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Systematic Review Article

WHICH IS MORE EFFECTIVE IN REDUCING BLOOD PRESSURE IN HYPERTENSION PATIENTS: A LOW SALT DIET OR THE DIETARY APPROACHES TO STOP HYPERTENSION (DASH)?

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ABSTRACT

Background: Hypertension is a disease that requires early attention. One effort to prevent increased blood pressure in hypertension sufferers is to implement a diet that has been consulted with nutrition experts.

Objectives: The aim of preparing this literature review is to compare the effectiveness of implementing a low-salt diet and dietary approaches to stop hypertension from the results of previous research.

Design: The design used in preparing this article is a systematic review.

Data Sources: This systematic review used 5 search databases to collect articles, including SCOPUS, Pubmed, Google Scholar, DOAJ, and ScienceDirect with the search year range 2019-2024.

Review Methods: The researchers used the JBI Critical Appraisal guidelines to determine articles suitable for this systematic review. Then, the selected articles were reviewed comprehensively using a narrative approach.

Results: Search results obtained 10,685 publications. Researchers filtered by eliminating duplicate publications, reviewing articles, and focusing on the Issue of Interest in Table 1 totaling 9,578 publications. Researchers re-screened the title (n = 598), abstract (n = 387), and full text (n = 113) of each publication that did not meet the inclusion criteria in Table 1. The researchers found 9 full-text publications that met the requirements for use in this systematic review. However, researchers only used 7 publications because 2 publications were considered to have a risk of bias.

Conclusion: Based on the results of a systematic review that has been carried out, it was found that implementing the DASH diet will be more effective than implementing a low-salt diet.

Keywords: Low Salt Diet, Dietary Approaches to Stop Hypertension, Hypertension Sufferers, Blood Pressure.

INTRODUCTION

Hypertension is a condition where blood pressure exceeds normal limits which requires early attention because it can increase the risk of heart failure in sufferers (Siloam Hospitals Medical Team, 2023). Often people with hypertension do not realize that they suffer from hypertension because they do not experience complaints that indicate an increase in blood pressure (Saputri, 2020). The increase in the incidence of hypertension is often related to several risk factors, including obesity, advanced age, a history of excessive salt use in daily life, and unhealthy lifestyles (such as lack of exercise, smoking habits, and alcohol consumption) (Atmaja & Ikhsan, 2022).

According to data from the World Health Organization [WHO] (2023), the incidence of hypertension has reached more than 30% of the adult population throughout the world. According to Kementerian Kesehatan Republik Indonesia (2023), the incidence of hypertension in Indonesia will increase day by day. To date, the Ministry of Health of the Republic of Indonesia has predicted that 1 in 3 people in Indonesia suffer from hypertension. This is shown in the results of the performance report for semester 1 of 2023 at the Ministry of Health of the Republic of Indonesia, an increase in the incidence of hypertension from 25.8% to 34.1%.

One effort to overcome the increase in blood pressure in hypertensive sufferers is to implement a diet that suits the needs of hypertensive sufferers and has been consulted with nutrition experts. (Atmaja & Ikhsan, 2022; Siloam Hospitals Medical Team, 2023). Some diets that are often used for hypertension are the low-salt diet and the DASH diet (Astuti et al., 2021; Fiddaroini & Ana, 2024; Jaclyn, 2020). There are differences in the application of the two diets. The application of this low salt diet in principle places more emphasis on limiting sodium intake in every food consumed by hypertension sufferers, while the DASH diet recommends that hypertension sufferers consume foods that are high in potassium, calcium, and magnesium, which are mostly obtained from vegetables and fruits (Nurmayanti & Kaswari, 2022).

METHODS

Design

The literature review design used in preparing this article is a Systematic Review. The preparation of articles using this method goes through 4 stages, including: The process of identification, evaluation, and interpretation of relevant research results related to the title of the literature review (Maulid, 2022). The protocol used in preparing this literature review is guided by The Center for Review and Dissemination and the Joanna Briggs Institute Guideline to assess the quality of research used in this literature review. In selecting articles, this systematic review uses the PRISMA checklist.

Search Methods

This literature review used 5 search databases to collect articles, including SCOPUS, Pubmed, Google Scholar, DOAJ, and ScienceDirect. The search process was carried out from 08 April 2024 to 16 April 2024 to identify relevant articles. In the search process, the authors used the PICOS format (P = Population; I = Intervention; C = Comparators; O = Outcomes; S = Study type) to evaluate relevant articles for use in this literature review. This process is presented in Table 1 below.

Table 1. PICOS format in preparing this Literature Review.

Criteria	Inclusion	Exclusion
Population	Hypertension sufferers	There are no exclusions
Issue of Interest	Implementation of a low salt diet and the Dietary Approaches to Stop Hypertension (DASH) Diet	Articles that do not focus on implementing a low salt diet and the Dietary Approaches to Stop Hypertension (DASH) diet
Comparators	Comparison of the effectiveness of implementing a low salt diet and the Dietary Approaches to Stop Hypertension (DASH) Diet	There are no exclusions
Outcomes	Comparison of blood pressure in hypertension sufferers after being given a low salt diet and the Dietary Approaches to Stop Hypertension (DASH) diet	It does not show a comparison of blood pressure in hypertension sufferers after being given a low salt diet and the Dietary Approaches to Stop Hypertension (DASH) diet
Study Design and Publication Type	Case Study, Cross-sectional, Randomized Control Trial, Pre-Experimental Study, Quasi-Experimental Study, Cohort Study, Qualitative Study	Review Article
Publication Years	Post-2019	Pre-2019
Language	Indonesian and English	Languages other than Indonesian and English

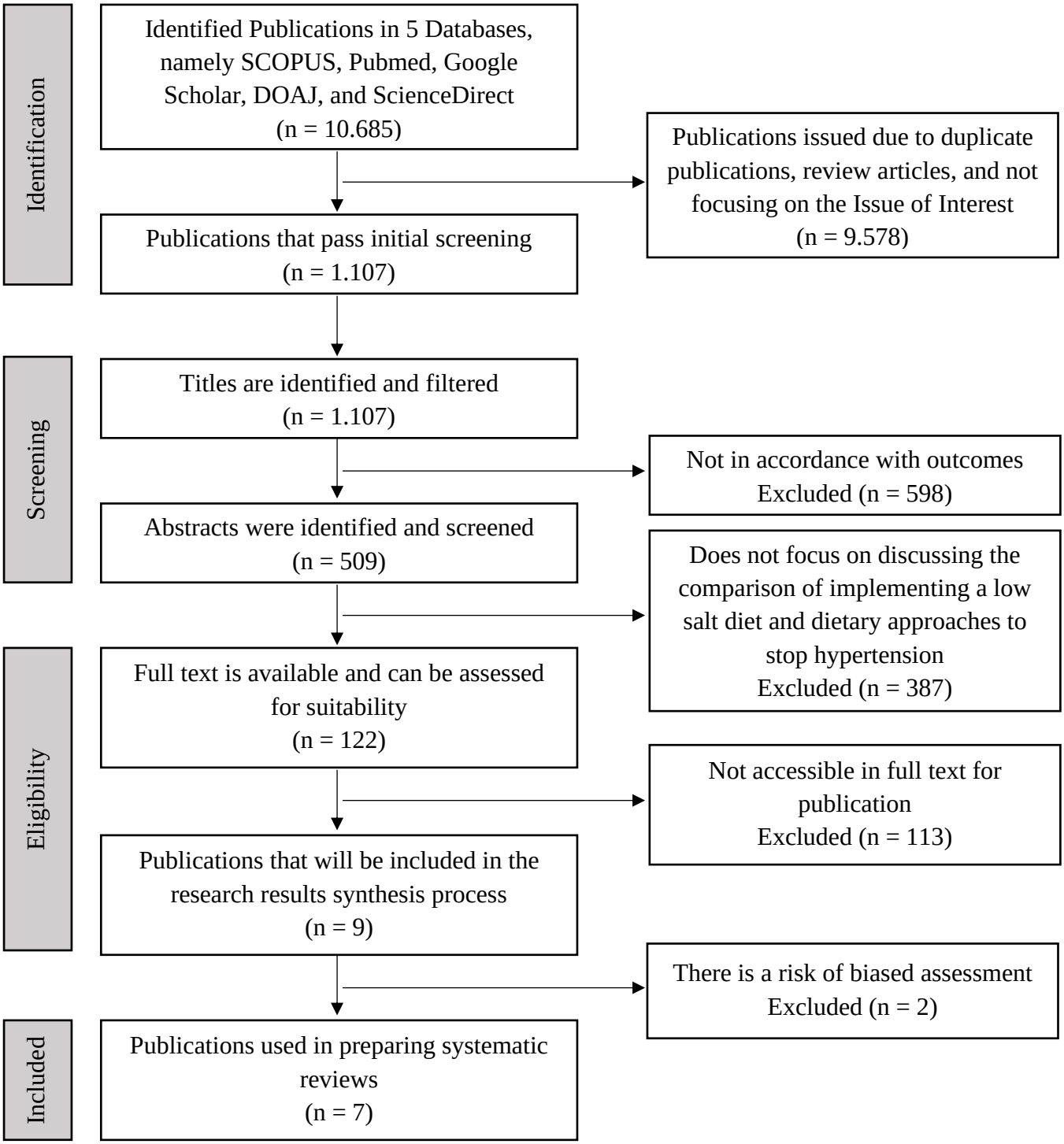
Based on the table above, the search for articles used in preparing this literature review was determined by inclusion and exclusion criteria using the PICOS format above.

The article search process uses a phrase search method with Boolean logic that uses the words "And" and "Or". The keywords used in this Systematic Review are (“Effectiveness Comparison” OR “Effect Comparison”) AND (“Application of a Low Salt Diet” OR “Application of a Low Sodium Diet”) AND (“Application of the DASH Diet” OR “Application of a Dietary Approaches to Stop Hypertension”) AND (“Blood Pressure”) AND (“Hypertension Sufferers” OR “High Blood Pressure Sufferers”).

Search Outcome

Based on search results in 5 databases using keywords determined by researchers, it was found that the number of articles that matched these keywords was 10,685 publications. Researchers filtered by eliminating duplicate publications, reviewing articles, and focusing on

the Issue of Interest in Table 1 totaling 9,578 publications. Researchers re-screened the title (n = 598), abstract (n = 387), and full text (n = 113) of each publication that did not meet the inclusion criteria in Table 1. The researchers found 9 full-text publications that met the requirements for use in this systematic review. The process of searching and selecting publications is presented in Figure 1.



Picture 1. Flowchart of the Publication Search Process and Determining Publications Used in Systematic Reviews.

Quality Appraisal

Researchers used JBI Critical Appraisal to assess the methodological quality of each publication (n = 9). This aims to assess the fulfillment of the requirements for each publication that will be used in preparing this systematic review. Publications used in this systematic review must meet at least 50% of the requirements by the JBI Critical Appraisal. Publications that have met 50%, the researcher will use them in preparing this systematic review. In this final process, nine publications have reached more than 50% and can be used in the next process, namely the data synthesis process. However, there was a risk of bias assessment in some publications, so four publications were excluded.

Data Abstraction

Data relevant to the preparation of this literature review will be extracted, including author, author affiliation, country, year of publication, writing background, research objectives, research design, sample size, sampling method, reliability and validity of research instruments, analytical and statistical techniques used, as well as analysis of research results.

Data Analysis/Synthesis

In the data analysis process, the author used a narrative approach in collecting evidence related to the comparison of the effectiveness of implementing a low-salt diet and the Dietary Approaches to Stop Hypertension (DASH) diet on blood pressure in people with hypertension, as well as developing a comprehensive narrative related to the similarities and differences between studies used in synthesizing the data in this systematic review.

RESULTS

Based on the results of searches carried out by researchers, it was found that there were several types of publications used in preparing this systematic review, including one publication with an experimental research design, one publication with a case study research design, one publication with a qualitative research design, and two publications with a research design. Randomized Controlled Trial (RCT) research.

Table 2. Summary of Publication Search Results Used in Systematic Review.

No.	Author, Year, Country	Publication Title	Research Design	Conclusion of Research Results
1.	Astuti et al., 2021, Indonesia	Implementation of DASH Diet Recommendations Compared to a Low Salt Diet Based on Nutritional Counseling to Reduce Blood Pressure in Hypertension Patients at the North Larangan Health Center	**Research Design:** The research design used in this research is experimental research with two research groups given 2 different treatments. **Variables:** The research variables collected were the characteristics of the respondents, history of illness and treatment undertaken, nutritional status, blood pressure, food intake, and nutritional values (including sodium). **Research Sample:** The sample for this research is hypertension sufferers who live in the working area of the North Larangan Community Health Center. **Instrument/Intervention:** Before implementing the diet, participants are given nutritional counseling first and	Based on the research results, it was found that there was a significant difference in the reduction of systolic and diastolic blood pressure in the group that was given treatment in the form of implementing the DASH diet compared to the group that was given treatment in the form of implementing a low salt diet.

			measurements are taken regarding nutritional status, blood pressure, food intake, and nutritional value (including sodium). Treatment was given for 2 weeks, after which measurements were taken again. **Analysis:** The statistical tests carried out to test systolic, and diastolic blood pressure and consumption of nuts were the Wilcoxon and Mann-Whitney Non-Parametric Tests. For sodium intake, quantity, and frequency of fruit and vegetable consumption, t-tests and independent t-tests were carried out. Meanwhile, to see the influence of all research variables simultaneously, a linear regression test was carried out.	
2.	Çapar & Yılmaz, 2022, Turkiye	Which Is More Effective in Hypertension?: Salt-Free Diet vs. Dietary Approaches to Stop Hypertension (DASH) Diet	**Research Design**: Randomized Controlled Trial. **Variables:** DASH Diet and Salt-Free Diet, Anthropometric Assessment, Blood Pressure, Biochemical Findings, Food Intake. **Research Sample**: 60 participants with primary hypertension aged 51.8 ± 9.2 years.	Based on the research results, it was found that implementing a Salt-Free diet had a more positive impact in reducing systolic blood pressure compared to implementing the DASH diet.

			Instrument/ intervention: There are 2 groups, namely the group using the DASH diet and the group using the Salt-Free Diet. Each group will undergo a pre-test related to anthropometrics, blood pressure, and biochemical findings at the beginning of the month and a post-test will be carried out at the end of the month. **Analysis**: In examining the relationship between all research variables it was analyzed using Pearson Chi Square. To analyze the comparison of the results of the two groups, a t-test was carried out. To analyze the differences in the influence of the two actions, Bonferroni-corrected multiple comparison tests were carried out.	
3.	Nurarifah & Damayanti, 2022, Indonesia	Self-Management of Hypertension Patients in Controlling Blood Pressure	**Research Design**: The research design used is qualitative research with a phenomenological approach. **Variables**: The variables in this study were diet, physical activity, smoking, antihypertensive treatment, routine blood tests, and social support. **Research Sample**: The sample for this study was hypertensive patients	Salah satu hasil penelitian yang didapatkan adalah sebagian besar partisipan lebih memilih menggunakan diet rendah garam dan rendah kolesterol yang dinilai lebih baik dalam mengontrol tekanan darah dibandingkan dengan diet DASH.

			who had undergone treatment for at least 3 years at the Community Health Center, totaling 9 participants. **Instrument/ Intervention**: The research instrument used was a questionnaire containing open questions that had been prepared by the researcher himself. **Analysis**: The analytical method used in this research is Van Manen's method.	
4.	Rahimlou et al., 2022, Iran	Association of Adherence to the Dietary Approach to Stop Hypertension and Mediterranean Diets with Blood Pressure in a Non-Hypertensive Population: Results from Isfahan Salt Study (ISS)	**Research Design**: The research design used in this research is a cross-sectional study. **Variables**: The variables in this study were the implementation of Dietary Approaches to Stop Hypertension (DASH), Mediterranean (MED) Diets, and blood pressure. **Research Design**: Participants in this study were 1363 adults who had pre-hypertension. **Instrument/ Intervention**: The research instrument used in collecting data in this study was the semi-quantitative Food Frequency Questionnaire (FFQ). Hypertension was measured by standard methods.	The research results showed that there was a significant inverse relationship in adherence to the DASH and MED diets, resulting in lower pre-hypertension and systolic blood pressure in the non-hypertensive population. This shows that implementing a diet will be able to prevent hypertension, thereby reducing the risk of cardiovascular disease.

			Analysis: The data analysis applied in this study was multiple logistic regression by looking at the odds ratio of pre-hypertension in tertiles in the application of the MED and DASH diets.	
5.	Nortajulu et al., 2023, Indonesia	Implementation of Dietary Approaches to Stop Hypertension (DASH) Recommendations for Reducing Blood Pressure in Hypertensive Patients at Karang Anyar Community Health Center	**Research Design**: The design of this research is a case study. **Variables**: The variables of this study are the implementation of Dietary Approaches to Stop Hypertension (DASH) and Reducing Blood Pressure. **Research Sample**: The sample for this research was 3 participants suffering from hypertension at the Karang Anyar Community Health Center. **Instrument/ Intervention**: The instruments used in carrying out this research were in the form of nursing care and blood pressure monitoring. The intervention carried out is in the form of implementing the DASH diet which is applied at breakfast, lunch, and evening. The DASH diet is implemented for 3 days.	Based on the results of this research, it was found that the application of the DASH Diet was more effective in lowering blood pressure than the application of a low-salt diet which had been carried out by participants.

			Analysis: Data analysis was carried out through descriptive analysis of the research results.	
6.	Filippou et al., 2023, Yunani	DASH vs. Mediterranean diet on a salt restriction background in adults with high normal blood pressure or grade 1 hypertension: A randomized controlled trial	**Research Design**: The research design used was a Randomized Controlled Trial Study. **Variables**: The variables in this study are systolic and diastolic blood pressure. The 4 treatments in this study are 1) Without any action; 2) Providing a low salt diet; 3) Giving the DASH diet; and 4) Providing the MedDiet diet. **Research Sample**: This research was carried out at Hippokration General Hospital of Athens, Greece. This research was carried out for 3 months. The number of patients who participated was 240 people who were divided into 4 research groups with 4 different treatments. **Instrument/ Intervention**: There were 4 research groups consisting of 1) a Control group (participants who did not receive any action); 2) a Group treated with a low salt diet; 3) a DASH diet treatment group; and 4) MedDiet diet treatment group. The respondent	Hasil penelitian menunjukkan bahwa MedDiet memiliki keunggulan dalam penurunan tekanan darah sistolik. Selain itu, hasil penelitian juga menunjukkan bahwa Diet DASH dan MedDiet memiliki pengaruh yang lebih baik dalam menurunkan tekanan darah dibandingkan pembatasan garam saja.

			data taken was systolic and diastolic blood pressure. This research was conducted for 3 months. For 3 months, researchers monitored systolic and diastolic blood pressure. **Analysis**: The statistical tests carried out in this research were the Paired T-Test and Bonferroni-corrected multiple comparison tests.	
7.	Zhang et al., 2023, China	Novel Low-Sodium Salt Formulations Combined with Chinese Modified DASH Diet for Reducing Blood Pressure in Patients with Hypertension and Type 2 Diabetes: A Clinical Trial	**Research Design**: The design of this study was a randomized controlled single-blind trial with a semi-open design. **Variables**: The variables in this study were the application of Chinese Modified Dietary Approaches to Stop Hypertension (CM-DASH), Low-Sodium Salt Formulation Diets, and blood pressure in people with hypertension and type 2 Diabetes Mellitus. **Research Sample**: The number of respondents in this study was 130 participants from the Sihai Community Health Center, Chongqing Nan'an District. **Instrument/ Intervention**: In this study, participants were divided into 4	The research results show that the application of the CM-DASH diet with a combination of 23% and 52% low sodium salt concentration will have an impact on controlling blood pressure in people with hypertension and type 2 diabetes mellitus. Based on this, there is a need for outreach to populations who are vulnerable to the occurrence of an increase in blood pressure to have good compliance in reducing the concentration of salt used in daily life.

	research groups, namely group A (CM-DASH diet combined with a normal amount of salt), group B (CM-DASH diet combined with a 52% low sodium salt concentration), group C (CM-DASH diet combined with a concentration of 23% low sodium salt), and group D (CM-DASH Nutrition Dietary Pack combined with a concentration of 23% low sodium salt). The implementation of the action was carried out for 8 weeks. What was analyzed in this study was blood pressure, 24-hour urine samples, and electrolyte levels in the blood. **Analysis**: Researchers conducted statistical analysis in the form of paired t-test, one-way analysis of variance, Kruskal Wallis H Test, and Wilcoxon's signed-rank test.	

DISCUSSION

Based on the summary of publication search results used in this systematic review, it was found that the application of the DASH diet was more effective in reducing systolic and diastolic blood pressure in hypertension sufferers compared to the application of a low salt diet. According to Juraschek et al. (2017), The application of the DASH diet is more effective than the application of a low-salt diet in several countries/regions that have a culture of consuming fruit and vegetables, and have a good economic status. This economic and cultural status will influence the level of compliance of hypertension sufferers in implementing the DASH diet so that they prefer to adopt a low salt and low cholesterol diet to maintain their blood pressure in a stable condition. However, several studies also combine the DASH diet with a low-salt diet with the aim of further increasing the effectiveness of therapy in stabilizing blood pressure in hypertension sufferers.

The application of the DASH diet places greater emphasis on consuming foods high in potassium, calcium, and magnesium, which are mostly obtained from vegetables and fruit (Nurmayanti & Kaswari, 2022). The benefits of potassium content for the human body are maintaining fluid balance in the body, helping to reduce sudden increases or decreases in glucose and insulin levels, reducing calcium levels in urine which can trigger kidney stones, helping the function of the nervous system in the body, reduces the risk of stroke (especially ischemic stroke), maintains body muscle mass, and reduces the risk of heart attack (Tim Medis Siloam Hospitals, 2023).

The DASH diet also emphasizes consuming foods high in calcium. According to Agustin (2023), Calcium is a mineral and electrolyte that has an important role in the human body, including being useful for stabilizing blood pressure, controlling muscle contractions and the electrical activity of the body's nervous system, strengthening teeth and bones, and optimizing the blood clotting process. Apart from foods high in potassium and calcium, the consumption of foods high in magnesium is also emphasized in implementing the DASH diet. The mineral magnesium itself also has very important benefits for the human body, including playing a role in the process of forming cells and tissues in the human body, maintaining heart rhythm, supporting nervous function in the human body, and controlling muscle contractions in the body (Tim Fakultas Keperawatan Universitas Airlangga, 2021).

However, implementing the DASH diet must go through counseling with a nutritionist, because an assessment of the body's needs for these minerals and electrolytes must be carried out (Astuti et al., 2021; Nurmayanti & Kaswari, 2022). Nutritional counseling is considered important at the start of implementing the DASH diet. This is because the consumption of minerals and electrolytes that exceed the body's needs can also hurt the human body.

CONCLUSION

Based on the results of a systematic review that has been carried out, it was found that implementing the DASH diet will be more effective than implementing a low-salt diet. This shows the need for health education related to the DASH diet for hypertension sufferers so that they can implement the DASH diet so that the blood pressure of hypertensive sufferers will be stable.

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DECLARATION OF CONFLICTING INTEREST

In preparing this literature review, the authors did not experience any conflict of interest.

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AUTHOR CONTRIBUTION

Yusiana Vidhiastutik : Searching for reading sources, compiling research methodology, synthesizing reading sources, compiling manuscripts, revising manuscripts.

Yuly Peristiowati : Synthesis of reading sources, compiling manuscripts, revising manuscripts.

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Yusiana Vidhiastutik: None.

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REFERENCES

Agustin, S. (2023). *Elektrolit, Ketahui Jenis dan Manfaatnya untuk Tubuh*. https://www.alodokter.com/mengenal-berbagai-elektrolit-dalam-tubuh

Astuti, A. P., Damayanti, D., & Ngadiarti, I. (2021). PENERAPAN ANJURAN DIET DASH DIBANDINGKAN DIET RENDAH GARAM BERDASARKAN KONSELING GIZI TERHADAP PENURUNAN TEKANAN DARAH PADA PASIEN HIPERTENSI DI PUSKESMAS LARANGAN UTARA. *Gizi Indonesia*, *44*(1), 109–120. https://doi.org/https://doi.org/10.36457/gizindo.v44i1.559

Atmaja, C. P. I., & Ikhsan, M. (2022). *Mengelola Hipertensi untuk Hidup Lebih Sehat*. https://rs.ui.ac.id/umum/berita-artikel/artikel-populer/mengelola-hipertensi-untuk-hidup-lebih-sehat

Çapar, A., & Yılmaz, M. (2022). Which Is More Effective in Hypertension?: Salt-Free Diet vs. Dietary Approaches to Stop Hypertension (DASH) Diet. *Research Square*. https://doi.org/https://doi.org/10.21203/rs.3.rs-2056603/v1

Fiddaroini, F. N., & Ana, K. D. (2024). HUBUNGAN KEPATUHAN DIET RENDAH GARAM DENGAN TEKANAN DARAH PASIEN HIPERTENSI DI KLINIK INTAN HUSADA JATIROGO TUBAN. *Journal of Nursing and Health*, *9*(1), 1–8. http://jurnal.politeknikyakpermas.ac.id/index.php/jnh/article/view/359

Filippou, C., Thomopoulos, C., Konstantinidis, D., Siafi, E., Tatakis, F., Manta, E., Drogkaris, S., Polyzos, D., Kyriazopoulos, K., Grigoriou, K., Tousoulis, D., & Tsioufis, K. (2023). DASH vs. Mediterranean diet on a salt restriction background in adults with high normal blood pressure or grade 1 hypertension: A randomized controlled trial. *Clinical Nutrition*, *42*(10), 1807–1816. https://doi.org/https://doi.org/10.1016/j.clnu.2023.08.011

Jaclyn, A. (2020). *Diet DASH untuk Hipertensi, Ini Cara dan Manfaatnya*. https://www.klikdokter.com/info-sehat/jantung/diet-dash-untuk-hipertensi-ini-cara-dan-manfaatnya

Juraschek, S. P., Miller, E. R., Weaver, C. M., & Appel, L. J. (2017). Effects of Sodium Reduction and the DASH Diet about Baseline Blood Pressure. *Journal of American College of Cardiology*, *70*(23), 2841–2848. https://www.jacc.org/doi/abs/10.1016/j.jacc.2017.10.011

Kementerian Kesehatan Republik Indonesia. (2023). *Hipertensi Disebut sebagai Silent Killer, Menkes Budi Imbau Rutin Cek Tekanan Darah*. https://sehatnegeriku.kemkes.go.id/baca/rilis-media/20230607/0843182/hipertensi-disebut-sebagai-silent-killer-menkes-budi-imbau-rutin-cek-tekanan-darah/

Maulid, R. (2022). *Teknik Analisis Data Systematic Literature Review*. https://dqlab.id/teknik-analisis-data-systematic-literature-review

Nortajulu, B., Zainaro, M. A., & Trismiyana, E. (2023). Penerapan Anjuran Dietary Approaches to Stop Hypertension (DASH) terhadap Penurunan Tekanan Darah pada Pasien Hipertensi di Puskesmas Karang Anyar. *Jurnal Kreativitas Pengabdian Kepada Masyarakat (PKM)*, *6*(7), 2659–2668. https://doi.org/https://doi.org/10.31539/jks.v5i2.3087

Nurarifah, & Damayanti, R. (2022). Self-Management Pasien Hipertensi dalam Mengontrol Tekanan Darah. *Jurnal Keperawatan Silampari*, *5*(2), 641–649. https://doi.org/https://doi.org/10.31539/jks.v5i2.3087

Nurmayanti, H., & Kaswari, S. R. T. (2022). Efektivitas Pemberian Konseling Tentang Diet Dash terhadap Asupan Natrium, Kalium, Kalsium, Magnesium, Aktivitas Fisik, dan Tekanan Darah Pasien Hipertensi. *NUTRITURE JOURNAL*, *1*(1), 49–61. https://ojs.poltekkes-malang.ac.id/index.php/Nutriture/article/download/3531/508#:~:text=Prinsip diet rendah garam pada,terdapat pada buah dan sayur.

Rahimlou, M., Grau, N., Banaie-Jahromi, N., Taheri, M., Khosravi, A., Mavrommatis, Y., & Mohammadifard, N. (2022). Association of adherence to the dietary approach to stop hypertension and Mediterranean diets with blood pressure in a non-hypertensive population: Results from Isfahan Salt Study (ISS). *Nutrition, Metabolism and Cardiovascular Diseases*, *32*, 109–116. https://doi.org/https://doi.org/10.1016/j.numecd.2021.09.029

Saputri, N. K. W. (2020). *STATUS KEGEMUKAN, ASUPAN NATRIUM DAN TEKANAN DARAH SISTOLIK PENDERITA HIPERTENSI DI WILAYAH KERJA PUSKESMAS I DENPASAR TIMUR* [Poltekkes Denpasar]. http://repository.poltekkes-

denpasar.ac.id/4342/

Siloam Hospitals Medical Team. (2023). *Hipertensi - Penyebab, Gejala, dan Cara Mengatasinya*. https://www.siloamhospitals.com/en/informasi-siloam/artikel/apa-itu-hipertensi

Tim Fakultas Keperawatan Universitas Airlangga. (2021). *MENGENAL BERBAGAI JENIS ELEKTROLIT DALAM TUBUH DAN MANFAATNYA*. https://ners.unair.ac.id/site/lihat/read/766/mengenal-berbagai-jenis-elektrolit-dalam-tubuh-dan-manfaatnya

Tim Medis Siloam Hospitals. (2023). *7 Manfaat Kalium bagi Kesehatan Tubuh dan Sumbernya*. https://www.siloamhospitals.com/informasi-siloam/artikel/manfaat-kalium

World Health Organization [WHO]. (2023). *Hypertension*. https://www.who.int/health-topics/hypertension#tab=tab_1

Zhang, Z., Zhou, X., Mei, Y., Bu, X., Tang, J., Gong, T., Liu, G., Cai, S., Ren, Y., & Mu, L. (2023). Novel low-sodium salt formulations combined with Chinese modified DASH diet for reducing blood pressure in patients with hypertension and type 2 diabetes: a clinical trial. *Frontiers in Nutrition*, *10*, 1219381. https://doi.org/10.3389/fnut.2023.1219381