



The Benefits of Lifestyle Changes in the Management of Hypertension: A Review of the Literature

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Introduction: Hypertension has been identified as an important health problem worldwide. It is a major factor in cardiovascular diseases with a resultant high mortality rate. Understanding the role of lifestyle modification in the management of hypertension is important in improving the health of the population, especially in middle-aged adults.

Aim: The aim of this research is to identify and evaluate the positive effects of lifestyle changes, specifically dietary modifications and physical activities in the management of hypertension.

Methods: This study employed a systematically structured literature review, with emphasis on important studies that focused on lifestyle changes and their effect on hypertension. The review focused on peer-reviewed articles that addressed dietary interventions and physical activity levels among middle-aged adults with hypertension.

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Results: The research revealed that changes in the lifestyle if properly implemented would have a positive impact on the management of high blood pressure. A more personalized dietary regimen and regular exercise are the strategies that were singled out as efficient for reducing blood pressure

Conclusion: The findings of this study underscore the importance of lifestyle modifications in the management of hypertension. When applied correctly, these changes can significantly contribute to better health outcomes and reduced risks associated with high blood pressure.

Keywords: Alcohol; diet; exercise; hypertension; life changes; obesity; sodium.

1. INTRODUCTION

High blood pressure is a global challenge in the health sector today [1]. An observation carried out in 2018 by the World Health Organization shows that 1.13 billion persons globally have been diagnosed with hypertension and a prediction of a 1.5 billion rise in 2025. According to National Institute for Health and Care Excellence (NICE) hypertension remains the leading cause of death globally and in the United Kingdom, about 30% of cases in middle-aged adults are uncontrolled while 25% are diagnosed with high blood pressure [2]. Allam et al. in their study, stated that there is global concern about hypertension and the likely rise in years to come due to redundant lifestyle and diet-related habits of individuals.[3] It is the principal predisposing factor of cardiovascular disease and has contributed to the rise associated with cardiovascular death [3]. Elevated blood pressure is the principal cause of global premature death as a result of its relationship in the risk of developing other related organ diseases such as diabetic mellitus, kidney disease, stroke and heart failure [4]. Allam et al. state that inactivity and dietary lifestyles of individuals are contributing to the increase in the number of people with hypertension [5]. with conditions such as obesity, alcohol, and tobacco consumption predisposing people to hypertension [6]. Although hypertension is majorly the major cause of cardiovascular problems, this, however, can be modified by a simple application of lifestyle changes which includes exercise, weight reduction and control, and reduction of sodium [7]. The adoption of modern ways of life such as the consumption of calorie food and a sedentary lifestyle has been associated with the rise in hypertension which is one of the world's biggest challenges [8]. As a result of the above information, a gap was identified to find out how beneficial lifestyle changes are in controlling hypertension. In an attempt to find out the relevance of positive lifestyle changes in the regulation of

hypertension, a review of the literature was adopted.

Although some studies have examined hypertension in relation to lifestyle changes, this study involved a process of reviewing relevant literature on lifestyle changes, such as diet and physical activities, as they relate to the management of hypertension. In conclusion, evidence suggests that lifestyle changes are effective in the management of hypertension when applied appropriately.

The aim of the systematic review was to explore how positive lifestyle changes help in controlling blood pressure in adults between the ages of 45 to 65 years. The objectives were to identify the relationship between hypertension and lifestyle changes. To evaluate health promotion strategies that can be used to reduce blood pressure and to identify lifestyle changes that can be adopted in the management of hypertension.

2. METHODS

The method used in this literature review is the collation of data from peer-reviewed articles, research papers, and journals. Searching the relevant databases for articles on lifestyle changes like diet and physical activities as they relate to the management of hypertension. The search in this work was focused on specific databases, which include PubMed, Medline, Cochrane, and Search engines like Summon Library. Systematic reviews were used as Primary sources on a similar topic.

The major keywords used for the search in this study were lifestyle changes, hypertension and classification of hypertension. Information was also gotten from recent publications in books, theses and articles. The report in this study was done using the principle of PRISMA. A Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for scoping review. Important findings were arranged in the table and

analyzed with the Critical Appraisal Skill Program as it will enable the identification of the strength and weaknesses of research materials.

The criteria for selecting articles in this study were.

In selection of inclusion criteria for this study, the PICO tool was used to define the population, intervention, comparison and study outcome as it is used for the identification of factors.

P Middle-aged hypertensive patient
I Application of lifestyle changes in the management of hypertension
C comparing substitutes, use of medications
O The relevant outcome of applying lifestyle changes

1. Articles reviewed by a peer group to enhance the credibility of the study
2. Articles that are written in English as there is no time and resources to translate
3. Publications between 2000 and 2021 to carry out an up to date research
4. Qualitative and quantitative literature review on articles that address the topic of interest to enhance uniformity of study and for retrieval of information needed for the research.

The exclusion criteria were

1. Article not translated into English
2. Any publications before the year 2000
3. Articles that are not related to the topic of interest.
4. Quantitative and qualitative related literature that is not related to the topic of research were also excluded in the study to aid good analyses of the articles in the work.

3. RESULTS

In selecting articles for the study, databases and a total number of 2207 were used in the search. These databases include PubMed, Medline, Cochrane, and Summon). The Prisma principles were used to check and select articles for the study. (Appendix A). Having considered the year of published articles to be used and the type of study, a further search was made based on the choosing keywords giving a total of 2207 literature available for the work. The number of articles retrieved from each database was Medline (n=879), PubMed (n=1262), Summon 19, and Cochrane 47.

In the analysis, a total number of duplicated articles from 1834 were removed, leaving 373 literatures to be used for the study. Further screening of the literature was done applying the research inclusions and exclusions criteria and 18 literatures were left (Appendix A). The details of the articles used in this study which include, the list of titles and authors, aim, methods used, outcomes, and limitations of the various studies were explained (Appendix B). The analysis of the search process is shown in Appendix C. The Database, search terms used, and the retrieved articles relevant to the study are all shown in the table.

4. LITERATURE REVIEW

Analyzing this study, a total of 6 peer-reviewed articles were selected for the study from a broad database that was centered on dietary and physical exercise as interventional models. These interventional means were the lifestyle changes that were aimed at managing hypertension as against the use of medications. The evidence of results obtained from this research indicates that lifestyle changes have a very good effect on the reduction of blood pressure [9,10]. It has been suggested that in the management of hypertension, lifestyle changes should first be considered as the body in general is regulated by what is taken and how it is used [11]. According to Ozemek et al., lifestyle changes can either be therapeutic or non-therapeutic [8]. In this study the therapeutic effect of lifestyle changes was explained and the relationship in the management of hypertension. Even though hypertension can be managed with both pharmacological and non-pharmacological methods, due to the associated effect of the medicinal management, Ozemek et al., in their study, encourages adults in their middle age to adopt a healthy lifestyle which will help in the prevention rather than subjecting themselves to treatment [8]. Hinderliter et al., encourages the use of a non-pharmacological lifestyle changes approach in the management of hypertension but when a patient is diagnosed with cardiovascular-related diseases, they are advised to combine both lifestyle changes and the use of medication [10]. In support of this research, Gee, et al. and Allam et al., state that lifestyle changes are beneficial in the management of high blood pressure [9,3]. These four themes retrieved from the articles were used to link the effectiveness of lifestyle changes and the management of hypertension.

4.1 Obesity

Hypertension is commonly associated with obesity and weight loss programs can effectively lower blood pressure [8,12.] Research by Allender & Rayner indicated a significant correlation between obesity as hypertension-related comorbidity in the UK [13]. Additionally, the NHS found an increase in overweight middle-aged adults from 29% in 2017 to 64% [14]. A survey by the National Health and Nutrition Examination revealed a predisposition to hypertension in individuals with a BMI over 30 [15]. Regulating blood pressure in overweight individuals is challenging due to the compressive effects of adipose tissue on the kidneys, resulting in elevated blood pressure [16]. Barriers such as low motivation, excessive weight loss, and substance relapse can impede lifestyle changes for hypertension management [12]. Literature suggests that younger patients aged 20-44 years are less compliant with lifestyle changes than middle-aged counterparts. The CDC indicates that while middle-aged adults adhere better to health regimes, comorbidities like arthritis and diabetes hinder compliance in individuals aged 45-65 [17]. Hence, Park in his study, emphasized the importance of health education and follow-up in ensuring compliance [18]. Hypertension management involves multiple disciplines, including cardiologists, nutritionists, physiotherapists, and nurses [18], with nurses playing a critical role in observation and health education across various healthcare settings [19]. Collaborative efforts among health professionals are essential for effective care [20].

4.2 Nutrition

Sodium is essential in the diet, with salt being a primary source and preservative as stated by Hinderliter et al., [21]. In America, sodium intake averages 3400 mg per day, surpassing the recommended 2300 mg [22]. High sodium intake correlates with hypertension due to increased water retention and arterial pressure [23]. Whelton asserts that excessive sodium intake adversely affects cardiovascular and renal systems [24], while reduced intake can mitigate hypertension in middle-aged adults [25]. Verma et al, in their opinion, recommended home-cooked meals to manage sodium intake, as processed foods typically contain higher sodium levels [26].

Appel et al. highlight the benefits of fruits, vegetables, and unsaturated oils for heart health,

emphasizing low sodium consumption as a practical recommendation [27] It was found by Sacks et al. that consumption of red meat, wine, and processed potatoes elevates blood pressure due to high saturated fat and sodium content [28]. They advocated the intake of vegetables, eggs, and yogurt to effectively lower systolic blood pressure. Increased dietary intake of lean proteins like poultry, fish, and low-fat dairy have also been shown to effectively reduce blood pressure and mitigate hypertension when properly integrated into the diet [29].

4.3 Exercise

Numerous studies underscore the significance of exercise for fitness and healthy living [29,21]. Exercise is advantageous in managing hypertension by regulating blood pressure and mitigating cardiovascular risk [12]. The primary physiological benefit of exercise is the enhancement of cardiac functional capacity [30]. Hamer observed that increased inactivity may lead to hypertension affecting a significant portion of the global population [31]. Exercise is recognized as the most efficacious non-pharmacological intervention for hypertension [21,12]. Research by Moraes et al. demonstrated that a 12-week exercise regimen in middle-aged men resulted in a notable reduction in systolic and diastolic blood pressure [32]. Engaging in moderate weekly exercise, such as 150 minutes of walking, alleviates stress and anxiety, further contributing to lower blood pressure [33]. Additionally, Murtaugh et al. have also associated exercise with weight reduction [34].

4.4 Tobacco Cessation

Tobacco contains nicotine which increases the activities of the nervous system leading to increase in oxygen demand in the myocardium which will eventually result to raise in blood pressure. According to Warburton et al., cessation from smoking do not only regulate blood pressure but reduces mortality rate [35]. Although not very much study has been done about tobacco smoking and hypertension, a research by verma et al., states that the nicotine content in tobacco has a negative effect in the blood vessels and when nicotine use it is reduced or stopped, there is associated reduction in blood pressure [26].

4.5 Alcohol Consumption

According to Klatsky & Gunderson, alcohol consumption increases the level of blood

pressure, due to the pathological effect in the rise renin level which further results in narrowing of blood vessels [5]. In a study by Verma et al., a lifestyle changes of reduction of alcohol intake in heavy drinkers results in a subsequent lowering of blood pressure within a short period [23]. This is said to occur as a result of decrease in the stimulation of endothelia following alcohol cessation which will further result to vasodilatation [18].

While studies have shown that there is relationship between high blood pressure and alcohol intake, a clinical trial confirms that reduction in alcohol consumption can bring about 5mmHg decrease in systolic and 3mmHg reduction in diastolic blood pressure within four week [23].

5. CONCLUSION AND RECOMMENDATIONS

Hypertension is a leading cause of cardiovascular diseases, and this study shows that lifestyle changes, such as dietary modifications, regular exercise, and cessation of smoking and alcohol, can effectively manage blood pressure. Further prospective studies using various lifestyle interventions as research parameters are recommended to explore their comparative advantages.

6. LIMITATIONS OF THE STUDY

This study is based on a literature review rather than prospective or quantitative analysis, which limits the findings to already established data. Additionally, only English-language articles were reviewed, potentially omitting relevant studies in other languages.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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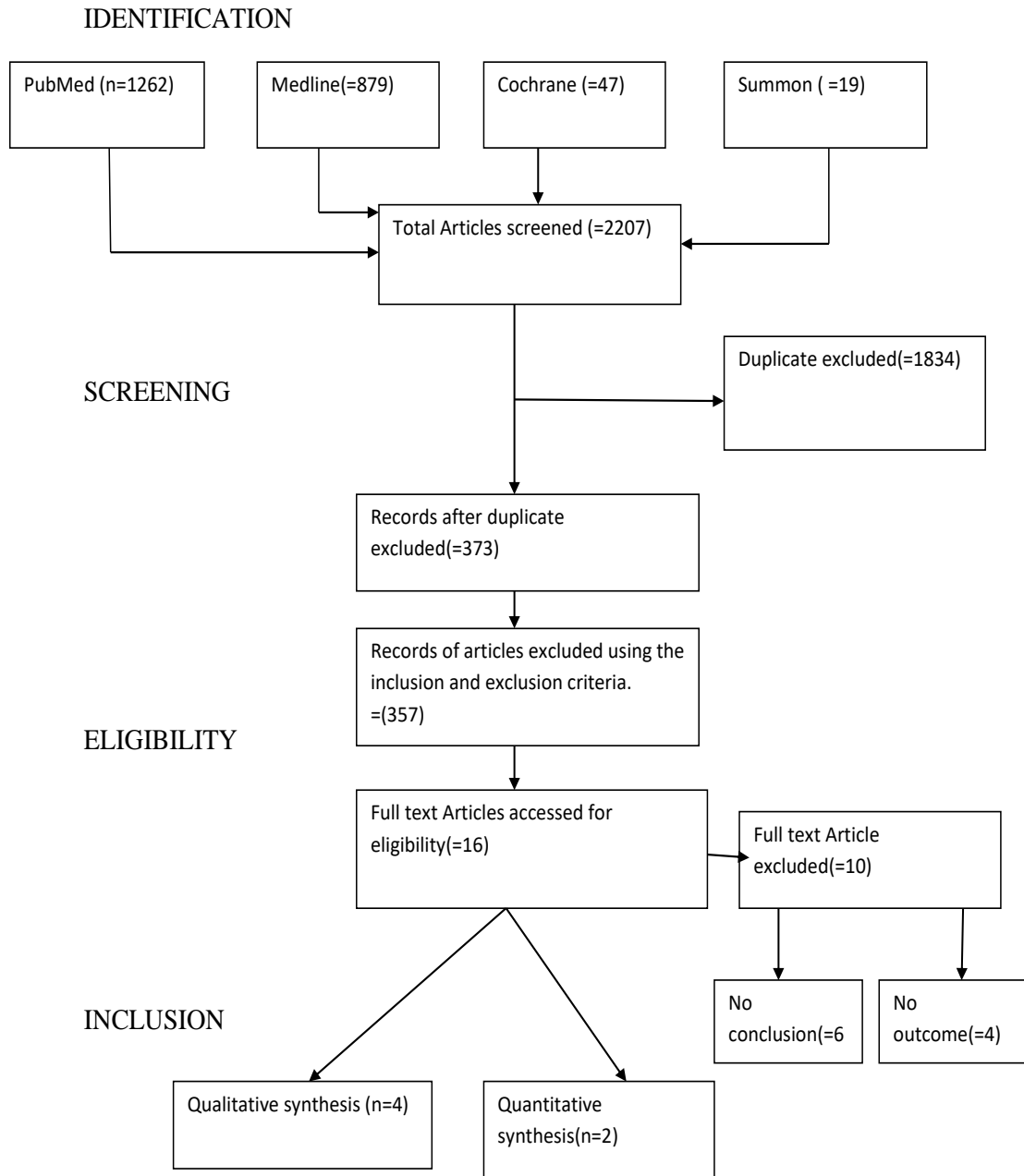
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APPENDIX

APPENDIX A: PRISMA FLOW CHART



Appendix B: List of Articles Included in the Study

| Titles and Authors | Aim | Methodology | Intervention and Main Finding | Limitations |
|---|--|--|--|--|
| The effectiveness of nurse-led group interventions on hypertension lifestyle management: A mixed method study (Nanyonga, et al 2022) | To assess how effective were the psychological method used by nurses in the management of hypertension in relation to lifestyle changes and sustainance. | Health education, phone messages follow-up by support group. Duration=9months Population=54 | It is important to apply nurse led intervention method as it enhances achievement of goal in the management of hypertension. | The location of the meeting point which not all client are able to use the stair. Not generalise sample collection method. |
| Prevalence of, and Barriers to, Preventive Lifestyle Behaviors in Hypertension [9] | Patient barriers in preventing changes in hypertensive patients | Survey Duration=2years Population=6142 | Reduced interest, coexisting health issues and time factor is were the main reasons for non compliance to lifestyle changes | Co existing health problem, in ability to differentiate between those that stopped lifestyle changes and those that never participated |
| The Long-Term Effects of Lifestyle Change on Blood Pressure: One-Year Follow-Up of the ENCORE Study [10] | To identify how individuals with hypertension are able to sustain the benefits achieved life style changes. | RCT Duration=16weeks application of exercise and nutrition and follow up 8months. Population=144 Dietary, behavioural and follow up. | Noticeable persistent changes in blood pressure after 8mounths of application of the 16weeks ENCORE programme. | Incomplete data from some participants and follow up time was short. |
| Web-Based Dietary and Physical Activity Intervention Programs for Patients with Hypertension: Scoping Review [5] | To study the literature on the various web-based programs designed for patients with hypertension to improve their physical activity and dietary habits. | The literature searches were performed on various electronic databases. These included PubMed, Web of Science, MEDLINE, ScienceDirect, Google Scholar, and Scopus. | The results of this study suggest that implementing a web-based program that focuses on physical activity and dietary changes can help lower blood pressure. | Some patient with co existinghealth problems were on able to participate as expected. |
| Feasibility study to assess the delivery of a novel isometric exercise intervention for people with stage 1 hypertension in the NHS: protocol for the IsoFIT-BP study including amendments to mitigate the risk of COVID-19 [30]. | To study how individuals with stage 1 hypertension can achieve reduction of high blood pressure through individual based exercises | Randomised controlled Feasibility research. Duration=18 months Population=100 | | few number of people were involved in the study hence the findings and results were limited |
| Non-pharmacological management of hypertension Verma et, al. [26] | To analyse lifestyle modifications including changes in the dietary pattern, adopting special diets | A MEDLINE search was done for relevant references with emphasis on original studies, randomized controlled trials, and meta-analyses | Life style modifications like quality nutrition, physical activity of few times per week, attaining normal body weight, cessation of alcohol and tobacco, reduction in sodium intake and increasing calcium, magnesium and potassium, stress management, and supplementation of certain ingredients may prove beneficial | The study is limited to the literatures more extensive and better-designed research is necessary to provide better understanding of the optimal approach to reduce cardiovascular morbidity and mortality associated with hypertension |

Appendix C. Table of the Search Process

| Databases | Search term | Number of retrieved articles | Articles relevant to the research based on the title abstract and full-text |
|-----------|------------------------------------|------------------------------|---|
| Pubmed | Hypertension and lifestyle changes | 5674 | 1262 |
| Medline | Hypertension and lifestyle changes | 2345 | 879 |
| Cochrane | Hypertension and lifestyle changes | 2543 | 47 |
| Summon | Hypertension and lifestyle changes | 100 | 19 |

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