, and progressive decrease of night work with increasing age.

Employees involve in night shift also should have planned naps during night shifts or simulated night shifts to reduce nocturnal sleepiness and improved sleep-related performance deficits. Two napping strategies are typically adopted by employees: (i) napping before the night shift, or so-called prophylactic napping, and (ii) napping during the night shift, or so-called restorative napping Although the wide variability in study designs, populations, settings, and measures make the studies difficult to compare, the findings do provide important information that may be useful in supporting future systematic research and prescriptions for napping in shift work settings.

Although length and timing of naps varied widely among the reviewed studies, both 30 to 40min nap opportunities between the hours of 02:00 and 03:00 and naps as short as 20 min during this time frame had beneficial effects. While later naps (04:00) had small-to-moderate effects on improving reaction time and sleepiness, sleep inertia may have an impact on the outcomes of naps taken during this time frame.

Although napping during the night shift is not regulated in Malaysia, the employees should have tacit agreements with their respective heads, which allowed them to nap/sleep during the night shift, only during their break time. A power nap of 30 minutes should be enough for them to recover. In order to allow the employees to recover, employer could give access to private rooms where they can nighttime napping or to sleep before driving back home.

This study extends the current literature in that it highlights the important role of internal motivation in shift workers' life- style choices. Shift work can be used as an excuse for less healthy dietary choices; it was 'easy to blame shift work' and use shift work to justify unhealthy behaviours. Those who were less motivated to lead a healthy lifestyle appeared to believe that the negative influence of shift work on their lifestyle was beyond their control, and were less likely to attempt to negate this influence. Individuals differ in their tolerance to shift work, with some developing better coping mechanisms than others do. Internal motivation to improve health decreases the likelihood of shift work adversely influencing lifestyle behaviours. Acknowledging the role of internal motivation can inform the development of public health strategies to minimize the impact of shift work, and identify specialist interventions tailored to help facilitate healthier choices in this group

Nutritional interventions would certainly prevent and / or limit the physical symptoms associated with night shift work. Practical strategies allowing night shift nurses to adopt more structured and balanced diet can be put in place with the help of a nutritionist. In this case, it is first necessary to make employers understand that night shift work has harmful effects on the health of employees and then to work in collaboration with them to implement these strategies.

We could then consider monitoring the nurses over a well-defined time in order to observe the effect of these interventions and strategies. Irregular meal times, snacking, lack of physical activity, and limited food supply at night are challenges that need to be improved to reduce the risk of overweight and obesity associated with night work.

The issues faced by GRSB and RRSB on high medical cost due to the employees taking diabetes and hypertension medicine could be reduced if the companies take these measures seriously. Intervention on employees' health, with programs design to promote healthy lifestyle, nutritional food and diet could help the companies in the long run as lesser employees will have diabetes and hypertension due to unhealthy lifestyle.

Employees will also feel more motivated to reduce their weight and this will also eliminate diseases related to obesity in the future. Intervention on sleep deprivation, for example the designated place for employees to take a nap during their break time or to sleep after their shift has ended will definitely help the employees to be more focus on their job, eliminating issues related to errors done while sleep deprived.

5.4 Limitation of study

The main limitation of this study is the small sample size. With small sample size, there is a possibility of not finding the true effect. However, the small sample size is inevitable in this study as the number is the actual employees in the two companies that the researcher intends to study. Prospective research in larger samples collected in other companies in the MRT industry could help us to investigate this topic in greater depth.

Much of the responses received are open to individual interpretation and understanding. Each respondent's interpretation on ambiguous terms may be different from other respondents. For example, questions on social life may be construed differently from one respondent to another.

The researcher does not consider situational variable of the respondents. The respondents come from one ethnicity only which is Malay and all are male. If the respondents are from different ethnicity and gender, the result of the survey might be different as different ethnicity and gender might have different perspective in life, so does one's relationship with the people around them and their perception on life.

Employees who are currently single and have no other commitment may not be bothered if they could not spend time with their family members. It goes to introvert employees who would prefer to stay at home rather than spending time going to social activities with their friends and families.

Having female employees as part of the respondents might give different result to this study. Female employees normally have to tend to their family after they finish their night shift work. They also have to go for groceries shopping or attend to their children's needs during their off day and hence they are more likely to be sleep deprived. Female employees who are sleep deprived will be more stress and they will probably turn to food to make them less stressful, which will in the long run, make them either overweight or obese. This scenario will definitely change the landscape of this study.

Financial ability of an employee might also influence their response to the study. There are employees who never go for a full medical check-up, as it will cost them between RM200 to RM300 for a simple blood test. Without knowing their glucose and blood test reading, they would not be able to know if they have diabetes or not.

Some employees need to do extra job outside of their working hour or during their off day because of their financial issues. These employees will have less rest time to recoup and recover from their night shift. Their response to the survey especially on the question on sleep deprivation might affect the result of this study.

Owing to the limitation of the questionnaire design, work schedules could only be classified into day versus night shift and fixed versus rotating shift, leaving other domains of shift work undetermined. The self-reported nature of this survey and the absence of register-based records for work schedule were another study limitation, leaving the validity of shift-type categorisation questionable.

Individual differences in vulnerability to sleep disturbance could be expected. For instance, people with a late chorotype generally have a higher shift work tolerance. On the one hand, evening-type people who have better ability to cope with shift work may have self-selected into night jobs. On the other hand, workers with poor health conditions might have quit shift work, leading to a healthy worker selection bias. As a result, the prevalence of sleep problems and other health risks in shift workers might have been underestimated.

5.5 Suggestion of future study

To give a better outcome on the impact of night shift to employees' health and well-being, the population of the study should be broadened. The future study should include all employees who are involve in night shift work in MRT or rail industry, nation-wide, not only confine to Klang Valley. Different employees from different region and different industries might face different impact from working on night shift.

Future study could also include employees from different ethnicity and gender not only confine to Malay and Male employees only. Employees from different ethnicity background might have different perspective on things. Their perspective on relationship with family might be different from Malay.

In a study by B E Mustaffa (1985), gender and race might give different result to the future study as they have different lifestyle and health habit. According to the study, diabetes was common in Indians especially males and least common in Chinese. Obesity was noted in nearly 70% of female Malays and Indians while the majority of Chinese were not overweight.

There was a study that conclude that females that work night shift schedule are prone to health adverse effects than their male counterparts, simply because their body systems have been affected by the circadian rhythm disruption. Females who experience poor appetites are 4% higher than males and 18% higher in sleep difficulty. Female experience muscle fatigue easily than males, this may be due to their body hormone system. Health wise, females have higher incidence of mental health problem than do males. (Fasanya B, et. al 2018)

Future researchers could also classify the different time of night shift and different shift cycle. An employee working on night shift for two weeks consecutively might be facing a bigger impact as compared to an employee who works in night shift only for four days in a week.

5.6 Conclusion

The conclusion that could be made from the research is that, the employees in GGRB and RRSB find that night shift work make them sleep deprived and obese. Intervention needs to be done by the companies and other service industries in general in ensuring that the employees' health and well-being are maintained. Maintaining the health and well-being of an employee is important for a company to produce the best services to the stakeholders.

The organisation should realise that the workforce is going to be filled with the Millennial (born between 1981 to 1996) and Generation Z (born between 1997 to 2012), thus it is important for the organisation to have a policy or culture that promotes healthy lifestyle especially to the Millennials and Gen-Y who are now filling up the current workforce, replacing the Generation X employees (born between 1965 to 1980).

Unlike the Generation X era, where they work really hard in their career and sometimes ignoring their health, employees in the new era are more concern on their physical health and appearance. Organization should not be afraid to invest in better facilities and intervention programs that promote healthy lifestyle to ensure that these employees are well taken care off and can contribute to the organization. Failing to take these initiatives into action can have big repercussions to the organization.

Employers must decide whether the 12-hour night shift is a challenging one for the employees. From an employer's point of view, a move to 12-hour night shifts can appear to reduce short term costs by reducing the overlap and enabling a reduction in workforce. But very little is known about either the long term effects on employee sickness absence and turnover or the effects of removing this period of overlap.

If 12-hour night shifts are associated with increased fatigue and more missed care then productivity can be lost, maybe it is time to reduce it to 8-hour shift, as it is not possible to eliminate the night shift after all. A key issue of 12-hour night shifts is that 'it depends on how it is done'.

The question we have sought to address has been 'what are the effects of working 12-hour shifts?' controlling for other factors. Future research should focus on how 12-h shifts be optimised to minimise the potential risks. Besides the number of hour per night shift, organization should also re-look into the possibility of making the number of days for night shift per week set at between 3 to 4 days a week with more rest days in between.

As an organisation especially a profit-making organisation, the bottom line is to make profit and to make profit, the biggest asset that are the human resources, need to be given careful attention. It is best to have employees who are healthy, both physical and mental as unhealthy employees mean extra unnecessary cost especially on medical cost which can also affect the organisation's revenue and profit in the long run as they need to cover high overhead cost.

The result from this study is consistent with previous studies. As described by Doi (2005), poor sleep quality was proven to be related to perceived health, sick absence, and occupational activities. The irregular working hour seems to exert strong, acute effect on sleep and alertness in relation to night and morning work.

In the study conducted by Åkerstedt T (2003), the mechanism behind the disturbances is the sleep-interfering properties of the circadian system during day sleep and the corresponding sleep-promoting properties during night work. In accordance with that finding, in the present study work-shift work-ers had bad quality of sleep and consequently bad functional outcomes.

Night shifts reported to result in greater loss of total sleep time than evening and slow rotating shift schedules (Kobayashi et al., 2002). The finding of study by Agarwal et al. (2014) mentioned that sleep disturbances may leads to poor sleep hygiene, medical conditions, and circadian rhythm disorders which are most common symptoms for scheduled sleep-wake periods and shift work sleep disorder (Belcher, Gumenyek & Roth, 2015).

In fact, sleepiness in the workstation may leads to poor concentration on work, ac-accidents and injuries. High stress of shift work may also result in poor mental health because of the shift work decrease satisfaction of physical and psychical needs (Conway et al. 2008). In a prospective longitudinal study, Berthelsen et al. (2015) examined the impact of different shift types on depression and found that night shifts and rotating shifts were not associated with increased chances of anxiety or depression after 12 months of follow-up (Ruggiero, 2005) and the study found no difference be-tween shift type and level of depression.

However, the study conducted by Saksvik-Lehouiller et al. (2012) was showed that the relationship between shift work tolerance and depression was best explained by level of hardiness. Hardiness is a general resilience factor influencing how one copes with stress and illness (Storemark et al. 2013) According to Natvik et al. (2011), to determined predictors of depression among shift workers and concluded that the impact of shift work is complex and interrelated with other factors such as morning-ness, sanguinity and hardiness. According to a study by Paola et al. (2016), the potential impact of this issue on professional well-being is lower job satisfaction.

Their study looked at rotated night shift nurses and it was reported that they perceived to have lower job satisfaction. Gu et al. (2015) agreed that rotating night shift work imposes circadian strain and leads to a greater number of physical and psychological symptoms with a higher risk for several chronic diseases than other shift. The result of this study showed there is a significant of relationship that can lead significant relation-ship between psychological well-being and night shift work.

Tahghighi et al., (2017) found the similar finding and declared that some studies did re-port negative psychological outcomes for those who working shifts, this was not a consistent finding across all studies (Conway et al., 2008). The current evidence mentioned that shift work may not have the same negative impact on all workers, but it is depending on how they respond to shift work and de-pendent on other factors. According to Tahghighi et al., (2017), it is dependent on how much sleep the worker getting, how many days off they had per month, whether they worked part-time of full time, the gender of the worker, and their level of resilience.

The result from this study is consistent to existing studies carried by other researchers. The finding of study conducted by Chang et al. (2011) explained that every single person has a different adaptability of their circadian rhythm. Workers who do more consecutive night shifts are more likely to adapt their circadian rhythm to the new situation than those who spend a smaller number of night shifts at work (Ferguson et al., 2012).

According to Kang et al., (2017), night work leads is known to disrupt the body's circadian rhythms, including the sleep– wake pat-tern. Most prominently, disrupted endogenous melatonin secretion can cause depression, anxiety, and sleep–wake cycle disorders (Rahman et al., 2010). In addition, Driesen et al. (2011) has explained the gender differences is that women may be more vulnerable to the adverse effects of shift work be-cause of their more complex circadian and hormonal rhythms.

Besides, several studies have indicated that night shift work interferes with sleep-wake cycle and reduces the quantity and quality of daily sleep (Ferguson et al., 2012). Hence, night shift results in an approximately 2-hour reduction of individuals' average daily sleep. In addition, the accumulation of lack of enough sleep, in turn, leads to performance decline (Bjorvatn et al., 2006).

The result from this study is consistent to existing stud-ies carried by other researchers. In a Japanese study, insomnia was more prevalent among shift workers than among non-shift ones (38% versus 26%); both groups were employed at the same company and assessed using the same instrument and definition of sleep complaints (Nakata et al., 2001). The other study also showed that two rotating shifts, fixed night shift and daytime works were in order of prevalence of sleep com-plaints and depression in male manual workers (Kobayashi et al., 2002).

The study conducted by Belcher et al. (2015) showed the finding that insomniacs without excessive sleepiness showed more severe impairments than insomniacs who report excessive sleepiness According to Wright et al. (2013), many shift workers meeting diagnostic criteria for shift work disorder report sleep difficulties consistent with those reported by patients with an insomnia disorder, while others report excessive sleepiness (either alone or in combination with insomnia symptoms).

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APPENDIX

Appendix 1 : Questionnaire

THE IMPACT OF NIGHT SHIFT WORK ON HEALTH AND SOCIAL LIFE AMONG TECHNICAL EMPLOYEES IN GLOBAL RAIL MALAYSIA SDN BHD AND RAPID RAIL SDN BHD IN MRT KAJANG LINE

Dear Participants,

This study aims to understand the impact of night shifts on health and social life among technical workers at Global Rail Sdn Bhd and Rapid Rail Sdn Bhd on the Kajang MRT line. You are invited to participate in this study. Please answer the question as best you can. Your participation is voluntary and all your feedback will be kept confidential. There are no right or wrong answers to every question asked. This study only took about 5 minutes to complete.

Your participation in this study is greatly appreciated. If you have any questions regarding this study, please contact Badrul Hisham Bahari at 016-3467624 or email to badrulhb@oum.edu.my

Thank you for your cooperation and help in my study.

Part A – The following questions ask about your background. For each question, please tick (√) the appropriate box that is applicable to you

Age 1. ☐ 20-25 2. ☐ 26-30 3. ☐ 31-35 4. ☐ 36-40 5. ☐ 41-45 6. ☐ >45	Total years in GRSB / RRSB 1. ☐ < 2 years 2. ☐ 2-5 years 3. ☐ > 5 years
Smoker or non smoker 1. ☐ Smoker 2. ☐ Non Smoker	Frequency of exercising in a week 1. ☐ None 2. ☐ < 1 hour / week 3. ☐ 1-3 hours / week 4. ☐ > 3 hours / week

Part B – The following questions are about your shift pattern. For each question, please tick (√) the appropriate box that is applicable to you

1. How long have you been working on night shift? ☐ < 2 years ☐ 2 -4 years ☐ > 5 years
2. How many days in a week you work on night shift? ☐ 4 days ☐ 6 days ☐ 5 days ☐ < 4 days

3. Do you also work on day shift? ☐ Yes ☐ No

Part C – The following questions are your hypertension history (if any). For each question, please tick (√) the appropriate box that is applicable to you

1. Do you have hypertension? ☐ Yes ☐ No ☐ Not sure
2. If yes, do you get hypertension while working ib GRSB / RRSB? ☐ Yes ☐ No ☐ Not applicable
3. If you have hypertension, are you currently on medication? ☐ Yes ☐ No ☐ Not applicable

Part D – The following questions are your diabetes history (if any). For each question, please tick (√) the appropriate box that is applicable to you

1. Do you have diabetes? ☐ Yes ☐ No ☐ Not sure

2. If yes, do you get diabetes while working ib GRSB / RRSB? ☐ Yes ☐ No ☐ Not applicable
3. If you have diabetes, are you currently on medication? ☐ Yes ☐ No ☐ Not applicable

Part E – The following questions are about your sleep pattern. For each question, please tick (√) the appropriate box that is applicable to you

1. Have you ever fall asleep while driving after finishing your night shift? ☐ Yes ☐ No
2. How frequent do you fall asleep while working on night shift? ☐ < 2 times per shift ☐ 2-4 times per shift ☐ > 4 times per shift
3. Do you have to take caffeine in order to stay awake? ☐ Yes ☐ No

Part F – The following questions are about your weight. For each question, please tick (√) the appropriate box that is applicable to you

1. What is your BMI reading? Formula BMI= kg/m^2 ☐ Nomal (18.5 – 25) ☐ Overweight (25 – 30) ☐ Overweight (> 30)
2. Does your weight increase while working in GRSB / RRSB? ☐ Yes ☐ No
3. Do you think you over-eat while working on night shift? ☐ Yes ☐ No

Part G – The following questions are about your social life. For each question, please tick (√) the appropriate box that is applicable to you

1. Does night shift has any impact to your relationship with your family / friends? ☐ Yes ☐ No ☐ Sometimes
2. Can you still fulfil your family / children /spouse's needs while working on night shift? ☐ Yes ☐ No ☐ Sometimes

3. Can you still maintain your social activity routine while working on night shift? (e.g: sports / family gathering)

☐ Yes

☐ No

☐ Sometimes