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Combating Non- Communicable Disease Among HCW: The Broken Soldiers

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ABSTRACT

Non communicable disease (NCD) has recently emerged as a major public-health concern, with prevalence rising over the world. As a submerged portion of the iceberg, the hidden burden of NCD is escalating and devouring the world. NCD affects HCW in the same way it affects other types of workers. Healthcare worker (HCW) should serve as role models in the community, raising NCD prevention knowledge and encouraging patients to adopt a healthier lifestyle. The Objective to the study to access the prevalence of non-communicable disease among healthcare workers. A cross sectional study was conducted in Johor state public health division with secondary data source from health screening of HCW from 2021. A total of 123 subjects participated in the study. Based on BMI calculation 26% were categorized normal, 42% were overweight and 30% were obese. Correlation and univariate analysis were conducted on BMI and blood screening. The results show a significant relationship between BMI towards Total Cholesterol and Fasting blood sugar level among HCW (P value <0.01). The high prevalence of NCD risk factors and their significant association necessitate an appropriate risk-reduction strategy to reduce the possibility of chronic illness among them.

Contribution/Originality: This study contributed to the existing literature based on the references regarding non communicable disease. Furthermore, this study uses new estimation methodology to assess the correlation between BMI and blood screening results. In addition, this study is one of very few studies which have investigated NCD among healthcare workers in southern Malaysia.

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1. Introduction

Non-Communicable Diseases (NCD) are the leading cause of death and a recognised threat to global development (Drozd et al., 2021). NCD are currently viewed as new priorities that place an additional burden on the healthcare systems of developing nations. The leading NCD include cardiovascular diseases (CVDs), cancer, diabetes, and chronic respiratory diseases, which kill approximately 15 million people annually (Johnson et al., 2021). The majority of these deaths occur in low- and middle-income nations (LMICs). Due to rapid urbanisation, sedentary lifestyles, and the availability of increasingly nutrient-poor processed foods, the prevalence of noncommunicable diseases is rising in these nations (Rarau et al., 2020).

In addition, NCD have socioeconomic impact that rapidly deplete the household resources of the affected individual due to the exorbitant costs of lifelong care. However, the capacity of the healthcare system in LMICs to manage short-term health conditions such as emerging infectious diseases and maternal health is limited, whereas it is not accustomed to managing NCD, which require a multidisciplinary, long-term approach (Kataria et al., 2020). In 2016, the World Health Organization (WHO) estimated that NCD caused 41 million deaths, or 71 percent of all deaths worldwide (Kontsevaya et al., 2018).

Furthermore,80 percent of NCD-related deaths occur in low- and middle-income nations. In other words, noncommunicable diseases are the leading cause of death for people of working age worldwide (Chandran et al., 2021). Between 2009 and 2014, NCD were the leading cause of death in Malaysia, while cardiovascular disease was the leading cause of death in 2019 (Mazlan et al., 2021). Studies also indicate that the prevalence of NCD diseases and risk factors among adult Malaysians is high, with 1 in 5 Malaysians suffering from diabetes and as many as 3 in 10 suffering from hypertension. Those with NCD have an increased risk of morbidity and mortality due to infectious diseases (Harris et al., 2019; Sadanandam, 2017).

As with other professions, NCD also affects healthcare workers (HCW) (Dadar Singh et al., 2021). Healthcare workers should serve as role models by increasing community awareness of NCD prevention and encouraging patients to adopt a healthier lifestyle (Kunyahamu et al., 2021a). Despite working in an environment related to disease prevention and health promotion, HCW have a higher prevalence of NCD than the general population, according to a number of studies (Faruque et al., 2021). Employees are an important asset for the productivity of a country. The need to provide a level of safety, health and well -being in place work contained in the Occupational Safety and Health Act 1994 (Act 514) and the Machinery Act 1967 (Act 139). Under Section 15(1) of the Occupational Safety and Health Act 1994 states every employer need to ensure the safety, health and welfare of employees are at the level optimum. And vice versa under the same act that employees also have responsibility to follow the employer's instructions in all aspects of safety and health (Tay, 2014).

Healthcare workers are a vital and diverse workforce group who dedicate the majority of their time to fostering a healthier society (Laaksonen et al., 2004). They consist primarily of qualified physicians, nurses, medical assistants, medical scientists, laboratory technologists, pharmacists, and other nonclinical support personnel such as administrative personnel. On the basis of their knowledge and training, it is reasonable to assume that they make healthier lifestyle decisions and are in better health than

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others. In addition, it is anticipated that the prevalence of cardiometabolic diseases and their risk factors would be low among them. Certain occupation-related risk factors, such as physical and mental stress from work shifts, overtime, providing medical care in life-or-death situations, etc., expose them to high-risk behaviour of impending NCD (Garzaro et al., 2022).

Little research has been conducted on a large scale in Malaysia regarding NCD among HCW. According to a number of studies health care workers in Malaysia are more likely to be obese than the general adult population (Al-Asi, 2003). To the best of our knowledge, however, previous research has not investigated whether specific job categories among Malaysian HCW are associated with their BMI and health status.

This issue's impact on health services, whether direct or indirect, makes an accurate evaluation essential. Knowing the higher-risk occupation groups among HCW can aid in the development of intervention programmes for this problem (Baicker et al., 2010). This study may also assist other researchers in studying additional factors that contribute to NCD among healthcare workers. Consequently, the primary objective of this study was to determine the prevalence of non-communicable disease among HCW and the associations between BMI and blood screening.

2. Methods

A cross-sectional study was conducted in the southern part of Peninsular Malaysia. For this study, secondary data from the annual blood screening programme for all government HCW, in Johor state public health department. This study was open to all permanent government HCW who underwent a health screening programme between 1 January and 31 December 2021. The inclusion criteria were HCW that works in Johor State Public Health Division and the exclusion criteria were staff who that absent of the time of the research. A 103-sample size of participants was determined based on openepi.com for a population-based study. The research followed the guidelines stated in the ethic form and written informed consent was obtained from all participants. Study was conducted in compliance with ethical principles outlined in the Declaration of Helsinki and Malaysian Good Clinical Practice (GCP) Guideline. Ethical approval will be obtained from the Malaysian Review Ethics Committee (MREC). Financial support of this study was funded by Johor State Health Office. No external grant or funding will be obtained.

2.1. Data Analysis

Data analysis was performed using Statistical Package for Social Science version 25.0. The average of the responses in each section are calculated. Descriptive statistics of sociodemographic factors comprised of frequencies and percentages. The association of independent variable with dependent variable were determined using a series of independent t-test and one-way ANOVA analyses for normally distributed data. Meanwhile, Spearmen's correlation was used for non-normally distributed data as per outcome of the normality test. Descriptive results were presented using tables and figures. Variable with p value <0.01 were considered statistically significant factors. On the basis of their normal distribution, numerical data were presented as mean (standard deviation) and categorical data as frequency (percentage). Each group's descriptive statistics for all variables were calculated.

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3. Results

After applying the inclusion and exclusion criteria 123 sample were extracted from the data. Hence all 123 sample were included in the analysis (Table 1). The study subjects mean age was 38.25. Majority of the subjects were Male 68 (55.3%) and most of them were Malay (118)96%. Furthermore 104(84 %) of the staff were non-smokers and 101 (82.1%) of the subjects have strong family history of NCD disease. Each group's descriptive statistics for all variables were calculated.

Table 1: Sociodemographic

Variables		Frequency	Percent
Gender	Male	68	55.3
	Female	55	44.7
Race	Malay	118	96.0
	Indian	2	1.6
Smoking Status	Smoker	19	15.4
	Non-Smoker	104	84.6
Family History	Yes	101	82.1
	No	22	17.9

3.1. Prevalence of NCD among Healthcare worker

Few parameters of blood investigation were measured during the health screening:

i. Fasting blood sugar
ii. Total cholesterol
iii. LDL
iv. Uric Acid

3.3. BMI

Using the body mass index (BMI), HCW were classified according to the WHO 1998 BMI categories: underweight (BMI 18.5 kg/m2), normal (BMI 18.5 to 24.9), overweight (BMI 25 to 29.9), and obese (BMI > 30 kg/m2).52 (42.3%) of the participants were overweight, while 38 (30.9%) were obese. Average BMI was 27.9.

3.4 Blood screening

Blood screening result were checked and measured based on non-communicable disease Malaysia guideline (Table 2). The prevalence of high fasting blood sugar (> 6.4 mmol) is 15 (12.2%). Besides that, 87 (70.7%) of the subjects has high level of total cholesterol and 54 (43.9%) of the subjects has high level of LDL. Furthermore, 63 (51.2%) of the subjects has high urid acid.

Table 2: Frequency distribution

Variables		Frequency	Percent	Mean	SD
FBS (Fasting blood Sugar)	Low (<4.2)	4	3.3		
	Normal (4.2-6.4)	104	84.6	5.48	1.728
	High (>6.4)	15	12.2		
Total Cholesterol	Low (<3.6)	3	2.4		
	Normal (3.6-5.2)	33	26.8	5.79	1.262

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LDL (Low-density lipoprotein)	High (>5.2)	87	70.7	3.91	1.098
	Low (<0.8)	0	0		
	Normal (0.8-4.0)	69	56.1		
	High (>4.0)	54	43.9		
Uric Acid	Low (<154.7)	0	0	373.38	98.444
	Normal (154.7-357.0)	60	48.8		
	High (>345.0)	63	51.2		
BMI	Underweight (<18.5)	1	0.8	27.912	4.9682
	Normal (18.5-24.9)	32	26.0		
	Overweight (25-29.9)	52	42.3		
	Obesity (>29.9)	38	30.9		

3.5. Associations between Obesity categories and blood investigation screening

Table 3 provides a summary of the results of univariable analysis. Multiple logistic regression confirmed a significant association between the BMI of healthcare workers and blood screening. Only variable FBS and LDL were significantly associated with BMI among HCW, according to this analysis.

Table 3: Univariable analysis

Variables	Regression Coefficient B	Crude OR (95% CL)	Wald Statistics (df)	*p*-value
High FBS				
Yes	0.051	1.09(1.03,1.11)	91.81(1)	0.01
No				
High Cholesterol				
Yes	-0.062	0.83(0.80,1.15)	0.65	0.60
No				
High LDL				
Yes	1.52	3.4(2.6,4.0)	110.30	0.01
No				
High Uric Acid				
Yes	-0.215	1.18(1.03,1.25)	4.88	0.50
No				

*High FBS (>6.4), *High Cholesterol (>5.2), *High LDL (>4.0), *High Uric Acid (>345)

3.6. Correlation between BMI and blood screening

Table 4 shows the linear regression was conducted to predict the BMI based on blood screening taken from the subjects. The linear regression established there is a positive correlation between total BMI towards FBS and LDL. The correlation is statistically significant (P<0.01)

Table 4: linear regression

Variables	Std Error	*p*-value	Confidence interval
FBS	0.250	**0.01**	0.44(0.30-0.78)
Cholesterol	1.181	0.09	-2.5(-4.9-0.18)
LDL	2.543	**0.01**	0.55(0.31-0.92)
Uric Acid	0.18	0.08	0.349(0.40-0.51)

*Dependent Variable BMI

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4. Discussion

Overall, the findings of this study can be used to forecast the long-term impact of noncommunicable disease status among HCW in the future; the average age of the study population was 35.64 years, implying that most HCW in this study will have at least 25 more years of mandatory service with the Malaysian Ministry of Health.

Furthermore 22 (18%) of the subjects has very strong family history. Families share similar genetic ancestry, as well as comparable environments and ways of life. Together, these characteristics can provide indications of familial diseases. By observing patterns of illnesses among relatives, healthcare practitioners can establish if an individual, family members, or future generations are at an elevated risk of having a specific condition (Downing et al., 2020). Despite the fact that a family health history provides information about the risk of specific health issues, having relatives with a condition does not necessarily indicate that an individual will develop that ailment. A person without a family history of a disorder may nevertheless be susceptible to developing the disorder (Tolonen et al., 2022).

Besides that, 19 (15.4%) of the subjects are smokers. Heart disease and stroke are two to four times more likely to happen if you smoke (Adgoy, 2019). Chronic lung diseases caused by smoking can be very viscous. This makes the risk of death 12 times higher. Smoking is a risk factor for diabetes on its own, and it is thought that smoking is responsible for most of diabetes cases in the Moldova (Sécula et al., 2020). People with diabetes who smoke have a higher chance of dying and of getting diabetes-related problems like amputations and trouble seeing.

Obesity among HCW is a big problem because it can contribute to other disease. This study found that one out of every five HCW had a high BMI, which isn't too different from other studies done in other country on HCW (Kunyahamu et al., 2021b). These results showed that, despite the many initiatives was done, the number of obese HCW was not reducing in trend. The higher rate of obesity among health care workers (HCW) compared to the rest of the adult population could be because they are more likely to get fat because of their irregular and long hours of work, bad diet, and stress at work. A study by Munyogwa et al. (2021) found that people who work in the health-care industry are much more likely to be overweight than people who work in any other industry.

4.1. Blood screening

15 (12.2%) of the subjects were having high FBS. This indicates the subjects having Diabetic Mellitus. Inadequate sleep and lack of access to healthy food options may lead shift workers to overeat or select nutrient-poor and energy-dense (e.g., high fat and sugar) foods during and after their shifts (Mirzaei et al., 2020). Continuous exercise has been found to be associated with a 15% reduction in the incidence of type 2 diabetes. Sedentary employment conditions (e.g., prolonged sitting at work) and lack of physical activity also contribute to diabetes risk. Work-related stress has been associated with shift work, long work hours, high job demands, inadequate job controls, and job instability, however the connections between work-related stress and type 2 diabetes differ from study to study (Sadanandam, 2017).

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Besides that, majority of the subject has high level of Total cholesterol and LDL. According to the World Health Organization, elevated blood cholesterol contributes to one-third of the world's ischemic heart disease (Liu et al., 2018). Blood levels of low-density lipoprotein cholesterol (LDL-c) are a significant predictor of incident atherosclerotic cardiovascular disease, and LDL-c-lowering therapy has been demonstrated in numerous populations to reduce the risk of CVD. CVDs have been described as the leading cause of death worldwide, accounting for more deaths annually than any other cause (Shi et al., 2014).

Moreover 63(51.2%) of the subjects has high level of Uric acid. Uric acid was found to be positively related to several indices, including BMI, waist circumference, and dyslipidaemia, in epidemiological studies on metabolic syndrome. As a result, hyperuricemia is regarded as a common lifestyle disorder associated with obesity in humans (Higa et al., 2020). Several epidemiological studies have linked hyperuricemia to a variety of diseases, including diabetes, dyslipidaemia, obesity, hypertension, cardiovascular disease, and metabolic syndrome (Kleinman et al., 2007). Our findings indicate that high BMIs contribute significantly to this burden.

4.2. Association of BMI and blood investigation screening

This present study demonstrates there is association and correlation between BMI towards FBS and LDL. High BMI is primarily associated with chronic systemic inflammation and increased sympathetic activity, both of which can contribute to insulin resistance and hypertension, resulting in endothelial dysfunction and atherosclerosis. As a result, its effect is primarily mediated by other intermediary risk factors, such as hypertension, hypercholesterolemia, and hyperglycaemia, the latter two of which are also known as metabolic risk factors (Shockey et al., 2021).

Besides that, Obesity-related excess adipose tissue surrounding and compressing the kidney, combined with overactivity of the sympathetic nervous system, contribute to hypertension, a key pathophysiological mechanism causing cardiovascular illnesses, stroke, and chronic renal disorders (Montazerifar et al., 2019). High insulin levels during fasting, along with elevated lipid levels and lipid signalling, can fuel cancer aetiology, and a low-grade inflammatory response may hasten cancer growth. Obesity causes alterations in immunological function, which impact host defence and may have implications for immune disorders like asthma (Kiplagat et al., 2017).

The American Heart Association (AHA) has suggested several important areas for future research on CVD and obesity (Razzaghi et al., 2019). One of them is concerned with "policy research on the impact of overweight/obesity on future health care in people with and without CVD." A 10 kg increase in body mass was associated with a 3 mmHg increase in systolic blood pressure. As a result, the risk of coronary heart disease rises by 12% (Bajaria & Pandit, 2018).

5. Conclusion

In conclusion this study highlights the urgent need for education and lifestyle interventions as the first step in preventing noncommunicable diseases among high-risk healthcare workers. In turn, this may result in widespread lifestyle modifications throughout the environments traversed by healthcare workers. A comprehensive risk reduction approach, including health education and screening for risk factors, should be

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designed for healthcare workers. Policies and guidelines aimed at enhancing the health of healthcare workers are crucial to avert the coming metabolic health crisis.

Ethics Approval and Consent to Participate

The researchers used the research ethics provided by the Research Ethics Committee of Johor State Health Department Public Health Division. All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional research committee. Informed consent was obtained from all participants according to the Declaration of Helsinki.

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Conflict of Interests

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

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