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REVIEW AND IDENTIFICATION OF WORKPLACE HAZARD THAT INCREASE THE RISK OF PREECLAMPSIA IN FEMALE WORKER AT INDUSTRIAL AREA

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Abstract

Female worker are exposed to a range of risks that can result in diverse health issues. These hazards can be internal and external factor. Workplace risks have been recognized as potential variables that increase the risk of preeclampsia. The aim of this research was to review the article and identify risk factors in the workplace that can increase the risk of preeclampsia. This review was conducted in compliance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). A comprehensive literature search was conducted utilizing databases such as Medline, EMBASE, Web of Science, Pubmed, SagePub, Sciencedirect, etc. In data extraction, we excluded articles published outside of 1998 to 2024; as many as 6798 articles were identified—and as many as 6509 articles after excluding duplicate articles. After screening as Figure 1 the remaining 7 articles. Work-related stress, high physical activity and long working hours perweek, hypertension, vibration and repetitive work have importan role to develop or increase risk of preeclampsia in female worker.

Keywords: Workplace Hazard, Preeclampsia, Female Worker, Industrial Area.

INTRODUCTION

Female worker are exposed to a range of risks that can result in diverse health issues. These hazards can be internal and external factor. Workplace risks have been recognized as potential variables that increase the risk of preeclampsia, a major cause of health problems for both mothers and babies during pregnancy and childbirth. Multiple studies have investigated the link between work-related exposures and the occurrence of preeclampsia during pregnancy (Rahman, 2020). Preeclampsia is a multi-factor disease that may be at risk in female working mothers. Various factors in the workplace can be modified or regulated to reduce the risk of preeclampsia in female mothers. The aim of this research is to review the article and identify risk factors in the workplace that can increase the risk of preeclampsia.

METHODS

This review was conducted in compliance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) standards. A comprehensive literature

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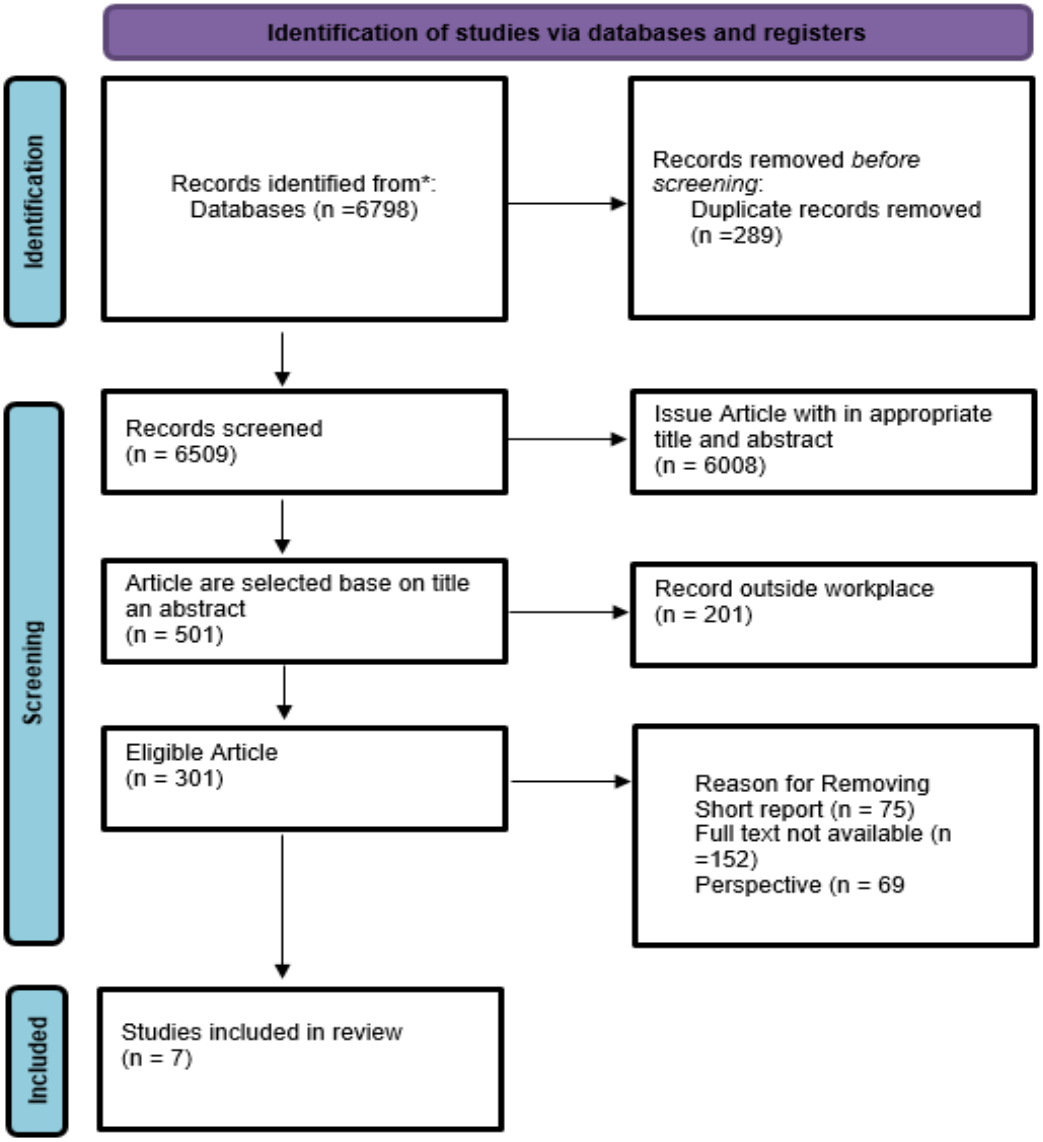
search was conducted utilizing databases such as Medline, EMBASE, Web of Science, Pubmed, SagePub, Sciencedirect, etc. The search was restricted to publications published in the English language. The following abbreviated search phrases were utilized with different permutations: Preeclampsia is a condition that can affect pregnant women who are exposed to occupational hazards such as stress, high physical activity, long working hours per week, hypertension, vibration, and repetitive work. All papers that had the potential to meet the eligibility criteria were included for additional evaluation. One author initially scanned these studies, and their findings were then verified by another author. In data extraction, we excluded articles published outside of 1998 to 2024; as many as 6798 articles were identified—and as many as 6509 articles after excluding duplicate articles. After screening as Figure 1 the remaining 7 articles



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RESULT

Work, in general, does not increase the risks of pregnancy complications. Generally, engaging in work does not heighten the likelihood of experiencing difficulties during pregnancy. Pregnancy can be negatively impacted by work that is physically, psychologically, or both, stressful. High levels of work-related stress are associated with an elevated likelihood of experiencing miscarriage, preterm labor, preterm birth, low birth weight, and preeclampsia (Katz, 2012). The higher the stress level of working women, the greater the risk they face in experiencing health problems, including preeclampsia.

Spinillo reported a statistically significant linear correlation between the level of physical activity at work and the risk of preeclampsia ($p = 0.002$). Furthermore, engaging in intense physical activity at work was linked to a twofold rise in the likelihood of severe preeclampsia when compared to mild exercise (odds ratio 2.08, 95% confidence interval 1.11, 3.88). Evidence suggests that engaging in moderate to high levels of physical exercise at work is associated with an elevated risk of severe preeclampsia.

Women who experienced high job strain had a greater likelihood of developing preeclampsia compared to women who experienced moderate job strain, with an adjusted odds ratio of 2.1 and a 95% confidence interval ranging from 1.1 to 4.1. The probability of experiencing similar outcomes was shown to be comparable for women who were exposed to a full-time, high strain job (working 35 hours or more per week) with an adjusted odds ratio (aOR) of 2.0, compared to those in a part-time, high strain job with an aOR of 1.8. The study found that those with high job strain had a modestly increased chance of developing gestational hypertension (adjusted odds ratio [aOR] = 1.3; 95% confidence interval [CI] = 0.8-2.2). These findings suggest that women who experience high levels of job strain have an increased likelihood of developing preeclampsia and, to a lesser degree, gestational hypertension (Marcoux, 1999).

The combination of high psychosocial stress and persistent hypertension might significantly raise the risk of preeclampsia by up to 20 times. This discovery emphasizes the significance of initiatives aimed at preventing, screening, and managing chronic hypertension, as well as reducing psychosocial stress, especially among women with chronic hypertension (Yu, 2013). The study found that lifetime stress (odds ratio [OR], 2.1; 95% confidence interval [CI], 1.6-2.9), perceived stress during pregnancy (OR, 1.7; 95% CI, 1.3-2.2), and chronic hypertension (OR, 10.4; 95% CI, 7.5-14.4) were all linked to a higher likelihood of developing preeclampsia. The combined impact of perceived stress during pregnancy and chronic hypertension on the development of preeclampsia was highly comparable to the combined impact of lifetime stress and chronic hypertension on preeclampsia.

A study conducted by Zhang (2013) found that mental stress was linked to a higher likelihood of developing gestational hypertension (odds ratio [OR], 1.26; 95% confidence interval [CI], 1.00–1.59; $P = 0.047$) and preeclampsia (OR, 1.49; 95% CI, 1.27–1.74; $P < 0.001$). Additionally, the study found that work stress (odds ratio [OR] = 1.50; 95% confidence interval [CI] = 1.15–1.97; $p = 0.003$) and anxiety or depression (OR = 1.88;

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95% CI = 1.08–3.25; p = 0.02) were positively correlated with an increased risk of preeclampsia.

Martiana et al. (2021) reported that pregnancy issues are linked to risk factors such as vibrations (P=0.004), irritants (P=0.002), and repetitive tasks (P=0.009). The findings indicated a significant association between pregnancy problems and maternal education (p= 0.05), work shift (p= 0.036), and vibration (p= 0.009). The health of mothers and children is impacted by both internal factors, such as education level, and external factors, including work shifts and environmental risks like dust and vibration in the workplace. Industrial management should implement health education programs to mitigate the hazards associated with pregnancy disorders.

Banerjee (2009) states that female workers may differ from males in their susceptibility to workplace hazards, particularly during pregnancy. They may have reduced coping abilities while pregnant and may be less fit for certain tasks compared to males. Some risk factors in the work environment include heavy lifting, shift work and inconvenient working hours, lengthy working hours, work exposure, and environmental exposure such as temperature, noise, and vibration.

DISCUSSION

Stress

There is a correlation between work-related stress and a higher likelihood of developing preeclampsia, a dangerous illness marked by elevated blood pressure in pregnant women. A study revealed a significant correlation between women who were employed during pregnancy and a nearly fivefold increase in the likelihood of developing preeclampsia, in comparison to their non-working counterparts. Even after accounting for common risk factors including age, smoking, and weight, researchers still identified a higher risk. The study revealed that women employed in the health and social work sector exhibited a greater susceptibility to preeclampsia in comparison to women working in alternative industries. These studies indicate that work-related stress, especially in physically demanding or high-stress employment, may be a factor in raising the likelihood of developing preeclampsia (Yu, 2013).

Job-related stress plays a key role in the development of preeclampsia through multiple mechanisms: Hypertension, Physical Exertion, Mental Strain, Work-related Hazards, Interplay with Additional Risk Factors Jeong (2023), Spadarella (2021), and Yu (2023).

1. Pregnant women exposed to stressful work conditions may experience elevated blood pressure levels. Preeclampsia is characterized by elevated blood pressure and can lead to significant difficulties for both the mother and the fetus.
2. Jobs that require physical exertion, such as moving heavy objects or standing for lengthy periods of time, can elevate the likelihood of developing preeclampsia. Engaging in these physical activities can result in elevated blood pressure and other physiological alterations that may potentially contribute to the onset of preeclampsia.

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3. Psychological stress arising from employment, such as job uncertainty, extended working hours, and demanding job requirements, can heighten the likelihood of developing preeclampsia. Challenging job conditions can result in long-term high blood pressure and other bodily alterations linked to preeclampsia.

High Physical Activity and Long Working Hours Perweek

Preeclampsia has been linked to a higher risk when individuals engage in intense physical activity and work long hours. According to Gasparin (2018), women who participated in intense physical activities like running or brisk walking had a 54% lower chance of developing preeclampsia compared to those who did not engage in such activities. Several research have indicated that engaging in high levels of physical exercise at work can elevate the likelihood of developing preeclampsia. For instance, women employed in physically demanding occupations had a greater likelihood of developing preeclampsia compared to those working in administrative and support roles.. Prolonged periods of work have been associated with a heightened likelihood of developing preeclampsia. According to Spadarella (2021), women who worked for extended periods of time, specifically 40 or more hours per week, were discovered to have an elevated likelihood of developing preeclampsia in comparison to those who worked fewer hours. In addition, extended periods of standing at work and occupational tasks that require significant physical exertion have been linked to a higher likelihood of developing preeclampsia (Kasawara, 2012). Engaging in moderate physical exercise can have a positive impact on reducing the likelihood of developing preeclampsia. However, participating in excessive levels of physical activity and working long hours can actually raise the chance of developing this condition.

Hypertension

Hypertension is a major factor in the development and advancement of preeclampsia, a disease that occurs during pregnancy and is characterized by the sudden onset of high blood pressure and the presence of protein in the urine after 20 weeks of gestation. Elevated blood pressure, whether persistent or occurring during pregnancy, heightens the likelihood of developing preeclampsia. Chronic hypertension, specifically, increases the likelihood of developing superimposed preeclampsia, a condition that affects around 17% to 25% of pregnancies in women with chronic hypertension (Seely, 2014).Women with a history of preeclampsia have a higher likelihood of developing hypertension and cardiovascular disease in the future. Preeclampsia in women with persistent hypertension is frequently characterized by heightened severity and can result in adverse birth outcomes, such as premature birth and cesarean delivery. Diagnosing preeclampsia in this particular group can be difficult because of the pre-existing high blood pressure and the possibility of proteinuria prior to pregnancy. Hypertension, whether it is chronic or gestational, greatly enhances the likelihood of developing preeclampsia and can result in enduring cardiovascular and renal consequences. The pathophysiology of preeclampsia is characterized by placental ischemia and extensive endothelial dysfunction, which are further aggravated by hypertension (Garovic, 2013; Palei, 2013).

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Vibration and Repetitive work

Pregnant women are at an increased risk of developing preeclampsia due to major occupational exposures such as vibrations and repetitive activities. Research has demonstrated that: There is a correlation between being exposed to vibrations in the job and an elevated likelihood of developing preeclampsia. A study revealed that vibrations were identified as a substantial risk factor for preeclampsia, displaying a statistically significant correlation (P = 0.004). Engaging in repetitive tasks, characterized by activities that are conducted in quick succession within a time frame of less than 30 seconds, might further heighten the likelihood of developing preeclampsia. Various pregnancy issues, such as preeclampsia, preterm labor, and low birth weight, have been linked to this particular sort of job (Rahman, 2020).

Vibration exposure during pregnancy increases the likelihood of developing preeclampsia due to many mechanisms: Exposure to whole-body vibrations (WBV) has been linked to alterations in uterine blood flow and hormone levels. These alterations can disturb the regular functioning of the placenta, resulting in preeclampsia. Exposure to certain factors can elevate blood pressure and vascular resistance, which are significant characteristics of preeclampsia. This exposure can also modify the blood flow in the uterine artery, which can contribute to the onset of preeclampsia (Daniel, 2021; Skröder, 2020).

CONCLUSION

Work-related stress, high physical activity and long working hours perweek, hypertension, vibration and repetitive work have importan role to develop or increase risk of preeclampsia in female worker. We suggest the indusry can prevent female worker from any hazardous condition at work.

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