JOB CHARACTERISTICS RELATED STRESS AS A RISK FACTOR OF STROKE: A LITERATURE REVIEW

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ABSTRACT

Individuals may get the stress from everywhere which contact with them including the workplace. The aim of this study is to describe and update the empirical literature regarding job characteristic related stress as the risk factor of stroke both in woman and man workers. This review literature including studies published between 2009 until 2018. We searched by an electronic database including PUBMED, Web of Science and search engine Google scholar using several keywords related job stress. Analyzing data was used PCOT (Population, conclusion, outcome and time) for general questions and was assessed continuously in order to make better judgments about the value of each article. A literature search was performed nine studies from different countries. Many factors induced the job stress which correlated the risk factors of stroke. Eight studies reported high job strain had association with the risk factor of stroke which is psychological pressure, excessive work, sitting and inconsistency of work. In contrast, there are two studies had a negative association between job strain and risk factor of stroke. High demand and low job control were causes the high job strain in the worker population. The company have to focus on regular check-up of workers.

Keywords*: Job strain, Stroke, Risk factor*

ABSTRAK

Individu bisa mendapatkan stres dari mana-mana yang berhubungan dengan mereka termasuk tempat kerja. Tujuan dari penelitian ini adalah untuk mendeskripsikan dan memutakhirkan literatur empiris mengenai karakteristik pekerjaan terkait stres sebagai faktor risiko stroke baik pada pekerja perempuan maupun laki-laki. Literatur review ini termasuk studi yang dipublikasikan antara tahun 2009 hingga 2018. Kami mencari berdasarkan database elektronik termasuk PUBMED, Web of Science dan mesin pencari Google scholar menggunakan beberapa kata kunci terkait stres kerja. Analisis data menggunakan PCOT (Populasi, kesimpulan, hasil dan waktu) untuk pertanyaan umum dan dinilai terus menerus untuk membuat penilaian yang lebih baik tentang nilai setiap artikel. Pencarian literatur dilakukan sembilan studi dari berbagai negara. Banyak faktor yang menyebabkan stres kerja yang berhubungan dengan faktor risiko stroke. Delapan penelitian melaporkan tingginya ketegangan kerja berhubungan dengan faktor risiko stroke yaitu tekanan psikologis, kerja berlebihan, duduk dan inkonsistensi kerja. Sebaliknya, ada dua penelitian yang memiliki hubungan negatif antara ketegangan kerja dan faktor risiko stroke. Permintaan yang tinggi dan kontrol pekerjaan yang rendah menjadi penyebab tingginya tekanan pekerjaan pada populasi pekerja. Perusahaan harus fokus pada pemeriksaan rutin terhadap pekerja.

Kata Kunci: *Strain Kerja, Stroke, Faktor Risiko*

INTRODUCTION

Stroke is the second most common cause of death in the worldwide (Lazzarino, Hamer, Stamatakis, & Steptoe, 2013; WHO, 2015). Many countries were kept struggling to prevent or to make better outcome among stroke patients. The government had been tried many ways to reduce the incidence of stroke. One of them is reducing the risk factors of stroke through heath education or promoting stroke in social media etc.

Generally, risk factors of stroke can be divided in modifiable risk factors such as age, gender, and non-modifiable risk factors such as high blood pressure, high body mass index, diet high sodium, smoking (O'Donnell et al., 2016). One of the risk factors which focused by researcher for several couple years ago was stress. Individual can get the stress from many ways which are such as family (Mc Cubbin & Sussman, 2014) , work place (Khamisa, Oldenburg, Peltzer, & Ilic, 2015; Useche, Cendales, Alonso Plá, & Serge, 2017), or in community (Roe et al., 2013) and many others. Lazarus (1966) Defined psychological stress as "particular relationship between the person and the environment that it appraised by the person as a taxing or exceeding his or her resources and endangering his or her wellbeing". When the people have stress, it may disturb the physiological functions of their body (Cooper & Marshall, 2013; Fagundes, Glaser, & Kiecolt-Glaser, 2013).

Research about Stress in occupational setting has been started in few decades (Hart, 1987; McFarlane & Bryant, 2007; Tennant, 2001). One of the factors is high job strain which mean low job control and high job demand (Chiang, Birtch, & Kwan, 2010; Hansen, Blangsted, Hansen, Søgaard, & Sjøgaard, 2010). Many investigations linked job strain or stress influenced the poor health outcome such as depression(Stansfeld, Shipley, Head, & Fuhrer, 2012), fatigue(DeTienne, Agle, Phillips, & Ingerson, 2012), sleep disturbance(Takaki et al., 2010), high body mass index(Smith, Fritschi, Reid, & Mustard, 2013), and cardiovascular disease(Puttonen, Härmä, & Hublin, 2010).

Several studies have been done to see the effect of perceived stress on the risk factors of stroke. A study from Gallo et al. (2004) shows the involuntary job loss can be a stressful live event of individual, it is strongly associated with following a risk factor of stroke. The same finding from Gallo et al. (2006) people with the career job loss tend to get the myocardial infraction and stroke after follow up until ten years. Furthermore, the people who may have high job strain and the little control of their work will have the greatest risk become ill such as cardiovascular disease and stroke (Kivimäki & Kawachi, 2015; Tsutsumi, Kayaba, & Ishikawa, 2011). A prospective study from Tsutsumi, Kayaba, Kario, and Ishikawa (2009) shows during 11 years follow up of 6553 Japanese female and male workers, there are 147 incidence of stroke (91 in men and 56 in woman) with the several kind of stroke such as ischemic stroke, intra-cerebral hemorrhage and subarachnoid hemorrhage. Because few studies had been publish and to support several evidences related to job stress. The present review aims to describe and update the empirical literature regarding the job characteristic related stress as risk factor of stroke both in woman and man workers.

METHOD

This study was conducted a literature research using the following databases: PUBMED, EMBASE and Web of Science and one search engine: Google scholar. The keywords included "job stress and risk factor of stroke", "occupational stress and risk factor of

stroke", "psychosocial stress and risk factor of stroke", "job strain and risk factor of stroke", and "work stress and risk factor of stroke" and other keywords related job characteristics. The inclusion criteria of this review are selected the cross-sectional study, prospective study, retrospective study and longitudinal study. Any articles were in English language about job stress and risk factor of stroke in worker population. The articles were excluded if addressing other disease. From reading the title and abstract of the articles and if the article is eligible with the inclusion criteria, the author will choose that. Analyzing data was used PCOT (Population, conclusion, outcome and time) for general questions and was assessed continuously in order to make better judgments about the value of each article.

RESULTS

The characteristic and results of the selected research study and literature review are listed in table 1. The literature review explored that some factor related job strain in worker population. All of the articles were found in different search engine. Four articles from Google scholar, three article from PUBMED, two articles from web of science. Those articles are related with job strain with different variables. The eleven articles are described more in the table 1.

Table 1 Summary of the articles

Tittle/Authors (year)	Objectives	Country	Participants	Study design	Tools	Findings
Longitudinal study of occupational noise exposure and joint effects with job strain and risk for coronary heart disease and stroke in Swedish men Eriksson et al. (2018)	To see whether the occupational noise will increase the risk factor of coronary heart disease and stroke and to explain the stressful working conditions based on job-demand control model.	Sweden	10.000 Swedish men who were born 1915-1925 lived in Gothenburg.	Prospective cohort study	1. To assess the occupational noise was used the Job exposure matrix (JEM). 2. To explore the psychosocial workplace exposure was used the psychosocial job exposure matrix (JEM)	There are positive findings of the association of occupational noise and high strain (high demand and low job control) on the high-risk factor of coronary heart disease but the negative association with the stroke which means occupational noise and high strain (high demand and low job control) did not contribute the risk factor

						of stroke.
The psychosocial work environment is associated with risk of stroke at working age. Jood et al. (2017)	To investigate the relationship between a first-ever stroke at working age and the psychosocial work environment.	Sweden	Case group is 198 patients age 30-60 who had been working full-time at the time their stroke and for control group is 396 healthy people	Case control study	1. To measure the psychosocial work environment was used the Swedish Demand-Control-support questionnaire (DCSQ) and effort reward imbalance (ERI) 2. To assess conflict at work was asked by the report occurrence in the last year of threat, violence, bullying by supervisor, harassment or bullying by colleagues, involvement in conflicts, or victimization at work place	High job strain has higher association with risk factor of stroke compare than effort reward imbalance and conflict at work.
A longitudinal general population-based study of job strain and risk for coronary heart disease and stroke in Swedish Torén et al. (2014)	To investigate whether psychosocial distress increase risk for coronary heart disease	Sweden	6070 Swedish men who was born between 1915 and 1925 without previous history of coronary heart disease and stroke at the baseline.	Longitudinal study	To assess the psychosocial workplace exposure was used Job exposure matrix (JEM)	High strain was associated with risk factor of coronary heart disease especially in smoker and blue collars. There were 549 events of stroke, however in total populations there were no increase risk

						factor of stroke.
Socioeconomic status inconsistency and risk of stroke among Japanese middle-aged women Honjo, Iso, Inoue, Sawada, and Tsugane (2014)	To investigate whether status inconsistency between levels of education as risk factor of stroke.	Japan	14742 middle-aged Japanese women included in the prospective Japan Public Health Center based (JPHC) Study Cohort I in 1990.	Prospective Cohort study	Level of education, occupational status and inconsistency was asked by short questions.	There is significant association level of education, occupational and risk factor of stroke. The women who are overqualified have a high risk of stroke compared qualified woman.
Sitting occupations are an independent risk factor for Ischemic stroke in North Indian population Kumar, Prasad, and Kathuria (2014)	To assess whether the sitting occupations are associated with the risk factor of stroke.	India	224 participant in case groups and 224 participant in control group.	Case control study	Demographic factors and occupational behavior questionnaire which include sedentary or sitting occupation and moderate physical work	There was significant correlation between sitting occupation and risk factor of stroke and also after adjustment of demographic factors.
Excessive work and risk of hemorrhagic stroke: a nationwide case-control study Kim et al. (2013b)	To investigated whether excessive working conditions would associated with increased risk of hemorrhagic stroke	Korea	940 hemorrhagic cases and 422 subarachnoid hemorrhagic cases. For controls is 1880 control	Case-control study	Demographic factors, regular working time, duration of strenuous activity during regular work and shift work, and type of occupational (white collars or blue collars) were assessed	1. There was association working conditions and risk factor of hemorrhagic stroke 2. Blue collars had higher hemorrhagic stroke incidence than white collars.

					by several questions.	3. Extend working time was also association with the risk factor of stroke. 4. Blue collars who have work 13 hours a day and strenuous activities ≥ 8 hours a week were significantly associated with the increase of risk factor of hemorrhagic stroke.
Perceived psychological pressure at work, social class, and risk of stroke Suadicani, Andersen, Holtermann, Mortensen, and Gyntelberg (2011)	To investigate association between perceived psychological work pressures, social economic status and risk factor of stroke.	Denmark	4943 middle age men without cardiovascular disease at 14 companies in Copenhagen.	Prospective study	All the variables including psychological pressure at work and leisure, physical fitness, physical activity in leisure time, lifestyle factors, and clinical and health related factors were assessed by several systematic questions.	Perceived regular work pressure are high prevalence in higher social men and also independent risk factor of stroke
Impact of occupational stress on stroke across occupational classes and gender.	To analyze the association between incidence stroke, occupational classes and stress and	Japan	A total 3190 male and 3363 female Japanese community-dwelling workers age 65 or under	Longitudinal study	1. Occupational stress was assessed Japanese version of the demand-control questionnaire from	Male workers with low occupational classes and high job strain were associated with risk factor of

Tsutsumi et al. (2011)	examine whether the association is found both men and women in a prospective study of Japanese female and male workers		with no cardiovascular disease history		WHO 2. Occupational classes was classified into white and blue collars and also manager and non-manager	stroke compared low job strain. However no significant was found in female
Socioeconomic position, psychosocial work environment and cerebrovascular disease among women: the Finnish public sector study Kivimäki et al. (2009)	To examine social economic positions, job demand and control and cerebrovascular disease among woman	Canada	52.465 woman in 10 city and about 21 hospitals	Cohort study design	1. Social economic position was classified into high, intermediate and low job 2. Conventional risk factors were assessed by several systematic questionnaire 3. Job demand and job controls were assessed by job demand questionnaire which arrange by authors	1. Low SEP woman are 2.28 times higher experience cerebrovascular disease than high SEP woman 2. Job demand and job control were not indicated as risk of cerebrovascular disease
Prospective study on occupational stress and risk of stroke Tsutsumi et al. (2009)	To estimate the risk of stroke onset associated with job strain in a Japanese working population.	Japan	6553 Japanese male and female workers	Prospective study	Occupational stress was assessed by Japanese version of job-demand control questionnaire from WHO (WHO-MONICA)	2-fold increase risk factor of stroke with those worker who have high job strain compare low job strain worker's

DISCUSSION

There are many factors caused stress in the work place. The factors resulted high job strain which lead stress and effect in worker's well-being.

Type of job

Type of job can be defined as blue and white collars. Low job strain is more likely happened in white collars than blue collars and increased risk factor of stroke (Tsutsumi et al., 2009) and they tend to be hemorrhagic stroke (Kim et al., 2013b). Luckhaupt and Calvert (2014) found that white collars are more likely have risk of stroke or coronary heart disease such as "administrative and Support and Waste Management and Remediation Services and Accommodation and Food Service" because high job insecurity, shift working, more likely to smoke. However, workers in educational service are less incidence of stroke. Similarly, Tsutsumi et al. (2011) found that higher incidence of stroke in men with high job strain among blue collars in managerial position but not in white collars in non-managerial position. On the contrary, the woman workers are significant increase in white collars with and managerial work.

Low social economic position

Based on research that low social economic status (manual, such as cleaners and maintain workers) is one of the risk factors cerebrovascular accident. The rate of cerebrovascular disease events was 7.4 per 10.000 woman per year (Kivimäki et al., 2009). Therefore, low social economic is the serious problem for society especially people who low educational and income. It is not only affect in developing cerebrovascular disease but also after acute phase, it can be more fatal (Lindmark et al., 2014). Moreover, Low social economic status has a tendency with inconsistency in environmental work and tends to be risk factor of stroke. Inconsistency can be workers with low educational status with higher occupational status have relation with the health problems (Braig et al., 2011).

Duration of work

Duration of work within blue collars and white collars it maybe same or different but excessive work definitely experienced for excessive work (Kim et al., 2013a). Long working hours as potential risk factor of disturbance of health status in working population (Johnson & Lipscomb, 2006) including stroke (Kim et al., 2013a). Song et al. (2014) explain that there are 19.7% workers with 52-60 hours a week, 10.9% workers with more than 60 hours per week. The more workers have long working hours the more them to have poor self-health. Moreover this problems can be emerged by poor life style such consuming alcohol, poor sleep quality(Virtanen et al., 2009), or smoking event thought in white collars (Schluter, Turner, & Benefer, 2012) (Nakashima et al., 2011) or blue collars (Åkerstedt, Fredlund, Gillberg, & Jansson, 2002; Dorrian, Baulk, & Dawson, 2011).

Job environment

Eriksson et al. (2018) reported that noise exposure did not associate with the risk factor of stroke. Similarly with Contrary with other findings that explained exposure of noise in Japanese male workers as a risk factor of stroke (Fujino, Iso, Tamakoshi, & group, 2007) but did not increase the risk factor of cerebrovascular disease. Even though limited study was done about noise exposure and risk factor of stroke. The possible causes of that is noise exposure >80 DB noise level induce systolic and diastolic elevation.

Job activity

Different works have different activity and were lead different effect in worker's well-being. This review, there is one paper about sitting during work.

Kumar et al. (2014) found that there is significant correlation between sitting occupations and risk factor of stroke. After adjust demographic factor, only large vessel stroke has correlation of with risk factor of stroke, none of other like small vessel stroke and ischemic stroke. A Meta-analysis from Van Uffelen et al. (2010) explain five paper explained sitting occupation are related with the obesity because of less physical activity and their work. Additionally, eight paper explained sitting occupations are related the cardiovascular disease. Both of them can be a risk factor of stroke. Standing/walking occupation can be more prevent all the risk of illness (Stamatakis et al., 2013).

Relevance of the clinical practice

Nursing area is not limited just in hospital but the community services including workers population. Occupational health services provided at the workplace to address the health care needs of working populations have been identified as an important component of the public health strategy. These services can also make a significant contribution to other government initiatives, such as; reducing health inequalities, reducing social exclusion and sickness absence, and by protecting and promoting the health of the working population (WHO, 2019).

To prevent all cause of disease including stroke in worker population. Give them the health promotion or routine screening is the way to minimize the risk factor of stroke in occupational setting. WHO (2019) explained "Occupational health nurses, working independently or as part of a larger multi-professional team, and at the frontline in helping to protect and promote the health of working populations". Through this review, it can be added the knowledge of health workers to improve their awareness for occupational health and for the worker population, need to more keeping their health while working.

CONCLUSION

Stroke disease is caused by blood vessel disorder in the brain including blockage and bleeding and is the second most common cause of worldwide (Lazzarino et al., 2013; WHO, 2015). There are many risk factors of stroke. One of them is stress. Stresses have more causes including job. Jon strain is the most recent cause of stress in workplace. It can be caused by long working hours, environmental noise, low social economic position, or type of job. Unfortunately in middle-low income countries, health care providers did not really take much attention of occupational health. This review suggests that nurses and other occupational health can be more attractive to catch this issue. Improve the capability in occupational health and collaborate with the government and corporations to do the management for rules of work-related health so that can prevent all risk of disease.

Conflict of interest

The authors declare there are no conflicts of interest

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