THE IMPACT OF INDUSTRIAL WORKERS WITH ISCHEMIC HEART DISEASE: LITERATURE REVIEW

Mohamad Roni Alfaqih[1]
Corresponding Author Email : alfaqih817@gail.com
Institut Sainns Teknologi dan Kesehatan Insan Cendekia Husada Bojonegoro

ABSTRACT

Heart disease is common both in the general population but also in the working age population. However, the costs of cardiovascular disease (CVD) in the workplace are more difficult to measure but are likely to be just as high. Heart disease can be the most common cause of death including in company workers. This type of research is a literature review, analyzing journals published from 2018-2023 in accordance with PRISMA. The search was carried out using the PubMed database. There are ten journals that meet the inclusion criteria using PICOS analysis. Based on the ten journals that has been analyzed, There are several categories of these journals, including: heart disease category, gender category, shit schedule category and lifestyle which are risk factors for coronary heart disease in company workers. Cardiovascular diseases are the leading cause of death worldwide. It is important to not only consider the presence of workplace hazards such as exposure to noise (which has been linked to increased blood pressure) or carbon monoxide (which has been linked to increased rates of coronary artery disease), but then measure any potential hazards such as disease risk factors that industrial workers have, age and shift schedule.

Keywords: ***ischemic heart desease, industrial workers, impact***

INTRODUCTION

Cardiovascular diseases are the leading cause of death worldwide. Cardiovascular disease was the underlying cause of death for about a third of the 2.8 million deaths in the USA in 2018: ischaemic heart disease accounted for 42% and stroke for 17% of all cardiovascular disease deaths. Worldwide, ischaemic heart disease ranks frst in years of life lost and stroke ranks third. Consistently identified independent risk factors include age, smoking, diabetes mellitus,hypertension, obesity, and increased total and low density lipoprotein or decreased high density lipoprotein cholesterol. A heritable genetic component for coronary heart disease has also been reported.

Societal and economic demands push towards an increase of 24-hour availability, in health care settings as well as service and security industries. The resulting disruption of social and biological rhythms, occurring especially during shift work, has been hypothesized to increase chronic disease risk, and suggestive evidence supports an association between shift work and coronary heart disease (CHD), metabolic disorders and cancer.

Most shift work studies on women have investigated nurses (Vetter et al. 2016). There are few studies of industrially employed female shift workers and health risks, especially regarding cardiovascular disease. Women within the industrial sector are also subjected to other hazardous exposures such as noise. It is well known that noise can cause various health efects, in particular hearing loss (Lie et al. 2016).

The increasing trend of mortality caused by IHD among women can be seen worldwide, but the true picture of IHD among women especially Malay women in Malaysia is unknown due to incomplete registry. In Malaysia, the National Cardiovascular Disease Registry consists of data from hospitals or centers with either resident or visiting cardiologist but the data from pri mary or even secondary care centers are not included in the registry. A report produced in 2008 from the avail able registry showed that men were three times more likely than women to have acute coronary syndrome.

Several personal characteristics, both fixed and modifiable, are known or suspected to be associated with cardiovascular disease. These are often broadly grouped under the heading “lifestyle factors” and include smoking habit, alcohol consumption, body mass index, social class, and habitual physical activity, both at work and during leisure. In this present study, we examine the contribution of these lifestyle factors to the variation in plasma levels of these hemostatic variables in a sample of middle-aged men.

The aim of our study was to analyze mortality due to cardiovascular disease, especially acute myocardial infarction, and total mortality, in relation to exposure to shift work and noise, in a female cohort of employees in the paper mill industry.

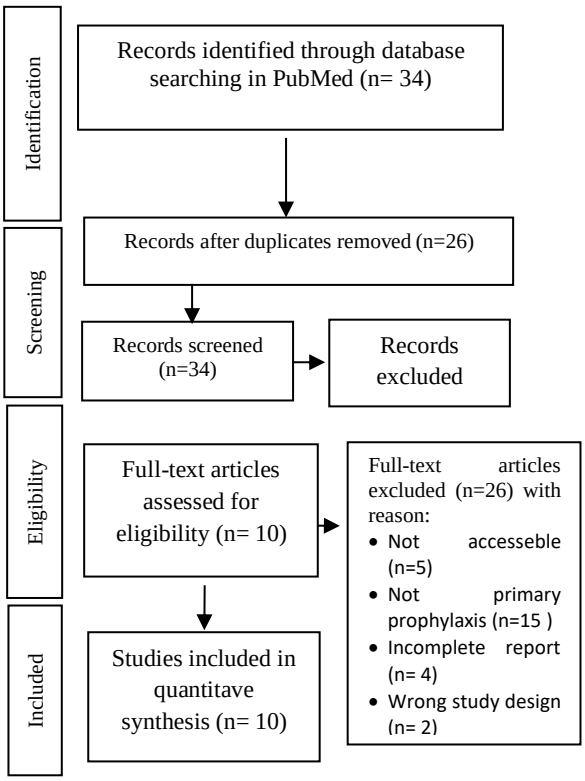
METHOD

The type of research used was a literature review which was carried out from September-October 2023. This research used a search through the database, namely Pubmed with Boolean words, namely ("work-related heart disease") and obtained 36 journals. Data screening was carried out by selecting articles that matched the research title and

met the inclusion criteria, namely 1. the article had been published in an international journal; 2. keywords correspond to boolean words; 3. article published less than 5 years; 4. can be accessed in full text; and 5 articles in English. Eligibility assessment is adjusted to the exclusion criteria, namely 1. articles that cannot be accessed; 2 duplicate articles; and 3. articles that are not research.

The research journal selection process uses the PICOS criteria: Population (workers at risk) Intervention (heart disease), Comparison (-), and Study (-). Based on the 34 journals, 26 journals were excluded due to duplication. Existing journals were then reviewed by reading the title and abstract and excluded if they did not meet the inclusion criteria so that 10 journals were obtained, then reviewed again by reading the entire contents of the journal and 10 journals were obtained that met the criteria**.**

Figure.1 Process of disbursing article selection



RESULT

The research results contain descriptions of articles that have been reviewed based on inclusion and exclusion criteria. Seven articles were selected for analysis in this literature review. (Table 1).

Table 1 Journal Review/Extraction Results

No	Journal Title	Name Researcher and Year Study	Research Area	Study Design	Variable Dependent	Variable Independent	Number of Subjects	Tool Measuring	Research result
1	Association between rotating night shift work and risk of coronary heart disease among women	Céline Vetter, PhD1,*, Elizabeth E. Devore, ScD1, Lani R. Wegrzyn, ScD2, Jennifer Massa, ScD3, Frank E. Speizer, MD1,4, Ichiro Kawachi, MD, ScD5, Bernard Rosner, PhD1,6, Meir J. Stampfer, MD, DrPH1,2,3, and Eva S. Schernhammer, MD, DrPH		Prospective cohort study	risk of coronary heart disease among women	Association between rotating night shift work	189,158		During follow-up, 7,303 incident CHD cases in NHS (mean age at baseline: 54.5yrs) and 3,519 in NHS2 (34.8yrs) occurred. In multivariable adjusted Cox proportional hazards models, increasing years of baseline rotating night shift work were associated with a significantly higher CHD risk in both cohorts (NHS: age-standardized incidence rate (IR)<5yrs per 100,000 person-years=435.1
2	Cardiovascular mortality in a Swedish cohort of female industrial workers exposed to noise and shift work	Helena P. Eriksson1,2 · Mia Söderberg2 · Richard L. Neitzel3 · Kjell Torén1,2 · Eva Andersson 1,2		cohort	female industrial workers exposed to noise and shift work	Cardiovascular mortality	soft tissue paper mills (*N* = 3013) and pulp and paper mills (*N* = 1483)		Fatal myocardial infarctions (*N* = 144) were increased in the total cohort, SMR 1.20 (95% CI 1.01–1.41) but not total mortality. The SMR for myocardial infarction for women exposed to noise ≥ 90 dB(A) for > 10 years was 1.41 (95% CI 1.02–1.89) and for those exposed to night

						shifts>10 years, 1.33 (95% CI 0.91–1.89). Shift workers without nights≤65 years, with noise exposure ≥ 90 dB(A), had SMR 2.41 (95% CI 1.20–4.31) from myocardial infarction. There was no increased mortality from cerebrovascular disease
3	Exploratory analysis of traditional risk factors of ischemic heart disease (IHD) among predominantly Malay Malaysian women	Norafidah Abdul Rashid1†, Azmawati Mohammed Nawi2*† and Shamsuddin Khadijah2	A case control study	of ischemic heart disease (IHD) among predominantly Malay Malaysian women	Exploratory analysis of traditional risk factors	142 Middle aged women were recruited with women diagnosed with diabetes (aOR = 1.92, 95% CI: 1.11–3.31), having low HDL-C (aOR = 3.30, 95% CI: 1.28–8.27), those with positive family history of IHD (aOR = 1.92, 95% CI:1.13–3.26) and passive smokers (aOR = 2.99, 95% CI:1.81–4.94) were at higher odds of IHD.
4	Ionising radiation and cardiovascular disease: systematic review and meta-analysis	Mark P Little,1 Tamara V Azizova,2 David B Richardson,3 Soile Tapio,4 Marie-Odile Bernier,5 Michaela Kreuzer,6 Francis A Cucinotta,7	Systematic review and meta-analysis.	cardiovascular disease	Ionising radiation	The meta-analysis yielded 93 relevant studies. Relative risk per Gy increased for all cardiovascular disease (excess relative risk per Gy of 0.11 (95% confdence interval 0.08 to 0.14)) and for

Dimitry Bazyka,8 Vadim Chumak,8 Victor K Ivanov,9 Lene H S Veiga,1 Alicia Livinski,10 Kossi Abalo,11,12 Lydia B Zablotska,1 3 Andrew J Einstein,14 Nobuyuki Hamada15

the four major subtypes of cardiovascular disease (ischaemic heart disease, other heart disease, cerebrovascular disease, all other cardiovascular disease). However, interstudy heterogeneity was noted ($P<0.05$ for all endpoints except for other heart disease), possibly resulting from interstudy variation in unmeasured confounders or effect modifers, which is markedly reduced if attention is restricted to higher quality studies or those at moderate doses (<0.5 Gy) or low dose rates (<5 mGy/h). For ischaemic heart disease and all cardiovascular disease, risks were larger per unit dose for lower dose (inverse dose effect) and for fractionated exposures (inverse dose fractionation effect). Population

						based excess absolute risks are estimated for a number of national populations (Canada, England and Wales, France, Germany, Japan, USA) and range from 2.33% per Gy (95% confdence interval 1.69% to 2.98%) for England and Wales to 3.66% per Gy (2.65% to 4.68%) for Germany, largely reflecting the underlying rates of cardiovascular disease mortality in these populations. Estimated risk of mortality from cardiovascular disease are generally dominated by cerebrovascular disease (around 0.94-1.26% per Gy), with the next largest contribution from ischaemic heart disease (around 0.30-1.20% per Gy)
5	Ischaemic heart disease, stroke and their	Nasheeta Peer , Leonard Baatiema & Andre-	**afrika**	stroke and their cardiometa bolic risk	Ischaemic heart disease	This paper focuses on ischaemic heart disease and stroke, and their

cardiometabolic risk factors in Africa: current challenges and outlook for the future	Pascal Kengne	factors in Africa	key contributors of obesity, hypertension, diabetes and dyslipidaemia which are well-established, rapidly rising and significant contributors to disease burden in SSA. However, their prevention, detection, treatment and control of are currently disorganised, inconsistent, unreliable and insufficient with most SSA countries not geared to respond to this growing problem. National policies are frequently lacking or, if available, remain poorly implemented, for the control of these conditions. Primary healthcare systems have not adapted to cope with these rising CVD burdens and remain weak, underfunded and under resourced. Numerous barriers at the healthcare service, healthcare provider and

							patient levels prevent optimal CVD risk factor care
6	Lifestyle and Hemostatic Risk Factors for Ischemic Heart Disease	John W.G. Yarnell, Peter M. Sweetnam, Ann Rumley, Gordon D.O. Lowe	The original cohort	Ischemic Heart Disease	**Lifestyle and Hemostatic Risk Factors**	2188	The contribution of factors associated with lifestyle (smoking, alcohol, body mass index, leisure and work activity, social class, and use of prescribed medicines) to variation in plasma levels of 8 hemostatic variables was examined. All results were adjusted for other lifestyle variables, age, and time of day. Most hemostatic variables increased with age and smoking habit. Increasing levels of alcohol consumption were associated with increases in tPA and plasminogen activator inhibitor (PAI-1) activity and with decreases in fibrinogen and white cell count. tPA, PAI-1, fibrinogen (nephelometric), and viscosity were positively associated with body mass index. Increasing levels of leisure activity

						were inversely associated with D-dimer, von Willebrand factor, nephelometric fibrinogen, and viscosity
7	Long weekly working hours and ischaemic heart disease: a follow-up study among 145 861 randomly selected workers in Denmark	Harald Hannerz,1 Ann Dyreborg Larsen,1 Anne Helene Garde1,2		ischaemic heart disease	Long weekly working hours	In total, we found 3635 cases of IHD and 20 648 cases of antihypertensive drug usage. The rate ratio of IHD was 0.95 (95% CI 0.85 to 1.06) for 41–48 compared with 32–40 WWH and 1.07 (0.94 to 1.21) for >48 compared with 32–40 WWH. The corresponding rate ratios for antihypertensive drug usage were 0.99 (0.95 to 1.04) and 1.02 (0.97 to 1.08). No statistically signifcant interactions between WWH and sex, SES and night work, respectively, were found
8	Occupational exposure to silica and risk of heart disease: a systematic review with meta-analysis	Kai Liu ,1 Min Mu,2 Kehong Fang,3 Yuanyuan Qian,1 Song Xue,4 Weijiang Hu,5 Meng Ye1	A systematic review and meta-analysis	risk of heart disease	Occupational exposure to silica	Twenty cohort studies were included. The results suggest a signifcant increase in the risk of overall heart disease (meta-RR=1.08, 95% CI 1.03 to 1.13). Stronger

					evidence of association with pulmonary heart disease was found in the risk estimate of both categories of heart disease (meta-RR=1.24, 95% CI 1.08 to 1.43) and in the exposure-response analysis (meta-RR=1.39, 95% CI 1.19 to 1.62). Our subgroup analyses also revealed that the statistical heterogeneity among studies could be attributed mainly to the diversity in reference group, occupation and study quality score
9	Shift work and the risk of cardiovascular disease. A systematic review and meta-analysis including dose–response relationship	*Luciana Torquati, PhD,1 Gregore I Mielke, PhD,1, 2 Wendy J Brown, PhD,1 Tracy Kolbe-Alexander, PhD*	A systematic review and meta-analysis	the risk of cardiovascular disease.	Shift work	We included 21 studies with a total of 173 010 unique participants. The majority of the studies were ranked low-to-moderate risk of bias. The risk of any CVD event was 17% higher among shift workers than day workers. The risk of coronary heart disease (CHD) morbidity was 26% higher (1.26, 95% CI 1.10–1.43, I2=

						48.0%). Sub-group analysis showed an almost 20% higher risk of CVD and CHD mortality among shift workers than those who did not work shifts (1.22, 95% CI 1.09–1.37, I2= 0% and 1.18, 95% CI 1.06–1.32 I2=0%; respectively). After the frst fve years of shift work, there was a 7.1% increase in risk of CVD events for every additional fve years of exposure (95% CI 1.05–1.10). Heterogeneity of the pooled effect size (ES) estimates was high (I2=67%), and meta-regression analysis showed that sample size explained 7.7% of this.
10	Shift work and ischaemic heart disease: meta-analysis and dose–response relationship	Man Cheng1,2, Heng He1,2, Dongming Wang1,2,3, Luli Xu2, Bin Wang1,2, Kim Myong Ho1,2,4 and Weihong Chen1,2	case–control	ischaemic heart disease	Shift work	Twenty-one articles with 31 independent results of 19 782 IHD cases in 320 002 participants were included. The pooled relative risk for the association between shift work and risk of IHD was 1.13 (95% CI 1.08–1.20, *I*2 = 53%,

	P < 0.001). Further evaluation of dose–response relationship indicated that each 1-year increase in shift work was associated with 0.9% (RR = 1.009; 95% CI 1.006–1.012) increase of the risk of IHD.

DISCUSSION

Hendrik L Blum explains in his theory that a person is said to be healthy if he is physically, mentally and socially healthy. According to Hendrik L Blum, the healthy category is influenced by 40% environmental factors, 30% behavioral factors, 20% health service factors, and 10% genetic factors. Environmental factors on the risk of hypertension in field workers are caused by shift work, work stress, noise exposure, heat exposure, exposure to small particles, and exposure to lead in the blood.

Based on the results of a review of 10 journals regarding the impact of work-related heart disease, several categories were found, including:

Disease Category

Based on 10 journals, several diseases that have the highest risk factors for company workers are ischemic heart disease, 8 of the journals (80%) stated that ischemic heart disease has a high mortality rate. Apart from that, there are several other diseases that pose a risk to Company workers, such as diabetes mellitus, CVD (cerebrovascular disease), and coronary heart disease.

Ischaemic heart disease (IHD) is the leading cause of death in many parts of the world. The Global Burden of Disease Study showed that the number of deaths due to IHD was continuously rising from 7.6 million in 2005 to 8.9 million in 2015 [1]. In addition, the Disability-Adjusted Life Year (DALY) ranked IHD first among all other causes of disease worldwide [1]. Several risk factors, including age, gender, diabetes, hypertension, lifestyle and occupational factors, were reported to increase the morbidity and mortality of IHD [2–7]. Among occupational factors, shift work might play a role in the development and progression of IHD. Shift

Chronic non-communicable diseases (NCDs) have cast their net across the globe following the major health transitions observed in the second half of the 20th century [1,2]. The key change among these health transitions has been the rise in atherosclerotic cardiovascular diseases (CVDs) of ischaemic heart disease (IHD) and cerebrovascular accidents (stroke) [2]. These have grown from a relatively minor condition a century ago to a leading cause of morbidity and mortality today [3]. Overall, CVDs contributed to about 31% of global mortality in 2016 accounting for almost 18 million deaths [4]; by 2030, the number of CVD deaths is predicted to increase to 25 million annually [5].

Gender and shift schedule:

based on 10 journals discussing female workers, with the female gender category, 90% stated that female workers have a high risk of experiencing heart disease, this is influenced by several factors including physical strength, rotation schedule and disease predisposing factors experienced by female workers.

Lifetime history of rotating night shift work was queried on average at age 55 in NHS (Nurse health study), when women are less likely to begin new shift work schedules; in NHS2, women were asked about shift work history when they were in their mid-thirties, with updated shift work assessments throughout follow-up. In NHS, CHD risk associated with rotating night shift work seemed to wane over time, so that after 20 years of follow-up the CHD risk associated with ≥10 years of exposure was not significantly elevated. In 1995, Kawachi et al reported in NHS that ≥6yrs of rotating night shift work were

associated with 51% increased CHD risk after multivariable adjustment, based on 4 years of follow-up and 292 CHD cases. The absolute rate difference corresponded to 86.2/100,000 person-years (comparing never shift workers to women with a history of ≥10yrs of rotating night shift work) and was of modest magnitude. The rate difference was also comparable to the one reported in the present analysis, when restricting to the primary endpoints of Kawachi and colleagues (i.e., MI and CHD death) and the first 12 years of follow-up in NHS (crude absolute incidence rate difference=91.6).

As the first journal talked abot, Rotating night shift work and risk of coronary heart disease among women, during follow-up, 7,303 incident CHD cases in NHS (mean age at baseline: 54.5yrs) and 3,519 in NHS2 (34.8yrs) occurred. In multivariable adjusted Cox proportional hazards models, increasing years of baseline rotating night shift work were associated with a significantly higher CHD risk in both cohorts. Among women who worked as registered nurses, longer duration of rotating night shift work was associated with a statistically significant, but small absolute increase in CHD risk. Over 24 years of follow-up and found that ≥5 years of rotating night shift work was associated with a significantly increased risk of CHD.

The second Journals is also talking about Cardiovascular mortality in a Swedish cohort of female industrial workers exposed to noise and shift work. Female paper mill workers had an increased mortality from acute myocardial infarction, especially before retirement age, when exposed to noise ≥ 90 dB(A) and with long-time employment

Life style

Based on 10 journals, there are five (5) journals which state that company workers have unhealthy lifestyles which can trigger heart disease in company workers, including: smoking, alcohol, BMI (body mass index), lack of activity and drug use.

CHD is a heart disease caused by narrowing of the coronary arteries, starting from atherosclerosis (stiffness of the arteries) or those where fat accumulation has occurred or plaque (plague) on the walls of coronary arteries, either accompanied by clinical symptoms or without symptoms. CHD is a type of disease that multifactorial. One of the factors that often linked to CHD is a habit smoke. WHO says that cigarettes causing approximately 7 million deaths each the year. This is predicted to happen an increase of up to 8 million deaths each the year is 2030 (CDC, 2018).

Alcohol use is one of the four main preventable and modifiable causes of non-communicable diseases. A study conducted by the Alcohol Group of the Global Burden of Disease (GBD) found that alcohol was the seventh risk factor causing death and disability-adjusted life years (DALYs), which was 2.2% [95% uncertainty interval (UI) 1.5–3.0] age-standardized female deaths and 6.8% (5.8–8.0) age-standardized male deaths. however, although it is now known that excessive alcohol consumption has adverse effects on health and mortality, epidemiological studies have also demonstrated several potential benefits of low alcohol consumption, including reduced incidence of coronary heart disease, ischemic cerebrovascular events, and reduced incidence of cardiovascular and cardiovascular disease. number of deaths.

Based on the fifth journal result show that Moderate alcohol consumption decreases the risk of IHD; however, heavy alcohol consumption increases the risk of cardiovascular disease, including stroke.

Increased weight can significantly improve the incidence of angina pectoris and also predicted the incidence of coronary disease and congestive heart failure failure) Accumulation of body fat in the central part of the body will increases the risk of heart disease and blood vessel. The fat cells in the abdominal wall has a size larger one dominated by Low Density Lipoprotein (LDL) cholesterol harms the body and is more ready to release its fat into the blood vessels than the fat cells in elsewhere, resulting in the risk of formation atherosclerosis also increases. This is accordance with sixth journal state that Overweight and obesity, assessed by body mass index, are risk factors for IHD and maturity onset diabetes mellitus. Beside that,
A further important personal characteristic of middle-aged men is the prevalence of prescribed medication. Such medication may be prescribed for both acute and chronic illnesses, including symptoms of cardiovascular disease.

CONCLUSION

Heart disease is common both in the general population but also in the working age population. It is estimated that heart disease, including stroke and high blood pressure, carries greater costs than any other disease or

injury. However, the costs of cardiovascular disease (CVD) in the workplace are more difficult to measure but are likely to be just as high. Heart disease can be the most common cause of death including in company workers. It is important to not only consider the presence of workplace hazards such as exposure to noise (which has been linked to increased blood pressure) or carbon monoxide (which has been linked to increased rates of coronary artery disease), but then measure any potential hazards such as disease risk factors that industrial workers have, age and shift schedule,

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