

Prevalence and Associated Factors of Hypertension among Health Workers: A Systematic Review

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ABSTRACT

Background: There is an increasing burden of hypertension, which has devastating consequences as it is associated with premature death and cardiovascular disease. Hypertension affects people from different walks of life, including healthcare workers. However, the prevalence of hypertension and risk factors among healthcare workers remain poorly understood. This systematic review was therefore conducted to determine the prevalence of hypertension and its associated factors among healthcare workers.

Methods: PubMed/Medline, Science Direct, and Google Scholar databases were searched for relevant literature. The review included 21 studies published from 1990 to 2023 that provided information on the prevalence of hypertension and associated factors among healthcare workers. Titles and abstracts were used to review the retrieved studies and full texts were screened for eligibility.

Results: The prevalence of hypertension among healthcare workers ranges from 13% to 40%. Several factors have been found to be associated with hypertension among healthcare workers, including male gender, being married, increasing age, increasing BMI, smoking, and workplace stress.

Conclusion: Healthcare workers are at a high risk of hypertension and pre-hypertension and implementing workplace wellness programs and providing regular blood pressure monitoring education can significantly improve their overall health outcomes.

Keywords: Associated Factors, Hypertension, High Blood Pressure, Healthcare Workers, Prevalence.

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Crossref Doi: <https://doi.org/10.36437/irmhs.2024.7.1.A>

Introduction

Hypertension is on the rise in low- and middle-income countries, where most cases are now concentrated.^{1,2} Following decades of decline in high-income countries, hypertension is now significantly higher in low-income countries, particularly in Africa south of the Sahara, South Asia, and Central and Eastern Europe.¹⁻³ The increase in the burden of hypertension has devastating consequences, as it is a key risk factor for premature death and cardiovascular disease.²

Several risk factors for hypertension have been identified, including high sodium intake, low

potassium intake, obesity, alcohol consumption, physical inactivity, and an unhealthy diet.¹⁻³ Additionally, studies show that various work-related factors are associated with high blood pressure.^{4,5} In light of this, hypertension affects people of all ages and from various professional backgrounds.⁵⁻⁷ However, the impact of hypertension on health workers is particularly significant due to the demanding nature of their job and the added stress they face in their work environment. Health workers, including doctors, nurses, and pharmacists, often experience high levels of stress and long working hours, which can

contribute to the development and worsening of hypertension. Additionally, the potentially high patient load and the responsibility of making critical decisions can further worsen the condition. Differences in the prevalence of hypertension between various occupations are likely to be due to differences in risk factors such as lifestyle choices, physical inactivity, and obesity.²

The prevalence and associated factors of hypertension among health workers are important to study as they can have significant implications for their overall well-being and job performance. By understanding the prevalence, healthcare facilities can implement preventive measures and interventions to reduce the risk of hypertension among their staff. Additionally, identifying the associated factors can help healthcare professionals take the necessary steps to mitigate those factors and promote a healthier work environment.

Reviews are needed to provide a comprehensive understanding of the prevalence of hypertension and associated factors among healthcare workers, given the increasing burden of hypertension and increased exposure to work-related factors among healthcare workers. The research objectives were to determine the current prevalence rate of hypertension among healthcare staff and identify the specific risk factors contributing to hypertension in this population.

Methods and Materials

Search Strategy

A literature search on studies reporting the prevalence of hypertension and associated factors in health workers published from 1990 to 2023 was conducted. Databases such as Pub Med, Science Direct, Research Gate, and Google Scholar were used to retrieve the literature reviewed. The search terms were: 'prevalence' OR 'magnitude' AND 'hypertension' OR 'high blood pressure' AND 'Health workers' OR 'health providers' OR 'health professionals' OR 'nurses' OR 'doctors' OR 'pharmacists' OR 'physiotherapists' OR 'dentists' OR 'biomedical scientists' AND 'risk factors' OR 'associated factors' OR 'determinants' OR 'predisposing factors'. Reference lists, PloS one,

Springer Link, Semantic Scholar, and bibliographies were also searched for additional relevant publications.

Inclusion and Exclusion Criteria

The systematic review included cohort studies, case-control studies, and cross-sectional studies that self-reported the prevalence of hypertension among healthcare workers and its associated factors. Because translation of other languages was not possible, only studies in English were included. Case reports and case series were excluded because they are not representative of the general population. Studies for which full text was not available were also excluded. Further, narrative reviews and editorial and opinion pieces were excluded because they typically do not use original data and rigorous methodology. Studies published before 1990 were excluded to ensure the review reflected the most recent and relevant research. Communication with conferences was excluded due to some of the potential limitations of conference abstracts because they lack comprehensive details and rigorous methodology. Similarly, Op-ed articles were excluded from our review as they depend mostly on opinion-based narratives rather than adhering to the scientific and empirical evidence that is essential for inclusion in a systematic review.

Quality Assessment

The Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Cohort and Analytical Cross-sectional Studies.⁸ This is a comprehensive checklist that was developed by the JBI, a globally recognized leader in evidence-based healthcare. It provides a standardized framework for evaluating and reviewing the methodological quality of the study designs. Further, they develop and disseminate resources like the appraisal checklist we used, helping researchers and healthcare professionals critically evaluate the quality of research.

Methodological quality refers to the robustness and trustworthiness of a study's design and execution. The JBI checklist focuses mainly on the following key aspects of the research such as; study design and sampling, data collection and measurement, data analysis and reporting, potential biases, and confounding factors.

We ranked studies in terms of their methodological quality on the basis of the total number of 'yes' responses to questions in the JBI. All 21 studies that had a total score of 50% or more were considered quality studies and were included in the systematic review.

Data Extraction

Titles and abstracts of studies identified by the literature search were reviewed. A full reading of the text of the studies that were potentially relevant was done, in order to ascertain their compliance with the inclusion/exclusion criteria. Studies were selected by 8 researchers working separately; any doubts were settled by mutual agreement. A purpose-designed Excel data extraction sheet was used. The data extracted included Author(s), year of publication, study country, study design, sample size, the prevalence of hypertension, and risk factors for hypertension. It is important to note that the majority of the studies (17 out of 21, 81%) relied on self-reported data from participants to assess their hypertension status and associated factors.

Synthesizing of the Findings

The main objective was to estimate the prevalence of hypertension and its associated factors among healthcare workers. To achieve this objective, we conducted a qualitative synthesis of the extracted data from 21 high-quality studies published between 1990 and 2023. This approach allowed us to describe and compare findings across different studies, providing a broader understanding of the issue.

Identification of studies

The PRISMA flowchart for the selection of studies is shown in Figure 1. In total, 4007 articles were found through this search of the Pub Med, Science Direct, Research Gate, and Google Scholar databases and other sources. However, 3142 of these articles were removed through title and abstract review (Misleading titles and abstracts as they did not accurately reflect the content of the full article), while another 825 were removed due to duplicates (multiple copies of the same article in different databases), 10 were removed because they did not report hypertension prevalence or risk factors. As a result, 40 research papers were assessed for eligibility and a total of 21 studies were included in the review as shown in Figure 1.

Flow Chart

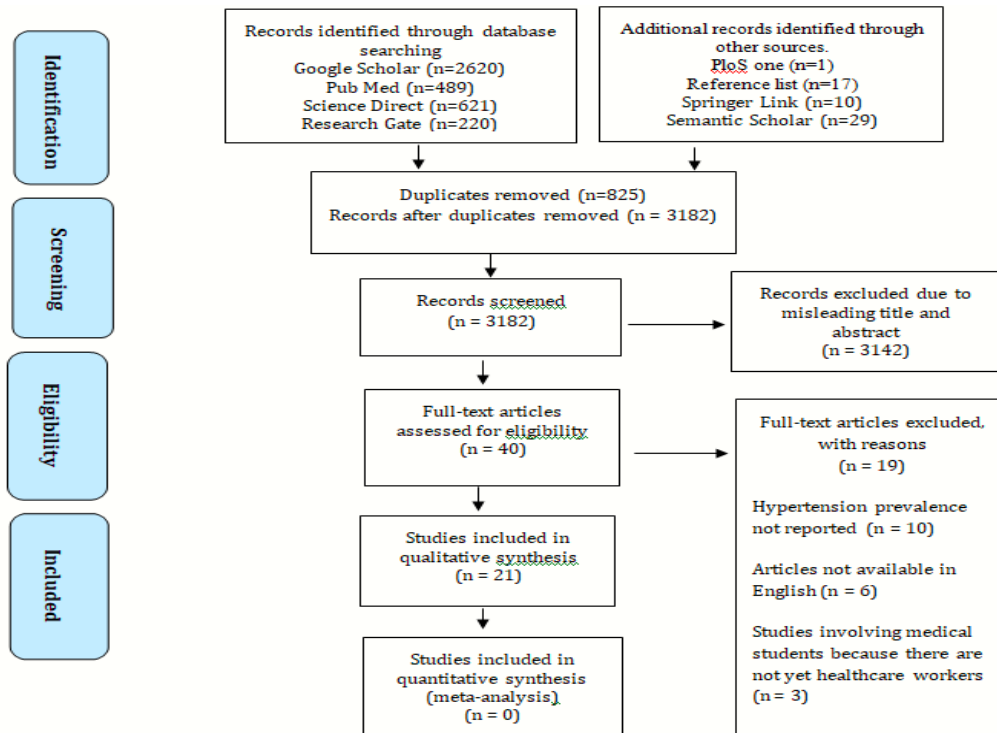


Figure 1: PRISMA flow-diagram for the selection of studies.

Characteristics of the studies

The review included 21 studies: 20 cross-sectional studies and one prospective cohort study. The studies included in the review were published between 1990 and 2023. There were 4 studies from Africa⁹⁻¹²; 12 Asia¹²⁻²³; 3 South America²⁴⁻²⁶; 1 North America²⁷ and 1 Australia.²⁹

The characteristics of studies included in the review are shown in Table 1. The characteristics include the name of the author, the title of the study, duration, and sample size. Other considerations were region, population characteristics, and study design.

Author(s)	Title	Duration	Sample Size	Region	Population characteristics	Study design
Monakali <i>et al.</i> , (2018) [9]	Prevalence, awareness, control and determinants of hypertension among primary health care professional nurses in Eastern Cape, South Africa	Feb to May of 2017.	203	Eastern Cape, South Africa	professional nurses, practicing in PHC clinics, aged 18 years and above	Cross-sectional survey
Obiebi <i>et al.</i> (2020) [10]	Prevalence and Correlates of Hypertension among Healthcare Professionals in Nigeria: Lessons from a Tertiary Hospital in South-South Nigeria	-	232	Nigeria	various cadres of health workers	Cross-sectional
Chinedu-Eleonu, Obasi and Nsonwu (2021) [11]	Association of Job Stress and Hypertension among Nurses in Imo State, Nigeria	-	388	Nigeria	nurses	Cross-sectional
Okoro, Edefe and Leader (2021) [12]	Determinants of Hypertension among Medical Practitioners in Bayelsa State: A Cross-Sectional Study	-	244	Nigeria	Medical Doctors	Cross-Sectional
Ghimire, Khadka and Anuwatnonthakate (2020) [13]	Prevalence And Factors Associated with Hypertension Among Health Workers of Central Hospitals in Nepal	-	422	Nepal	All the health workers aged ≥30 years	Cross-sectional
Sahebi, Vahidi and Mousavi (2010) [14]	Prevalence of Hypertension and Associated Variables in Hospital Staff in Iran	-	1027	Iran	staff of Shiraz hospitals	Cross-sectional study

Solymanzadeh <i>et al.</i> (2021) [15]	The relationship between rotating shift work and blood pressure among nurses working in hospitals of Abadan, Iran	Sept to Dec 2019	120	Iran	nurses	Cross-sectional
Zhao <i>et al.</i> (2019) [16]	Hypertension prevalence alteration in 92 815 nurses based on the new standard by 2017 ACC/AHA hypertension guideline: observational cross-sectional study from China	October 2016 to February 2017	93,603	China	nurses	Cross-sectional
Zhao <i>et al.</i> (2022) [17]	Prevalence of smoking among nurses and its association with blood pressure: A cross-sectional study in 11 cities of China.	-	128,009 nurses	China	nurses	Cross-sectional study
Thabit and Abdullah (2021) [18]	Prevalence of Hypertension Among Doctors and Risk Factors in Al-Thawra Hospital, Sanaa in 2019	Dec 2018 - Feb 2019	100	Yemen	Medical Doctors	Cross-Sectional
Ghosh <i>et al.</i> (2015) [19]	Prevalence of hypertension and pre-hypertension among doctors of different specialties in a tertiary-care teaching hospital in Eastern India and its correlation with body mass index -	-	162	India	Medical Doctors	Cross-Sectional
Shira, Das and Bhattacharjee (2020) [20]	Prevalence of Hypertension Among Resident Doctors of Clinical Departments in a Tertiary Care Hospital in North-Eastern Region of India	-	100	India	Medical Doctor	Cross-Sectional
Kumar <i>et al.</i> (2023) [21]	Assessment of Relationship Between Lifestyle Risk Factors and Hypertension in Doctors in a Medical College of Sri Ganganagar, Rajasthan	April - June 2022	195	India	Medical Doctor	Cross-Sectional

Sirinara, Hanprathet and Jiamjarasrangi, (2019) [22]	Prevalence of hypertension and associated factors among healthcare workers: A cross-sectional study	January 1, 2016 to December 31, 2016.	6,014	Thailand	6,014 healthcare workers	Cross-sectional
Hussain <i>et al.</i> (2016) [23]	Frequency of Hypertension among Doctors and Paramedics working in a Tertiary Care Hospital, Lahore	-	220	Pakistan	Medical Doctor and paramedics	Cross-Sectional
Aquino and Magalhães (2001)[24]	Hypertension in a female nursing staff--Pattern of occurrence, diagnosis and treatment.	-	494	Brazil	nurses	Cross-sectional
Oliveira and Nogueira (2010) [25]	Obesity as risk factor associated with hypertension among nursing professionals of a national philanthropy health institution.	-	147	São Paulo state, Brazil	nursing professionals	Cross-sectional
Portela <i>et al.</i> (2015) [26]	Self-reported hypertension and job strain in nursing personnel: Assessing two different formulations of the demand-control model	2005-2006	1,307	Rio de Janeiro, Brazil	female nursing workers	Cross-sectional study
Huang <i>et al.</i> (1998) [27]	Body Weight, Weight Change and Risk for Hypertension in Women	-	82,473	-	U.S. female nurses	Prospective
Gallagher <i>et al.</i> (2018) [28]	The health of working nurses: Hypertension prevalence, awareness, treatment and control by medication	-	5,041	-	nurses and midwives	Cross-sectional online survey
Merijanti <i>et al.</i> (2008) [29]	The role of night shift work on blood pressure among healthy female nurses	March to April 2007	152	Central Jakarta	152 healthy female nurses	Cross-sectional study

-: Data on that variable is not available.

Table 1: Characteristics of studies included in the review.

Results

Prevalence of Hypertension among Health Workers

The prevalence of hypertension among health workers using the threshold of 140/90 mmHg

varied across countries. Fifteen studies reported the prevalence of hypertension among health workers and the prevalence ranged from 8.6% among medical doctors in India²¹ and health workers in Iran¹⁴ to 52% among nurses in South

Africa.⁹ Three studies reported pre-hypertension in healthcare workers.¹⁹⁻²¹ The prevalence of pre-hypertension ranged from 36%²⁰ in a study from India to 60.5% in another study from India.¹⁹ (Table 2)

Associated Factors of Hypertension among Health Workers

Age: Twelve studies reported on the association between age and hypertension.^{2, 9,10,12,13,14,17,18,21,22,24,28} All of these 12 studies found that high blood pressure is associated with increasing age in healthcare workers. For example¹⁵ found that the age group 40-49 years (AOR: 3.11, 95% CI: 1.38-6.97) and the age group 50-59 years (AOR: 6.18, 95% CI: CI: 1.51-25.30) were associated with an increase in the risk of hypertension compared to the 30- to 39-year-old age group.

Body Mass Index: Eight studies reported the association between body mass index and hypertension and found that an increase in body mass index was associated with hypertension.^{9,10,18,19,21,22,24,27} Obesity has been found to be associated with an increased risk of hypertension among healthcare workers.^{9,10}

Substance Use: Two studies found that alcohol consumption among healthcare workers was associated with an increased risk of developing hypertension in healthcare workers compared to non-alcohol consumption.^{9,13} In addition, smoking was also associated with an increased risk of developing hypertension among healthcare workers.¹⁷⁻¹⁹

Sex: Only three of the 21 studies reviewed found an association between gender and high blood

pressure and the results of these studies showed that male gender was associated with an increased risk of developing high blood pressure in healthcare workers.^{12,17,21}

Stress: Moderate perceived stress (AOR:2.64, 95% CI:1.26-5.54) and high perceived stress (AOR:15.09, 95% CI:2.27-100.22) were associated with an increased risk of developing hypertension compared with low perceived stress.¹⁵ Another study by¹⁶ found a significantly strong positive correlation between high blood pressure and work stress (Wilks’s Lambda = 0.965, F = 13.85, p< 0.0001). In another study, it was reported that workplace stress was related to self-reported hypertension but was only statistically significant when workplace stress was assessed using the demand-control ratio.²⁶

Shift work: Two studies reported on the association between work shifts and hypertension.^{22,29} The study by²⁹ found that shift work affected systolic blood pressure but not diastolic blood pressure. Additionally, a study by²² found that healthcare workers who worked shifts were 23% more likely to have high blood pressure compared to healthcare workers who did not work shifts (aOR = 1.23; 95% CI: 1.03-1.48).

Marital status: Two of the studies reviewed reported that marriage was associated with an increased risk of developing high blood pressure among healthcare workers.^{13,18}

Years in practice: Two of the studies reviewed report that healthcare workers who have practiced for many years have an increased risk of hypertension compared to those with less professional experience.^{9,18}

Author	Pre hypertension	Prevalence	Associated Factors
Monakali et al. (2018) [9]	-	52%.	Age, alcohol use, parity, duration of practice, income and obesity

Obiebi et al. (2020) [10]	-	36.2%.	Being overweight/obese was associated with hypertension, OR 2.13 (CI 1.20 - 3.80), as were increasing age
Chinedu-Eleonu, Obasi and Nsonwu (2021) [11]	-	(36.1%).	A significant correlation was found between hypertension and job stress (Wilks's Lambda = 0.965, F = 13.85, p < 0.0001).
Okoro, Edafe and Leader (2021) [12]	-	Prevalence of 25%	Age was associated with hypertension (OR - 1.05;95%CI: 1.02 - 1.08).
Ghimire, Khadka and Anuwatnonthakate (2020) [13]	-	35.31% (95% CI: 30.70%-40.10%).	High blood pressure is associated with older age (40-49 years: AOR 3.11, 95% CI: 1.38-6.97; 50-59 years: AOR 6.18, 95% CI: 1.51-25.30), being married (AOR: 4.34, 95% CI: 1.85-15.90), consuming <5 servings of fruits and vegetables per day (AOR: 2.27, 95% CI: 1.06-4.88), low physical activity (AOR: 2.49, 95% CI: 1.12-5.14), alcohol consumption (AOR: 4.57, 95% CI: 2.11-9.92), and higher levels of perceived stress (moderate: AOR: 2.64, 95% CI: 1.26-5.54; high: AOR: 15.09, 95% CI: 2.27-100.22).
Sahebi, Vahidi and Mousavi (2010) [14]	37%	8.6%	Increasing age, to work in clerical group and job dissatisfaction
Solymanzadeh et al. (2021) [15]			Rotating shift work was significantly associated with hypertension, (OR: 1.76 [95%CI: 1.11-2.80])
Zhao et al (2019) [16]	-	28.96%	-
Zhao et al. (2022) [17]	-	*	Smoking was associated with higher diastolic and mean arterial pressure in both male and female nurses, but only with increased systolic BP in male nurses.
Thabit and Abdullah (2021) [18]		13(13%)	High blood pressure is linked to older age, a higher BMI, smoking, longer employment, and marriage.

Ghosh et al. (2015) [19]	98 (60.49%)	24 (14.82%)	High blood pressure had a positive correlation with age, BMI and was more common among smokers and those with a family history of hypertension.
Shira, Das and Bhattacharjee (2020) [20]	36%	13%	-
Kumar et al. (2023) [21]	44.10%	8.63%	Male sex, family composition, increasing BMI and age
Sirinara, Hanprathet and Jiamjarasrangi (2019) [22]	*	39.3%.	Age and BMI raise hypertension risk. Shift work increases odds by 23%. Poor sleep quality also raises risk.
Hussain et al. (2016) [23]	*	82 (37.3%)	High blood pressure was more common in men
Aquino and Magalhães (2001) [24]	*	36.4%.	Increasing age and increasing BMI
Oliveira and Nogueira (2010) [25]	*	11.6% had a SBP>140mmHg and 6.8% DBP>90mmHg	-
Portela et al. (2015) [26]	-	32%.	Self-reported hypertension and job strain.
Huang et al. (1998) [27]	-	*	BMI was linked with the occurrence of hypertension (P for trend 0.001).
Gallagher et al. (2018) [28]	-	20%	Hypertension was significantly more likely to be older (aged 55-64 years: OR 2.85, 95% CI 1.65, 4.80) than younger (25-34 years: OR 0.37, 95% CI .17, .80)
Merijanti et al. (2008) [29]	-	*	Shift work had a substantial effect on Systolic Blood Pressure, but not on Diastolic Blood Pressure.

*: Specific statistics were not fully provided in the source.

-: A particular factor or condition is not applicable or not fully observed in the study.

Table 2: Summary findings on the prevalence of hypertension and associated factors.

Discussion

This systematic review aimed to determine the prevalence of hypertension among healthcare workers and the factors associated with it. The prevalence of hypertension among healthcare workers ranges from 13% to 40%, while the prevalence of pre-hypertension ranges from 36%

to 60.5%. Several factors were found to be associated with hypertension among health workers, including being male, being married, increasing age, increasing BMI, smoking, and job stress. The overall prevalence rate of hypertension varies across different populations. In low- and middle-income countries, the

prevalence is estimated to be around 32.3%, with higher rates in the elderly, those without formal education, and urban settlers.³⁶

The prevalence of hypertension among health workers was relatively high compared to the general population. This finding is consistent with previous studies that have highlighted the increased risk of hypertension among individuals in high-stress professions such as healthcare.⁶ In West Africa, one systematic review found that the prevalence of hypertension among workers ranged from 12% to 69%.³⁰ These findings suggest that targeted interventions and regular screenings should be implemented to identify and address these risk factors in order to reduce the prevalence of hypertension among health workers. Additionally, the implications of these findings extend beyond the health of individual healthcare professionals, as it can also impact their job performance and overall well-being. It is crucial to help healthcare workers in stress management on both individual and organizational level in order to support their overall job satisfaction and performance.⁶

Married individuals are at high risk of having hypertension, according to the review findings. This result is similar to the studies¹⁸ which showed a similar trend of higher risk of hypertension in married people. The specific features underlying this association, however, are yet unknown and could involve a number of variables, including stress, social support, and lifestyle decisions. Strategies for preventive healthcare have been significantly affected by the association between the risk of hypertension in healthcare workers and marital status. These findings emphasize the need for healthcare institutions to be aware of the possible increased risk associated with married individuals and offer appropriate support and guidance.³¹

Healthcare workers with higher body mass indices (BMIs) are more likely to develop hypertension, which is consistent with other research that has shown an association between

being overweight and the development of hypertension.²⁷ These findings are the result of several underlying mechanisms, such as insulin resistance, inflammation, and aberrant hormone levels. Similar to other study findings, there is a correlation between being overweight or obese and the presence of hypertension. This observation underscores the significant association between body weight and increased risk of developing hypertension.¹⁰ Healthcare workers need to be aware of their higher risk and take the necessary precautions to control their weight. They should adopt a healthy lifestyle that involves regular physical activity, blood pressure monitoring, stress management, and balanced nutrition. To address the underlying causes of overweight and obesity, healthcare institutions should adopt comprehensive public health policies, encourage frequent blood pressure tests, and implement workplace well-being programs.³²

Smoking increases blood pressure, heart rate, and blood vessel constriction, among other factors that contribute to the development of hypertension based on review findings. This is consistent with previous studies done in China, which imply that smoking raises the risk of hypertension in healthcare workers.¹⁷ The substances found in cigarette smoke restrict blood vessels, which increases blood flow resistance and puts more strain on the heart. In addition, nicotine causes adrenaline to be released, which increases heart rate and narrows blood vessels, raising blood pressure in the process. The study findings highlight the global prevalence of this issue by emphasizing the fact that healthcare workers are not immune from the negative effects of smoking on blood pressure. The increased risk affects healthcare worker's general well-being and ability to do their jobs. Healthcare workers who smoke must give it up in order to lower their risk of hypertension and enhance their general cardiovascular health. Healthcare institutions should place a high priority on smoking cessation interventions that work.³³

Men are more likely than women to have high blood pressure, based on the review findings. The higher incidence of hypertension in men is consistent with other studies and indicates that men are typically more likely than women to develop hypertension.²¹ There are a number of potential causes for this gender gap in the prevalence of hypertension, including hormonal variations, lifestyle decisions, and genetic susceptibility. Socio-economic factors influence work-related stress and societal expectations among men, leading to high blood pressure, which contributes to this gender gap. Interestingly, study findings highlight that men were more likely than women to have high blood pressure, indicating a gender difference in the frequency of this health problem.¹² Further, behavioural differences in seeking healthcare between men and women could impact the diagnosis and treatment of hypertension.

Men are less likely to seek medication attention promptly, which might delay interventions. These findings emphasize the need for targeted healthcare interventions that take gender-specific factors into account. Healthcare providers need to adopt gender-sensitive methods for diagnosis and treatment, taking behavioural, psychological, and socio-economic factors into account.³⁴

Further, age and the onset of hypertension have a strong association; according to a review finding, people tend to have higher blood pressure as they age and hypertension is more common. The increased incidence of hypertension in the elderly is partly due to this age-related increase in risk factors for hypertension. This is similar to the other previous study findings¹³, which found that an increase in age had a strong association with the prevalence of hypertension. To reduce the risk of cardiovascular problems related to hypertension among older people, regular blood pressure monitoring is essential.³⁵ Implementing effective personalized management strategies, such as changes in lifestyle and medication adherence when needed, is essential, especially for older adults. Healthcare institutions should

establish programs that provide resources for physical fitness, mental health assistance, and health education to their older staff.

Studies investigating the association between shift work and hypertension in healthcare workers present mixed results. A study by²², suggests a 23% increase in the odds of developing hypertension for those doing shift work compared to those on regular schedules. Further, shift work status, number of working hours a day, number of night shifts a month, and number of rest interval hours a day were significantly associated with the presence of hypertension in healthcare workers. Additionally, another study²⁹ found healthcare workers at hospitals on a 24-hour shift lead to abnormally high systolic blood pressure in female nurses, thus suggesting that this type of work may be a risk factor for cardiovascular disease. Additionally, another study³⁷ suggests that the longer the duration of continuous shift work, the higher the risk of developing hypertension, potentially increasing vulnerability to cardiovascular disease (CVD) complications. However, a different study³⁸ found no significant association between shift work and hypertension in healthcare workers. This contradiction highlights the need for further research to conclusively establish the relationship between these factors, specifically within this population.

Therefore, being male, being married, increasing age, having a higher BMI, smoking, and job stress have all been linked to hypertension in healthcare workers. These results are similar to those from previous reviews on hypertension.^{1,2} The review found that male healthcare workers are at increased risk of developing hypertension, which is consistent with previous findings from systematic reviews of hypertension in the general population. The increased risk of hypertension among male healthcare workers may not solely be attributed to their occupation, but rather to other factors that are prevalent in the general population, such as genetics, lifestyle choices, and sedentary lifestyles.³¹

Conclusion

Healthcare workers are at a high risk of hypertension and pre-hypertension, with prevalence ranging from 13% to 40% and 36% to 60.5% respectively, which is higher than the general population. Factors contributing to these conditions include demographic characteristics like male sex, increasing age, and being married, alongside lifestyle factors such as a higher BMI, smoking, and low physical activity. Additionally, occupational factors like job stress, rotating shifts, and job dissatisfaction play a role.

Future Research

Studies should utilize stratified sampling, this would ensure a more representative sample by proportionally collecting various demographic groupings within the healthcare worker population. Future research should aim to include larger and more diverse samples to improve the external validity of the findings. Additionally, objective measures of hypertension should be utilized to ensure more accurate results. Furthermore, longitudinal studies should be conducted to examine the causal relationship between various factors and hypertension among health workers. This approach tracks healthcare workers over time and could determine the relationship between particular factors and the development or management of hypertension.

Limitations

This review should be interpreted with caution due to the following limitations:

1. The studies included in the review had a smaller sample size that was not representative of the entire population. Additionally, the majority of the studies reviewed relied on self-reported data, which may introduce bias and inaccuracies. The use of self-reported data in the studies reviewed introduces the potential for recall bias. In this case, since data is reliant on what participants report about themselves, there is a risk of overestimating or underestimating the prevalence of hypertension.
2. There is a lack of diversity among the health worker population included in the studies, which may limit the generalizability of the findings to other health workers

with different demographic characteristics, genders, races, job roles, or settings. This means that the conclusions drawn from the reviewed studies might not be applicable to or representative of all types of health workers.

3. While focusing on global trends, the absence of studies specifically from Zambia, limits generalizability to the local context.

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How to cite this Article: Mwale. M, Mulenga. M, Milandu. P, Bwalya. T, Mvula. R, Katandula. D. M, Kazonga. E, Nkhama. E; [Prevalence and Associated Factors of Hypertension among Health Workers: A Systematic Review](#); *Int. Res. Med. Health Sci.*, 2024; (7-1): 1-15; doi: <https://doi.org/10.36437/irmhs.2024.7.1.A>

Source of Support: Nil, **Conflict of Interest:** None declared.

Received: 28-1-2024; **Revision:** 17-3-2023; **Accepted:** 23-3-2024