Comparison of coronary heart disease stratification using the Jakarta cardiovascular score between main office and site office workers

To cite this article: S G Dharma et al 2018 J. Phys.: Conf. Ser. 1073 042018

View the article online for updates and enhancements.
Comparison of coronary heart disease stratification using the Jakarta cardiovascular score between main office and site office workers

S G Dharma¹, D S Soemarko¹* and B Setianto²

¹Department of Community Medicine, Faculty of Medicine, Universitas Indonesia, Jakarta, 10430, Indonesia
²Department of Cardiology and Vascular Medicine, Faculty of Medicine, Universitas Indonesia, Jakarta, 10430, Indonesia

*E-mail: dewisoemarko@yahoo.com

Abstract. The risk of cardiovascular disease has been reported to be associated with a sedentary behavior, which is characterized by long-term activities that involve lying down or sitting, especially when done for more than 10 h a day, compared with less than 5 h a day. One underlying problem in this company was the significant number of cardiovascular disease risk factors that were obtained during periodic check of employees in one department and the lack of assessment in the other departments. The purpose of this research was to determine the cardiovascular disease risk stratification using the Jakarta Cardiovascular Score as a recommendation to the company management to use this score to assess the risks for cardiovascular disease among workers, especially those in the main office. A cross-sectional study design was used with comparative analysis. The factor that was most closely related with cardiovascular risk stratification was a family history of cardiovascular disease ($p = 0.021$, OR $= 1334.3$, dan 95% CI $= 147.1–12,103.6$).

1. Introduction

Labor problems are a very complex issue. Of course, labor protection must be capable of encompassing both the industrial sector and the service sector, which include employees who work with long sitting durations. Each year, more than 36 million people die from non-communicable diseases, which account for 63% of all deaths. Globally, cardiovascular disease is the leading cause of death from non-communicable disease [1].

A research conducted by Andrea et al. showed that the major risk factor that increased the risk for cardiovascular disease, which is a leading cause of death in adults in the United States, was sedentary work, especially sitting for more than 10 h a day, compared with less than 5 h a day [2]. A sedentary behavior, which is characterized by long-term activities that involve sitting or lying down, has been reported to be associated with an increased risk of disease that affects the heart and blood vessels [3].

Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI. Published under licence by IOP Publishing Ltd
At the company where this research was conducted, a subjective observation showed that employees spent most of their time working by sitting in front of a computer screen, with less than 2 h of moving and standing activities. Unfortunately, none of the employees who worked in the office underwent annual periodic health screening. In order to prevent and overcome the risk factors of cardiovascular diseases, which comprise the main cause of death in workers, especially those in the main office, this study aimed to assess and analyze the risk stratification of PJK among the workers in the main office and site office of PT.X using the Jakarta Cardiovascular Score.

2. Methods
This cross-sectional study with comparative analysis was conducted at an office in PT "X", with a sample size of 58 people from each group. The target populations of this study were workers of PT “X.” The reasonable and accessible populations of this study were the workers in the main office and those on the site and were selected by simple random sampling. The number of the order was made from lists that were obtained from the employment section. Then, the number was included in the research randomizer application obtained from www.randomizer.org and was assigned to the respondents of this research. Primary data were collected directly from observation of the source and were obtained from the answers to the questionnaires, followed by physical examination. Data collection used several questionnaires, such as the Sedentary Behavior Questionnaire, the Rapid Assessment of Physical Activity, and the Self-Reporting Questionnaire [4]. Other data, such as fat profiles, previous history of heart disease, height of the respondent, and length of work, were obtained from the employment department.

3. Results
Data were collected from May 2017 to June 2017 at PT.X in South Jakarta by studying the medical data of the 2016 annual periodic results, interviews, and questionnaires. A total of 116 people were included as the study subjects, who were divided into two groups of 58 people each from the main office and from the site office. Most of the subjects were over 27 years of age (81%) and were men (63%). This shows the images of workers in similar companies were young productive workers.

A total of 96 subjects (82.8%) had worked in the company for more than 2.5 years, which was the cutoff value that was derived from the value of the ROC curve on employment and the Cardiovascular Strata of Jakarta. In this study population, majority comprised sedentary workers (n = 91, 78.4%), and few were workers exposed to dangers, such as noise, vibration, and chemicals (n = 9, 7.8%). Of the 116 respondents, 17 (14.7%) had a mental disorder. The subjects included in the obese category (BMI >30) comprised 5.2%, those with hypertension were 5.2%, and those who had a history of diabetes mellitus comprised 2.6%; 31% of the subjects were smokers or had a smoking history. Most subjects (90.5%) were classified as having mild physical activity or no physical activity at all. Only 7 (6%) of the study subjects had a family history of diseases. The subjects were grouped as low or medium-high, on the basis of the risk stratification by the Jakarta Cardiovascular Score. The subjects with high risk stratification comprised 41 (35.3%).

On the basis of the chi-square bivariate analysis, gender was the risk factor that was significantly associated with the Jakarta Cardiovascular Strata in all subjects. Age and sex were the risk factors that showed significant associations with the Jakarta Cardiovascular Strata for the main office group but not for the site office group. There were no occupational risk factors that were significantly associated with the Jakarta Cardiovascular Strata in all subjects and in both groups. The risk factors studied included BMI, smoking history, history of diabetes mellitus, physical activity, and family history of disease. The Cardiovascular Strata of Jakarta was significantly associated with blood pressure, smoking history, history of diabetes mellitus, physical activity, and family disease history in all subjects; with BMI, blood pressure, and smoking history in the main office group; and with smoking history and family disease history in the site office group.
A family history of disease was not included in the assessment of the cardiovascular scores in Jakarta; for this variable, the authors tried entering it into multivariate analysis of variables that theoretically influence cardiovascular risk stratification such as occupational variables, hazard exposure, and emotional disorders, although in bivariate analysis, the variables were not significant and also not included in $p < 0.25$. This analysis was performed in all subjects and in both groups. In the main office group, only emotional disturbance and family disease history were included in this multivariate analysis, because the variables of occupational and exposure to hazards had consistent results. The results of the multivariate analysis are shown in Table 1.

Table 1. Multivariate analysis of the risk factors according to the Cardiovascular Score Jakarta

| Risk Factors                  | B      | p      | OR    | 95% CI            |
|------------------------------|--------|--------|-------|-------------------|
| Type of work                 | -0.405 | 0.429  | 66.7  | 24.5–181.8        |
| Hazard exposure              | -0.084 | 0.917  | 92    | 18.9–446.9        |
| Emotional disturbance        | -0.0833| 0.217  | 43.5  | 11.6–163.2        |
| Family history of disease    | 2.591  | 0.021  | 1334.3| 147.1–12103.6     |

*p<0.05

In all analyses of all subjects and of both groups, family history of disease was the risk factor that was mostly associated with the Cardiovascular Stratification Jakarta ($p = 0.021$, OR = 1334.3, and 95% CI = 147.1–12,103.6).

4. Discussion

In this study, majority of the subjects were over 27 years old, which belongs to the common age group of employees at other similar companies, and were men. A total of 78.4% of the study subjects were categorized as sedentary workers; in the main office group, all (100%) were sedentary workers, whereas in the site office group, 56.9% were sedentary workers and 43.1% were non-sedentary workers. In the main office group, there were no workers with hazard exposure. On the other hand, in the site office group ($n = 58$), 1.7% had chemical exposure, 4.3% had noise exposure, and 1.7% had vibration exposure.

The subjects who were classified as having moderate to severe physical activity comprised only 9.5%, whereas those with mild or had no physical activity at all comprised 90.5%. The habit of physical activity in this study was lower than the results of the Basic Health Research 2013 (Riskesdas 2013) that was equal to 52.8%. The beneficial physical activity habits that can prevent coronary artery disease were classified as moderate-severe [5] however, in this study, physical activity was not found to be a preventing factor for cardiovascular disease. In the overall study population, the subjects who were current smokers were 28.4%; former smokers were 2.6%; and never-smokers were 69%. The smoking population in this study was smaller than that reported in the Riskesdas 2013, which stated a $>36.3\%$ smoking rate for the population aged more than 15 years (Indonesian Ministry of Health, 2013). Although the prevalence of subjects who smoke was still smaller than the Riskesdas 2013, this still needs attention [6,7].

In this study, hypertension was defined according to the JNC-VII criterion of blood pressure $\geq 140/90$ mmHg. The prevalence of hypertension in this population was 5.2%, which was lower than the 25.8% prevalence in the Riskesdas 2013. Compared with the 26.6% prevalence of obesity in the previously reported population of $\geq 15$ years old, the prevalence of obesity in this present study was lower at 5.2%, when based on the WHO criteria (BMI $\geq 30$), or at 12.1%, when based on the Asia Pacific criterion (IMT $\geq 28$). But still should be concerned for the company. The prevalence of diabetes mellitus was 2.6% in this study and 6.9% in the Riskesdas 2013 [7]. Research subjects with a family history of disease were 6%, but researchers have not received reference matrix for the prevalence of family history of disease in national scale.
In multivariate analysis of all groups, there was no significant association between family disease history and the Cardiovascular Stratification of Jakarta. However, incorporation of the variables of occupation, hazard exposure, and emotional disturbance in this multivariate analysis rendered a significant association between family disease history and cardiovascular stratification Jakarta \( (p = 0.021, \ OR = 1334.3, \text{and} \ 95\% \ CI = 147.1–12,103.6) \). It means, if it was analyzed with determinant cardiovascular scoring factor of Jakarta, family history of the disease could not provide a significant relationship due to outside determinant. However, if it analyzed with outside variable factors, the family history might affect the Cardiovascular score in Jakarta. Family history of disease is a non-modifiable risk factor for coronary artery disease, which means that it can directly affect the stratification of cardiovascular risk.

5. Conclusions
The level of risk stratification for CHD was higher in the main office workers than in the site office workers, regardless of the criteria used for BMI.

References
[1] Assadi S N 2013 Cardiovascular Disorders Risk Factors in Different Industries of Iran. *Int. J. Prev. Med.* 4 728–733.
[2] Chomistek A K *et al* 2013 The Relationship of Sedentary Behavior and Physical Activity to Incident Cardiovascular Disease: Results from the Women’s Health Initiative. *J. Am. Coll. Cardiol.* 61 2346–2354.
[3] Owen N, Healy G N, Matthews C E and Dunstan D W 2010 Too Much Sitting: The Population-Health Science of Sedentary Behavior. *Exerc. Sport Sci. Rev.* 38 105–113.
[4] Grundy S M, Pasternak R, Greenland P, Smith S and Fuster V 1999 Assessment of Cardiovascular Risk by Use of Multiple-Risk-Factor Assessment Equations. *Circulation* 100 1481–1492.
[5] The influence of stop smoking, combine with sport and or physical activity on survival of the population at Jakarta: a cohort - 77. (n.d.). Retrieved September 10, 2016, from http://mji.ui.ac.id/journal/index.php/mji/article/viewFile/78/77
[6] infodatin-jantung.pdf. (n.d.). Retrieved October 19, 2016, from http://www.depkes.go.id/resources/download/pusdatin/infodatin/infodatin-jantung.pdf
[7] Indonesian Ministry of Health 2013 Pokok-Pokok Hasil Riset Kesehatan Dasar Provinsi Riau. Retrieved from http://www.pusat2.litbang.depkes.go.id/pusat2_v1/wp-content/uploads/2015/02/Pokok-Pokok-Hasil-Riskesdas-Prov-Riau-.pdf