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Original Article

A SYSTEMATIC REVIEW: RISK FACTOR FOR BURNOUT-INDUCED HYPERTENSION AMONG WORKERS

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ABSTRACT

Background: Burnout could be described as a state of physical and psychological exhaustion resulting from demands or pressure at the workplace that caused individual to experience prolonged stress.

Methods: This study conducted a systematic review on the risk factors of burnout related to hypertension in the workplace.

Results: Based on the analysis of five articles, it was found that chronic work stress could indicate that chronic work stress increased the risk of metabolic syndrome (OR 2.25), there was no significant relationship between fatigue and hypertension (OR 0.62), moderate (OR 19.72) and severe stress (OR 32.55) increases the risk of hypertension, and fatigue increases the risk of heart attack (RR 2.13).

Conclusions: Burnout could increase the risk of hypertension among workers. It is important for employees and companies to pay attention to signs of fatigue and take appropriate preventive actions to maintain their hearts healthy.

Keywords: *Burnout; Risk Factor; Hypertension; Working; Work-related Burnout*

INTRODUCTION

Burnout was a topic of growing discussion, where severe fatigue was experienced by individuals as a result of excessive and prolonged stress [1]. In addition, there are 3 main dimensions of this response, namely emotional, physical, and mental exhaustion [2]. Other notable examples ware burnout trigger factors such as lifestyle, the influence of technological advances, social factors, and increased workload factors, as well as frequent overtime at work [3]. The present workplace was not just for work but could be a major factor in the health problems of every individual [4].

Workplace stress was increasing concern in occupational health, particularly due to its association with the development of chronic disease. As productivity exposed to psychological pressure that could lead to burnout. If left unaddressed, burnout could trigger long-term physiological consequences. Therefore, the researcher conducted a review of this issue to identify whether burnout contributed significantly to health risks such as hypertension, which was a crucial step in designing effective workplace health interventions. Stressful working conditions could lead to prolonged stress, which in turn could trigger chronic diseases such as hypertension [5].

Even though hypertension was recognized as one of the most significant risk factors associated with cardiovascular morbidity and mortality [6]. Hypertension belonged to the group non-communicable diseases [7]. It was also a leading cause of premature death, with an estimated 1.28 billion adults aged 30 to 79 years having hypertension, and about 46% of these adults were unaware that they hypertension [8]. The present review article focuses on the risk factors for hypertension and burnout among workers.

The term 'Burnout' his review study includes burnout from all emotional, physical, and mental fatigue. This review article allows researchers to observe individuals, but the study usually has a long period of time considering the risk factors that affect it [9,10].

METHODS

a. Literature Search

This is a review article started from October 2024 to January 2025 using a review system with the PICO method and PRISMA flow chart. Databases were

retrieved through PubMed, Semantic, ScienceDirect. The keywords are burnout and hypertension or burnout and high blood pressure, and odds ratio, or relative risk, and case control, or cohort.

b. Inclusion and Exclusion Criteria

The presents selection of this review article, there are inclusion criteria set by the researcher, namely: 1) Articles accessed from PubMed, Semantic, and ScienceDirect databases; 2) Articles are in accordance with the title of the topic being reviewed; 3) Articles use English and Indonesian; 4) Not from literature reviews and systematic reviews; 5) Using case-control and cohort designs; 6) Articles present data that have relative risks or odds ratios; 7) Discuss the risk factors for hypertension in burnout. The risk factors of hypertension in burnout. Exclusion criteria were set in this study, namely; articles with unclear credibility, studies conducted in pediatric populations. This approach is the selection of journal articles used in the review system only high quality articles, so that it can be a research study material or as a reference for further research.

c. Quality Assessment

In investigating the results, 1,341 journal articles were obtained, starting with duplication, abstract selection, and all articles that met the inclusion and exclusion criteria. There were 30 eligible journal articles that met the inclusion criteria. At this stage, the same articles were screened for deletion and there was no relative risk (RR) or odds ratio (OR) data.

d. Data Extraction

In addition, the procedures carried out in the process of collecting journal articles related to this review article are described Gambar 1. Based on what is described in the inclusion and exclusion criteria as a reference for the systematic review process, which includes names of authors, year of publication, location, sample size, measurement instruments, age, and adjustments.

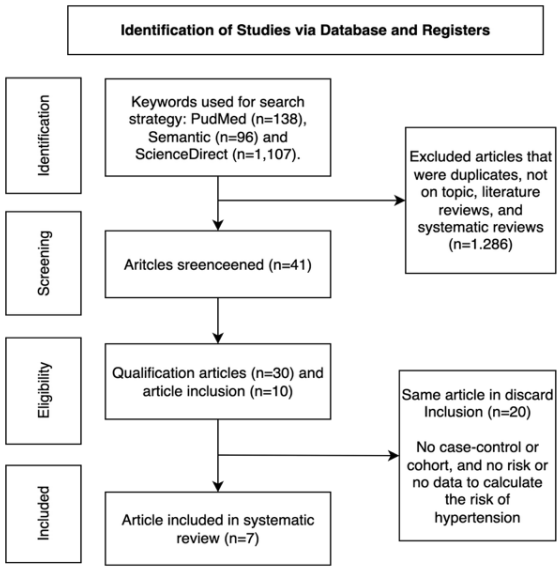

Figure 1. *Systematic review source selection flow*

RESULTS

Table 1. Primary studies in systematic reviews

Author, Country	Measuring	Design, Results	Population, Categories
(Apples, 1991), Netherlands	Maastricht	Cohort, RR 2.13	*n*=3.887, 39-65 year old, age smoking, and, cholesterol
(Chandola, 2008), London	Iso-Strain	Prospective cohort study, (Whitehall II study) RR 1.68, 95% CI 1.17-2.42	*n*=10.308, 35-55 year old, age, gender, occupation, job level, smoking, cholesterol, hypertension
(Wang, 2023), China	OSI-R, CBI, HCC, Sphygmomanometer	Cohort, RR 4.200, CI 95% 1.734 – 10.172	*n*=2.520, 37-53 year old, Demographics, age, physical characteristics, smoking and BMI
(Chandola, 2006), London	Iso-Strain	Prospective cohort study, OR 2.24, CI 95% I.31-3.85	*n*=10.308, age and job level
(Kitaoka-Hisashige, 2009), Japan	MBI-GS (Japanese-Version)	Cohort, OR 0.77, CI 95% 0.025-1.77	*n*=3.210, age, smoking and physical
(Arpin, 2015) Indonesia	IPAQ	Case control, OR 0.16, 95% CI 0.04-0.57	*n*=158, 15-74 year old, BMI, physical, comorbidity, obesity, stress levels, salt and fat consumption
(Appelbo, 2024), Sweden	PHQ-2, OLBI and SMBQ	Case control, OR 4.439 CI 95% 2.383-8.50, p<0.001	*n*=1.150, 45-46 year old, work, changes in job duties, psychological support

Based on Table 1, the results of several primary studies in systematic reviews had shown a consistent association between work-related stress factors, individual characteristics, and the risk of health disorders. Various cohort and case-control study designs had been conducted in several countries, as follows :

a. Objectives and Results of the Study

The results of the study indicated a correlation between increased work stress and the risk of

hypertension, mediated by changes in the activity and concentration of stress hormones. Psychological factors in the work environment also contributed to physiological responses that could chronically worsen blood pressure[11].

The investigating burnout and hypertension as an understanding of the ways in which stress can affect a person's physical health. This helps in finding solutions in problem solving and developing more effective patterns of prevention and management strategies to reduce the risk of hypertension [12]. In investigating the relationship is between occupational stress, and hypertensive disease, metabolic syndrome, which is often associated with the occurrence of heart disease [13].

In the review of this article the determinants of hypertension, impacting personal and public health strategies [14]. Even though, the increased risk of developing certain heart and diseases emphasizes the importance of addressing prolonged fatigue as a major issue in individual or community health [15]. Burnout is associated with certain physical health metrics, particularly those related to body composition and cholesterol levels, which are the risk factors for arteriosclerotic and hypertension disease [12].

Other notable examples are Impact of occupational stress on the development of metabolic and on-site psychosocial stress [13]. In the review article, the provided valuable insights into risk factor, protective factors associated with hypertension, as well as the need for a targeted intervention in the population studied [14].

The presents to determine whether the high levels of burnout experienced by healthcare workers during the first wave of the COVID-19 pandemic were associated with high levels of fatigue and depressive symptoms that persisted one year later [16]. In addition, the study also wanted to evaluate whether participation, psychological support was associated with reduced levels of burnout and depressive over time [16].

Early in the pandemic, one in five healthcare workers reported high fatigue. The group of cases that experienced these symptoms tended to continue to experience fatigue, depression at all follow-up points. Participation in psychological support did not correlate with a reduction in these symptoms [16]. This suggests a strong relationship between initial fatigue levels and symptoms and, indicating persistent fatigue and depression among the healthcare workers [16]. Current psychological support measures need re-evaluated [16].

b. Characteristic of Article in Sample

The investigated in there were 442 male respondents in Japan under the age of 55. The participants included top managers, middle managers, and general employees [12]. The final follow-up included 383 participants, 86.7% of whom had a mean age of 48.3 years with SD 4.6, while the mean age in the burnout group was 47.3 years with SD 4.8. This was not comparable between the two groups [12].

The investigated in another study involved 158 participants into two groups, 79 cases and 79 controls, maintaining a 1:1 ratio for the case-control study design. Cases and controls were matched based on comparable age distribution between the two groups, helping to control for age as a and confounding variable [14]. Other notable is study selected 2,520 employees in Xinjiang. There was an exclusion of 403 patients with hypertension and coronary heart disease, 2.116 [14]. The event thought in during follow-up, 332 people were lost out of 1.784 participants (830 males, 954 females) with a mean age of 37.77 years (SD 7.53) [14]. The percentage of males in the cohort was 46.52% [11].

The review article for considered age, gender, history of hypertension, coronary heart disease, stroke, diabetes, family history of cancer, level of physical exercise, alcohol consumption, smoking, and BMI [11]. At baseline, 423 subjects were randomly selected for hair sample collection to measure stress hormone concentrations from Eligibility was having hair longer than three cm, not being hypertensive, and not having hair that was permed, colored, shampooed frequently [11]. They participants underwent and occupational stress questionnaire and occupational health examination from 2016 to 2017 [11].

In article review this, the respondents included 10,308 Londoners aged 35-55 years in phase 1 (1.985-88). Participants came from 20 civil service departments [17]. Occupational stress was assessed in phases 1 and 2, with working age in different age groups, especially those under 50 years old [17]. Health behaviors and biological risk factors such as physical activity, diet, smoking, alcohol, consume consumption, and metabolic syndrome [17]. The study followed participants over several phases and clinical examinations [17]. In addition, the risk factors for burnout, such as being a nurse, working on the frontline, and changing work tasks, were more common in the case group [17]. This group was also more likely to seek help for mental health issues, suggesting a more vulnerable population [16].

c. Measurement of study

In this research article review, workers' baseline blood pressure was measured to assess hypertension using systolic and diastolic blood pressure gauges, and the instrument used was the occupational stress inventory (OSI-R), which aims to assess changes in occupational stress associated with fatigue [11].

It is reported that employees with chronic job stress are more than twice as likely to have metabolic

syndrome compared to those without job stress [13]. The odds ratio, adjusted for age and employment level, was 2.25 with a 95% confidence interval of 1.31 to 3.85 [13]. This suggests a significant association between chronic work stress and the risk of metabolic syndrome such as hypertension [13].

The developing hypertension defined as blood pressure 140/90 mmHg in the fatigue group compared to the healthy group was (OR) 0.62 with a 95% confidence interval of 0.23 to 1.66 and a p value of 0.34. After adjustment for additional factors, the odds ratio is 0.77 with a 95% confidence interval of 0.025 to 1.77 and a p value of 0.4 [12]. In article review this showed no statistically significant association of fatigue with the development of hypertension in this study [12].

The confidence interval included 1, and the p-value was greater than 0.05, indicating that the results not statistically significant [14]. Individuals experiencing moderate stress had a ratio of 19.72; those experiencing severe stress had a ratio of 32.55, indicating a strong association between stress levels and significant risk factors for hypertension [14].

Investigated using the question "Have you ever experienced fatigue?" were included in the study [15]. The study included 3,877 men aged 39 to 65 years who were followed up for 4.2 years. Of the men who were free of coronary heart disease (CHD) at the start of the study, 59. subjects had fatal or non-fatal heart attacks during the follow-up period [15]. The results had a higher risk of heart attack in the variables of age, smoking, and cholesterol, with a relative risk of 2.13; p<0.01 [15].

DISCUSSION

Burnout was a become global phenomenon that emerged as a result of prolonged stress and was no longer limited to specific professions [18]. This condition often began with high job demands, low control over stress management, and a lock of social support, which gradually could trigger emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment [19].

Higher levels of stress in workers are associated with poorer are mental status and hypertension [20]. Mortality from hypertension has increased very sharply with age, and most deaths occur in older adults [21]. Few are aware of the presence of hypertension in the individual and most of the treated participants are not well managed [22]. Especially low social support is associated with the syndrome dimension among workers [23].

Even though the work environments with busy schedules and high demands, as well as the need to prove worthiness, cause workers to become emotionally drained, cynical about work, and have a low sense of personal accomplishment [24]. The pressure continues after the workday ends as new technologies, mobile devices, and lack of boundaries prevent the necessary disconnection and recovery [24]. requires a large allocation of resources [25].

The present it comes to experiencing stress [26]. This article review found their burnout prevalence to be about 20.57% with AOR = 17.59, 95% CI: 11.7-26.4 and compared to those who did not experience burnout, while in this article, exposing the work group at night was associated with the incidence of burnout at OR = 1.86; 95% CI: 1,33-2,61; p<0,001 [27]. The results of the investigation that scheduled workloads a can significantly exacerbate fatigue conditions, which impacts the quality of care provided [28]. These are variables that are highly correlated with increased work-related burnout [29]. The article review is Emerging research on the impact of stress on health is becoming increasingly significant [30]. Recognizing the patterns that lead to susceptibility to stress-related diseases is critical, but finding pathways to resilience should be our top priority [31].

There is no relationship if it has high support from outside like the one in this article [32]. In this review article, there is no relationship linking gender roles in the workplace with mental health and allostatic load [33]. Although burnout is on the rise, there is currently no standard for its assessment [34]. At the very least, there is follow-up from the supervisor in dealing with all of this [35]. Bosses will be involved in the psychological protection of their employees or subordinates [36].

In addition, high job a demand, low control, inadequate support and indicators of stress. Uncontrollable demands can lead to tension in the workplace [37]. Increased blood pressure and pulse rate during and after working hours among female hotel room cleaners [38]. Team workers are more likely to experience negative work-related factors, adopt unhealthy habits and lifestyles, and exhibit changes in blood pressure during sleep [39]. Interestingly, they had jobs that stressed themselves out, leading to prolonged burnout at work [40].

In this investigation, there is an association between fatigue and the occurrence of hypertension in workers based on the variables studied [12]. In the article review, according to the results obtained in high stress working conditions, there is a high risk, with an odds ratio of 0.75 and a 95% confidence interval between 0.63-0.89, to experience hypertension [41]. Even is a though eliminating or reducing high demands on workers can overcome the problem of burnout in workers and can restore personal conditions to prevent negative health consequences due to chronic work stress [42].

Future developments in [43]. In addition, lifestyle factors such as smoking and obesity among workers are highly prevalent among young adults and individuals who drink alcohol are at high risk for hypertension [44]. In article review, they on focus on how reducing fatigue levels through mental health services or social support can effectively reduce the prevalence of suicidal ideation or behavior among working adults [45]. It is important that health workers are consider

interventions that reduce distress and assist in stress management [46].

Conduct a joint evaluation between the ranks [47]. The is actively engaging in self-preparation, coaching, and outreach to workers [48]. Involving employees and their families is critical to the success of this program [49]. This is possible and has tremendous potential to significantly minimize the likelihood of fatigue, especially in the case of heavy workloads [50].

Limitations

This article review has limitations during the process, including the following; 1) Burnout or depression have similar symptoms such as fatigue, loss of energy, and depressed mood, so many related studies relate to mental health or psychological cases; 2) This study takes a long time to determine the cause and effect, as well as the risk factors, so there are not many articles found that discuss how burnout can affect the occurrence of hypertension in the workplace using a cohort research design with relative risk (OR); 3) This study only took English and Indonesian articles, which may affect the presence of missed studies; 4) There are some articles that can only be accessed using a collaboration account.

CONCLUSIONS

A systematic review of the selected articles emphasized the importance of addressing the barriers of burnout, which is often caused by prolonged stress. This includes three main aspects: emotional, physical, and psychological. Factors such as lifestyle, technological advancements, social influences, and increased workload often trigger this burnout. Stressful working conditions can lead to prolonged stress, which contributes to chronic diseases. Such as hypertensive disease is a major risk factor in hypertension morbidity and mortality of approximately 1.28 billion adults worldwide. There is a need for a comprehensive and holistic approach to address burnout and occupational stress to reduce the risk of non-communicable diseases such as hypertension.

By implementing strategies that include emotional, physical, and psychological well-being. The workplace or organization can create a healthier work environment, reduce the incidence of burnout that results in prolonged stress and ultimately leads to complications in individual health, and at the same time, be in accordance with the goals of health programs in reducing the prevalence of hypertension in the world. Finally, advocate for a transformation in the way we view and manage stress in the workplace to promote a healthier workforce and improve overall public health outcomes.

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