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HEALTH PREVENTION INTERVENTIONS FOR THE CONTROL OF HYPERTENSION: A SYSTEMATIC REVIEW

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ABSTRACT

Hypertension is a major cardiovascular risk factor (CVD), contributing significantly to the worldwide burden of cardiovascular disease and disability, but its control remains an unmet challenge for public health systems. WHO estimates that there are 1.28 billion adults (aged 30-79 years) in the world with hypertension and an estimated 46% of them do not know they suffer from hypertension because hypertension is the silent killer. This Systematic Review aims to identify and analyze preventive health interventions for hypertension control, as well as promotional efforts that can be done to reduce the prevalence of hypertension at the global level. This study uses the Systematic Review method to search for articles based on several databases, namely Scopus, EMBASE, ScienceDirect, and PubMed on May 12, 2023. Search results with keywords hypertension, health prevention interventions, hypertension health promotion, hypertension control, decreased prevalence of hypertension. After being filtered based on suitability with the title and research objectives, relevant research articles were obtained, the full text was free and the publication year 2018-2023 produced 8 articles. The results of this study are several efforts to prevent the increase in the prevalence of hypertension, namely by promoting health to carry out physical activity, reducing stress levels, balanced diet and nutrition, maintaining ideal body weight, reducing salt consumption, not smoking and reducing cigarette smoke, avoiding alcoholic beverages, and lifestyle education interventions through education and counseling. Further research is needed regarding the most effective interventions for the prevention and control of hypertension.

Keywords: *hypertension, high blood pressure, health prevention intervention of hypertension, prevention of hypertension, interventions of hypertension*

INTRODUCTION

Hypertension is a major cardiovascular risk factor (CVD), contributing significantly to the worldwide burden of cardiovascular disease and disability, but its control remains an unmet challenge for public health systems (Widmer et al., 2015). Despite advances in blood pressure measurement techniques and the availability of effective and safe antihypertensive drugs, they are not always used optimally in clinical practice. As a result, a large number of hypertensive patients are not properly identified, and a significant proportion of those receiving antihypertensive treatment fail to achieve effective control of their blood pressure levels (Parati et al., 2021). Hypertension is diagnosed if blood pressure measurements on two different days show systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg. WHO estimates that there are 1.28 billion adults (aged 30-79 years) in the world with hypertension and it is estimated that 46% of them do not know they have hypertension because hypertension is the silent killer (Campbell et al., 2022).

Results of studies by Zhou et al (2021), with a population covering 184 countries in the world, showing that the number of people with hypertension in the age group of 30-79 years has doubled from 1990 to 2019. The figure shows a comparative map of hypertension prevalence from 1990-2019 between men and women, there is a decrease in prevalence in both men and women in countries on the European continent. While in Indonesia there is an increase

in prevalence, especially in women and is included in the four countries with the highest increase in prevalence (by 12%).

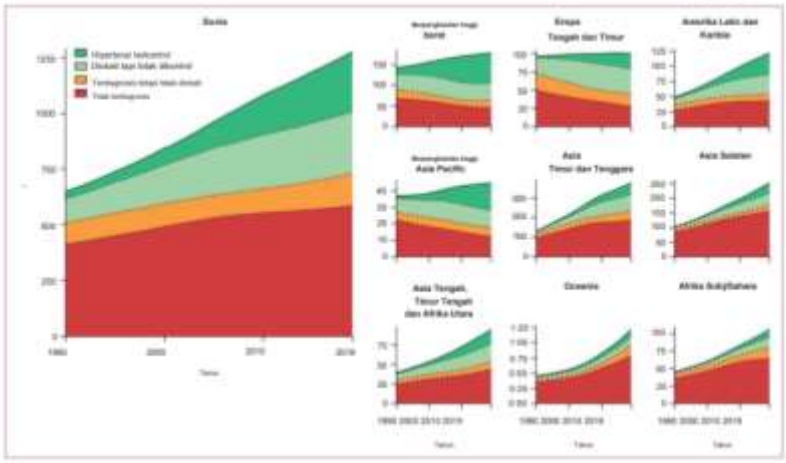

Figure 1.
Trends in the number of people with hypertension reporting a diagnosis, who use medication, and whose blood pressure is effectively controlled, globally, and by region, 1990-2019

The impact of high prevalence of hypertension is becoming a significant public health problem. Hypertension often shows no symptoms, so it is only detected after causing other organ disorders. Suboptimal blood pressure control (BP) was the most common cause of cardiovascular risk factors and cerebrovascular disease, including hemorrhagic (58%) and ischemic stroke (50%), ischemic heart disease (55%), and other CVD diseases (58%), including heart failure and peripheral arterial disease. In addition, hypertension is a major cause of chronic kidney disease, the development of kidney disease, and end-stage kidney disease, as well as dementia due to small brain blood vessels (Carey et al., 2018). Non-communicable disease control strategies such as hypertension cannot rely on curative and rehabilitative efforts alone, but also preventive and promotive efforts.

Based on this description, this Systematic Review aims to identify and analyze health prevention interventions for hypertension control, as well as promotional efforts that can be done to reduce the prevalence of hypertension at the global level. The systematic review was selected from studies related to the prevention and control of hypertension in several countries (Anand et al., 2019), such as Spain, Dubai, Malaysia, Bangladesh, Pennsylvania, Ethiopia, and the United Kingdom. The hope is that this systematic review can be a recommendation for other countries to carry out health prevention interventions to control the prevalence of hypertension in the world.

METHOD

General Description

This study uses the Systematic Review method to search for articles based on several databases, namely Scopus, EMBASE, ScienceDirect, and PubMed on May 12, 2023. Searches in the database use the keywords hypertension or high blood pressure, prevention and control

of hypertension, and reduce the prevalence rate of hypertension. Systematic Review is conducted in accordance with PRISMA (Preferred Reporting Item for Systematic Review and Meta-Analysis) guidelines in identifying articles using the PICO method consisting of Patient/Population, Intervention (or Exposure), Comparison (or Control), and Outcome. The screening process consists of three stages. In the first stage, an identification study of articles that meet the requirements based on the title is carried out, then the second stage of screening is carried out based on abstracts. The final stage, the identification of the full text and assessing the article based on the suitability of this Systematic Review. A summary of the included studies is presented in a table.

Search Strategy

The data source for this Systematic Review was obtained from Scopus, EMBASE, ScienceDirect, and PubMed on May 12, 2023 based on articles published between 2018 and 2023. For the included studies, a comprehensive search strategy using medical terms (MesH) was used in texts, titles, abstracts, and synonyms. Search for the title/abstract using a combination of relevant keywords such as (hypertension OR high blood pressure) AND (health prevention intervention of hypertension OR prevention of hypertension OR intervention of hypertension OR health promotion of hypertension) AND (control of hypertension OR decreased prevalence of hypertension).

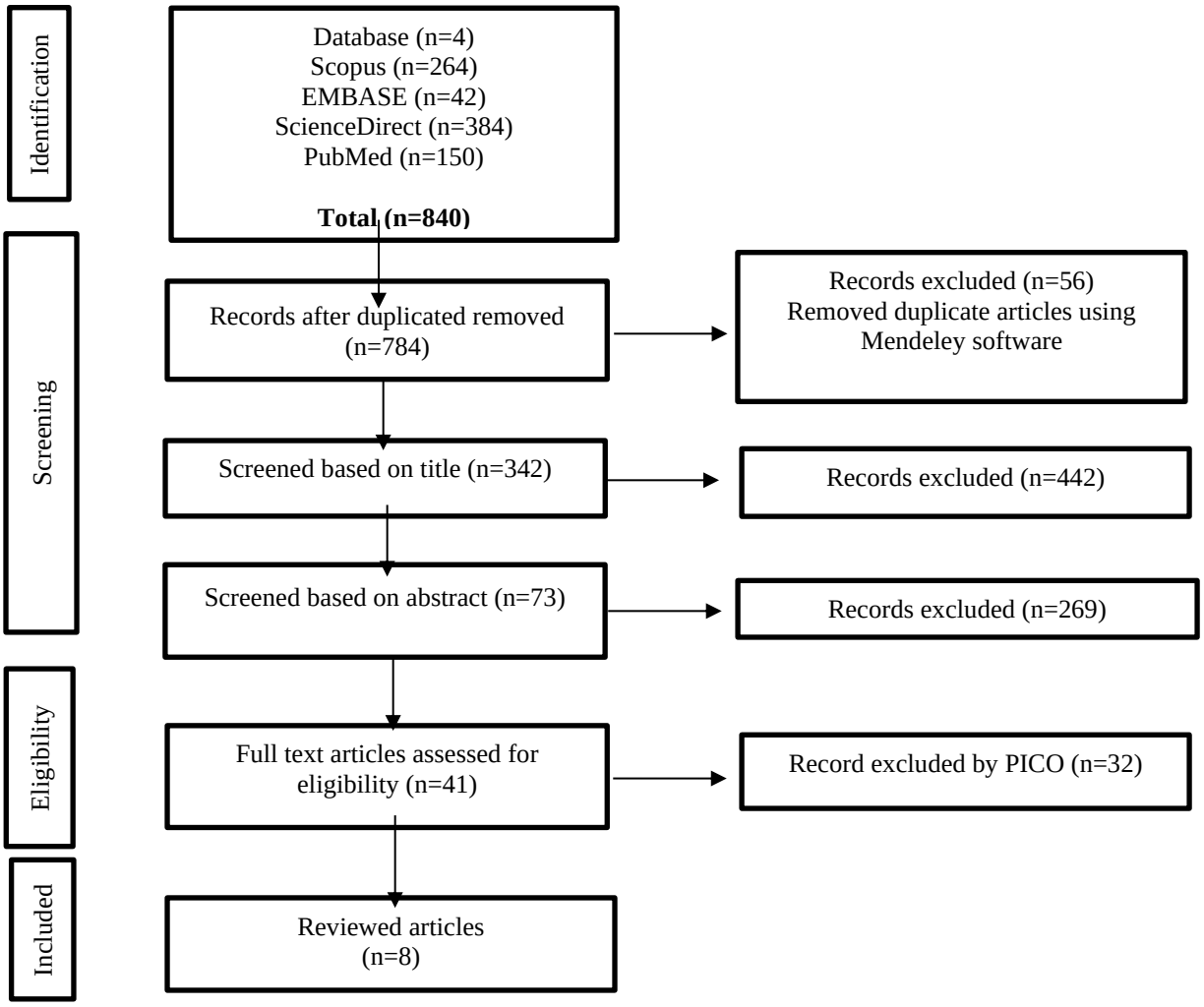

Figure 2. PRISMA Diagram of Study Selection Flow

Data Extraction

At the initial stage, the selection is based on the title of the article, then the second step of article selection is based on the abstract, then the third stage of studies that meet the criteria are downloaded for further selection. Studies that do not meet the criteria are excluded. The stages of study selection are presented in the PRISMA graph (Figure 2). The researcher extracts and summarizes the following information into a table: author's name, year of study, article title, study location, research sample, research method and summary of results.

RESULTS AND DISCUSSION

Table 1. Review of Articles

Author's Name	Article Title	Location	Sample Population	Research Methods	Result
Angel Denche-Zamorano, et al, 2022	Risk of Hypertension and Use of Antihypertensive Drugs in the Physically Active Population under-70 Years Old—Spanish Health Survey	Spanish	17,717 individuals in the 2017 National Health Survey	Cross-sectional study	In the population, the lowest risk of hypertension was found in the highly active group (OR: 0.41, 95% CI: 0.35–0.49). The same was found in men (OR: 0.36, 95% CI: 0.29–0.45), women (OR: 0.46, 95% CI: 0.35–0.61). It also found the lowest risk of antihypertensive drug use in the highly active group of people (OR: 0.32, 95% CI: 0.27–0.39). Based on the results of binary regression analysis on hypertension status and antihypertensive use, those who were young, female, normal weight and physically very active showed a lower risk of hypertension and antihypertensive use. (Denche-Zamorano et al., 2022)
Heba Mamdouh, et al, 2022	Prevalence and associated risk factors of hypertension and pre-hypertension among the adult population: fndings from the Dubai Household Survey, 2019	Dubai	2,530 adults (>18^{yrs})	Cross-sectional study	The association between behavioral risk factors of hypertension was shown on the table using univariate analysis, the current findings reflected that tobacco use, smoking status, secondhand smoke, eating enough fruits and vegetables, alcohol consumption, being physically active, all showed statistically significant associations with the prevalence of hypertension among Dubai residents at P<0.001 levels. Both smoking and drinking alcohol correlated with the risk of developing hypertension in this sample. On the other hand, physically active individuals were less likely to develop hypertension [OR 0.51 (95% CI 0.29–0.92)]. (Mamdouh et al., 2022)
Chiew Way Ang, et al, 2022	Mental distress along the cascade of care in managing hypertension	Malaysia	6,531 patients with hypertension age (≥35^{years})	Cross-sectional study	Respondents who had never been screened for hypertension and those who had uncontrolled blood pressure (BP) had higher tendencies for depression, anxiety and stress compared to those who had been screened and those who had their blood pressure controlled. Respondents who did not take

					antihypertensive medication were less likely to be depressed and anxious compared to those who were on medication. There is an association between different levels of hypertension treatment and mental stress. The implementation of hypertension services can be supported by increasing the provision of mental health clinics in primary care. (Ang et al., 2022)
Fakir M. Amirul Islam, 2023	Associations of physical activity levels, and attitudes towards physical activity with blood pressure among adults with high blood pressure in Bangladesh	Bangladesh	307 adults ages 30-75		• Systolic and diastolic blood pressure with physical activity at work, commuting, recreation, active hours per week and sedentary behavior. After adjusting for age, sex, education level, occupation, smoking status, and dietary habits, people who engaged in strenuous activity at work were associated with a lower average (95% confidence interval (CI)) SBP of 145.3 (140.9, 149.8) compared with those who did not participate in high-intensity activity at work on average (95% CI), 150 (147.6, 152.3). People who commuted to and from work for more than 10 minutes, people who followed moderate-intensity exercise, or spent less than four hours sitting per day were associated with lower SBP levels. • Blood pressure with the level of awareness and attitude in physical activity is very influential. People who were aware of the health benefits for physical activity were more likely to have lower than average SBP (95% CI) levels of 145.7 (138.5, 152.9) vs 151.9 (143.8 160.1), p = 0.02 and DBP (mean (95% CI) 89.8 (85.9, 93.7) vs 94.2 (89.8, 98.7), p = 0.03 compared to those who did not know the health benefits of physical activity.(Islam et al., 2023)
Nadia M.Penrod and Jason H. Moore, 2022	Antihypertensive efects of yoga in a general patient population: real-world evidence from electronic health records, a retrospective case-control study	Pennsylvania	During the study period there were about 1.2 million patients in the database, 2-3% of whom have in at least one clinical chart record containing the word "yoga"	Retrospective observational case-control study	• To calculate the effect of yoga on blood pressure, a mixed linear regression model was used. As a result of data collection, yoga use once or more per week was associated with lower SBP (−2.8mmHg, standard error 0.6, p<0.001) and lower DBP (−1.5mmHg, standard error 0.5; p=0.001) than no yoga use. (Penrod & Moore, 2022) • The odds of having normal blood pressure and using yoga were 85% greater than the odds of having normal blood pressure and not using yoga (OR 1.85, 95% CI 1.39–2.46). • For patients aged 40-59 years, the odds of having stage II hypertension and using

					yoga were 67% less (0.33, 95% CI 0.14-0.75) than the odds of having stage II hypertension and not using yoga.
Daniel Bekele Debela MPH, et al, 2023	Effect of an Educational Intervention on Lifestyle Modification of Patients With Hypertension at Bishoftu General Hospital, Ethiopia, 2021	Oromia, Ethiopia	50 hypertensive patients	Quasi-experimental study	Significant systolic decrease (−12.4 mm Hg; P<.001) and diastolic blood pressure (−4.6 mm Hg; P <,001), total cholesterol (−34.8 mg/dl; P < 0.001), and body weight (−2.6 kg; P <0.001). Educational interventions were found effective in reducing cardiovascular disease risk factors. (Debela et al., 2023a)
Paulina Pei Suu Tan, et al, 2022	Health motivations and perceived barriers are determinants of self-care behaviour for the prevention of hypertension in a Malaysian community	Kuala Lumpur, Malaysia		Cross-sectional study	Only health motivation (β = 0.217, p <0.001) and perceived barriers (β = 0.571, p <0.001) strongly influenced self-care behavior. Maintaining a healthy diet, regular physical activities and blood pressure checks need to be improved in the community, particularly in reducing salt and calorie intake. Lack of time, limited choices and laziness are the biggest challenges that need to be overcome in implementing a healthy diet and active lifestyle in the community. Many are ignorant of their health status, so they do not prioritize blood pressure checks. (Tan et al., 2022)
Ghadeer S. Aljuraiban, et al, 2023	Lifestyle Score and Risk of Hypertension in the Airwave Health Monitoring Study of British Police Force Employees	English	40,462 mean (SD)) 40.5th	Cross-sectional study	Basic lifestyle scores including waist circumference, smoking, and serum total cholesterol were calculated, with larger scores indicating a better lifestyle. Individual/combined with a number of other lifestyle factors (sleep duration, physical activity, alcohol intake, and diet quality). is also developed. Results: A baseline lifestyle score 1 point higher was associated with lower systolic BP (SBP; −2.05 mmHg, 95% CI: −2.15, −1.95); diastolic blood pressure (DBP; −1.98 mmHg, 95% CI: −2.05, −1.91) and inversely related to hypertension risk. Composite scores from other factors showed attenuated but significant associations with the addition of sleep, physical activity, and diet quality to baseline lifestyle scores; However, alcohol intake did not further dilute the results. (Aljuraiban et al., 2023)

DISCUSSION

The results of studies from the articles that have been selected mostly confirm that physical activity is very influential on blood pressure control. Normal and controlled blood pressure can lower the risk of hypertension. In studies (Penrod, 2022), physical activity that also affects blood pressure is yoga. Yoga, a lifestyle-based practice that combines physical posture, breath

control, and/or meditation, has antihypertensive effects in clinical trial settings. In this study, yoga was just as effective as exercise, and may add to the effects of treatment (Penrod & Moore, 2022). In addition, studies (Islam, 2023) show that work activities such as commuting to and from work for more than 10 minutes, people who participate in moderate-intensity exercise, or spend less than four hours sitting per day also affect blood pressure. According to studies (Mamdouh, 2022), physically active individuals are less likely to develop hypertension and are offset by reducing smoking and drinking alcohol. The results of the study Denche (2022), prove that physical activity is significantly inversely proportional to the risk of hypertension. Consistent evidence from studies has supported the beneficial effects of exercise and physical activity on blood pressure control for the prevention of hypertension. Maintaining a healthy diet especially in reducing salt and calorie intake, regular physical activities and blood pressure checks need to be improved in the community (Tan et al., 2022).

The findings Ang (2022), show that there is a relationship between different levels of hypertension services and mental stress. Respondents who had never been screened for hypertension had uncontrolled blood pressure (BP) and had a higher likelihood of depression, anxiety and, stress compared to those who had been screened and those who had ever controlled BP. The implementation of hypertension services can be supported by increasing the provision of mental health clinics in primary care. Knowledge interventions were also found effective in reducing cardiovascular disease risk factors in the findings (Debela, 2021).

Promoting healthy lifestyle changes is necessary to prevent progressive increases in blood pressure and CVD. Lifestyle factors are the focus of the intervention, including reducing salt intake, increasing fruit and vegetable consumption, increasing physical activity, avoiding alcohol, and adherence to taking medication. Consistent results from previous research findings in high-income countries provide evidence of the effectiveness of interventions using education and counseling strategies in the prevention and control of hypertension, in specific contexts in low-income countries. (Debela et al., 2023b)

The results of this systematic review show that interventions that have a significant influence in prevention efforts to control the risk of hypertension, namely: physical activity, reducing stress, not smoking or reducing exposure to cigarette smoke, avoiding alcoholic beverages, diet and balanced nutrition, especially reducing salt consumption, and lifestyle education through education and counseling.

CONCLUSION

In an effort to intervene in health prevention for hypertension control, several efforts can be made based on the results of this systematic review and have a significant influence on preventing the risk of hypertension, namely: physical activity, reducing stress, not smoking or reducing exposure to cigarette smoke, avoiding alcoholic beverages, diet and balanced nutrition, especially reducing salt consumption, and lifestyle education through education and counseling. Hypertension prevention interventions for the community that can be provided by health services are routine blood pressure control, providing information through the media of Information Communication and Education (KIE) about lifestyle to reduce the risk of hypertension: increasing physical activity, reducing stress, appeals not to smoke or reduce exposure to cigarette smoke, avoiding alcoholic beverages, diet and balanced nutrition, especially reducing salt consumption. In addition, ensuring the availability of antihypertensive

drugs / pharmacological therapy for people with hypertension and referral services for people with hypertension in need. Further research is needed regarding the most effective interventions for the prevention and control of hypertension.

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