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Effectiveness of Hypertension Management through Early Detection, Hypertension Education, and Hypertension Exercise

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Hipertensi merupakan salah satu Penyakit Tidak Menular (PTM) yang menjadi penyebab utama komplikasi kardiovaskular di Indonesia. Penelitian ini bertujuan untuk mengevaluasi efektivitas pengelolaan hipertensi melalui intervensi deteksi dini, edukasi hipertensi, dan senam hipertensi. Desain penelitian menggunakan pre-eksperimental dengan pendekatan asuhan keperawatan komunitas. Intervensi mencakup deteksi dini dan edukasi hipertensi terhadap 55 warga serta senam hipertensi yang diikuti oleh 15 warga dengan pengukuran tekanan darah sebelum dan sesudah intervensi. Analisis data menggunakan analisis bivariat. Hasil menunjukkan bahwa deteksi dini berhasil mengidentifikasi prevalensi 49,1% responden mengalami gemuk berat, 29,1% hipertensi derajat 2, dan 9,1% memiliki kadar gula darah >200 mg/dL. Kebiasaan hidup tidak sehat dari konsumsi tinggi natrium (69,1%), gula (60%), lemak (45,5%), hanya 25,5% yang mengonsumsi sayur dan buah secara ideal, aktivitas fisik rendah (52,7%), dan kebiasaan merokok (10,9%). Edukasi hipertensi terbukti meningkatkan skor pengetahuan dari 5,33 menjadi 7,69 (p = 0,000), dan senam hipertensi menurunkan tekanan darah sistolik dari 129,47 mmHg menjadi 122,73 mmHg (p = 0,000), serta diastolik dari 83,53 mmHg menjadi 81,13 mmHg (p = 0,027). Pengelolaan hipertensi melalui deteksi dini, edukasi, dan senam terbukti efektif meningkatkan pengetahuan serta menurunkan tekanan darah warga.

Effectiveness of Hypertension Management through Early Detection, Hypertension Education, and Hypertension Exercise

Hypertension is one of the leading Non-Communicable Diseases (NCDs) causing cardiovascular complications in Indonesia. This study aims to evaluate the effectiveness of hypertension management through early detection, health education, and hypertension exercise interventions. A pre-experimental design was used with a community nursing care approach. The intervention included early detection and hypertension education for 55 residents, as well as hypertension exercise involving 15 residents, with blood pressure measured before and after the intervention. Data were analyzed using bivariate analysis. Results showed that early detection identified a prevalence of 49.1% of respondents as severely overweight, 29.1% with grade 2 hypertension, and 9.1% with blood glucose levels >200 mg/dL. Unhealthy lifestyle habits included high sodium intake (69.1%), sugar (60%), fat (45.5%), while only 25.5% consumed vegetables and fruits adequately, 52.7% had low physical activity, and 10.9% were smokers. Hypertension education significantly increased knowledge scores from 5.33 to 7.69 (p = 0.000), and hypertension exercise significantly reduced systolic blood pressure from 129.47 mmHg to 122.73 mmHg (p = 0.000), and diastolic pressure from 83.53 mmHg to 81.13 mmHg (p = 0.027). Hypertension management through early detection, education, and exercise proved effective in increasing knowledge and reducing blood pressure among residents.

Introduction

Non-Communicable Diseases (NCDs) are a major challenge in global health development because they account for the majority of the number of illnesses and premature deaths. Based on data from the World Health Organization (WHO, 2022), 74% of total global deaths or around 41 million deaths annually are caused by NCDs, with 17.9 million of them dying from cardiovascular disease, including hypertension as one of the risk factors (Ministry of Health of the Republic of Indonesia, 2023a).

In Indonesia, a similar situation also occurs, where the burden of heart disease and stroke continues to increase and is the main cause *Disability-Adjusted Life Years* (DALYs). Based on findings from Muharram et al. (2024), ischemic heart disease and stroke remain the dominant factors contributing to the highest mortality and morbidity rates in Indonesia. Among the different types of cardiovascular disease, stroke, and peripheral artery disease are recorded as the most common. Compared to other ASEAN countries, Indonesia has the second highest number of DALYs due to cardiovascular disease after Laos. At the provincial level, the highest DALYs were recorded in Bangka Belitung, South Kalimantan, and Yogyakarta, while the highest increases occurred in West Nusa Tenggara (24%), South Kalimantan (18%), and Central Java (11%) (Wei et al., 2025).

Indonesian Health Survey 2023, It shows that the prevalence of hypertension based on blood pressure measurement reaches 30.8%, much higher than the figure based on medical diagnosis (8.6%). This shows that there is a considerable gap between the number of medically detected cases and the real conditions on the ground. This gap is exacerbated by the low public awareness to conduct regular blood pressure checks. Various factors also affect the increase in the prevalence of hypertension, including unhealthy living behaviors, such as an unbalanced diet, lack of physical activity, and smoking habits (Arifin et al., 2022). In addition, the high consumption of foods high in sodium, fat, and sugar in daily life also contributes to an increased risk of hypertension in general.

Hypertension is one of the most common forms of NCDs but often goes undetected because it does not show specific symptoms, so it often goes unnoticed (Nuryanto & Dewi, 2022). Research Sujarwoto and Maharani (2022), shows that the rate of early detection in Indonesia is still very low. Of the 27,692 respondents surveyed, only 14.4% (3,996 people)

regularly checked their blood pressure, while cholesterol, blood sugar, electrocardiogram, and prostate cancer checks were carried out by less than 2% of respondents. The lack of understanding and involvement of the public in early detection programs causes most individuals to only find out about their health conditions after the appearance of complications, which ultimately results in increased morbidity and mortality rates (Nuryanto & Dewi, 2022).

Efforts to prevent and control hypertension require a comprehensive approach. Sudayasa et al. (2020), suggests that actionable strategies include health education, screening and monitoring of risk factors, and strengthening advocacy and partnerships. Early detection, health promotion, and hypertension management must involve cooperation between health workers, the government, and the community. In addition, the interventions carried out need to consider the specific cultural aspects and conditions in each region so that the program becomes more effective. The results of the self-reflection survey in RW 12 Sukamentri Village from December 30, 2024 to January 2, 2025 showed that of 757 people of productive age, pre-elderly, and elderly, there were 102 cases of hypertension (10.5%), 4 cases of diabetes mellitus (0.4%), and 4 cases of stroke (0.4%). Unhealthy lifestyles are also still common among 316 Heads of Families (KK), with 43.7% of households regularly consuming high-sodium foods, 65.2% high-fat foods, and 48.1% high-sugar foods, both daily and 2-3 times a week. In addition, 88.3% of households have family members who smoke, with 55.1% being active smokers for more than 10 years, and 48.4% of households rarely or never exercising in a week.

Data from the posyandu shows that out of a total of 43 elderly people, in 2024 in October the number of elderly people who come to the posyandu is only 31 people, in November as many as 28 people, and in December as many as 19 people, with 55.8% of the elderly not regularly visiting the posyandu. The head of the posyandu cadre said that elderly visits to the posyandu are decreasing every month, possibly due to work activities, low interest, and posyandu activities which are considered monotonous because they only consist of blood pressure checks, blood sugar for hypertensive patients, and anthropometry. In addition, posyandu cadres also said that the posyandu was only managed by five cadres, who found it difficult to attract the interest of the elderly to come to the posyandu.

Therefore, a more comprehensive form of hypertension management is needed and attracts the interest of the public, so that they are aware and active in monitoring their health.

According to the hypertension management theory from the Health Social Security Administration Agency (BPJS Kesehatan) which has developed the Chronic Disease Management Program (Prolanis), where the Prolanis activity/program is an activity of BPJS while the PTM Posbindu program is an activity of the Health Office (Fauzi et al., 2020). The Posbindu PTM and Prolanis programs consist of health checks in the form of blood pressure checks, height measurement, and weight to determine Body Mass Index (BMI), blood sugar checks, counseling and exercise. In the context of hypertension education, the approach uses *Hypertension Knowledge* from Erkoc et al. (2012), can help improve public understanding through the delivery of materials that include definitions, treatments, adherence to medications, lifestyle, diet, and complications (Ernawati et al., 2020b).

Based on previous studies, activities at the elderly posyandu generally only include one type of intervention, such as education or blood pressure checks. For example, a study at Posyandu Shofa, Cileunyi, Bandung, showed that the activities carried out were limited to health counseling and blood pressure measurement (Bethasari et al., 2022). Therefore, researchers are interested in managing hypertension, with the novelty of the application of three components simultaneously, namely early detection, health education, and hypertension gymnastics at the posyandu level. This integrative approach has not been widely applied. This research was conducted as a continuous effort aimed at evaluating the effectiveness of hypertension disease management through early detection interventions, hypertension education, and hypertension gymnastics in RW 12 Sukamentri Village, Garut Kota District.

Method

This study uses a pre-experimental design with a one-group pre-test post-test approach and community nursing care, with the aim of evaluating the effectiveness of hypertension management in RW 12 Sukamentri Village through early detection, education, and hypertension gymnastics. The study population included people of productive age, pre-elderly, and the elderly with an intervention sample of 55 residents for early detection and education, and 15 residents for hypertension exercises. The instruments used include aneroid sphygmomanometers, glucometers, anthropometric tools, risk behavior questionnaires, and the Hypertension Knowledge Level Scale (10 questions) to assess knowledge. Early detection interventions are

carried out through blood pressure, blood sugar checks, and anthropometry; education is delivered with lectures and leaflets on hypertension; Meanwhile, hypertension gymnastics was carried out for 45 minutes to assess physiological changes. Data analysis was carried out bivariate by comparing pre-test and post-test results to assess knowledge improvement and changes in blood pressure before and after intervention.

Research Results

Table 1. Distribution of Frequency of RW 12 Residents Present in Posyandu Activities based on Demographic Data (n = 55)

Variabel	Frequency	Percentage (%)
Gender		
Man	6	10.9
Woman	49	89.1
Age		
Productive (19 - 44 years old)	11	20
Pre-Elderly (45 - 59 years old)	26	47.3
Elderly (≥ 60 years old)	18	32.7

Based on table 1, almost all respondents were female (89.1%) and almost half of the respondents came from the pre-elderly (47.3%) and elderly (32.7%) groups.

Table 2. Frequency Distribution of RW 12 Residents Present in Posyandu Activities based on the Results of Early Detection of Hypertensive Disease Risk (n = 55)

Examination	Frequency (*f*)	Percentage (%)
Body Mass Index		
Skinny Weight (<17)	1	1.8
Kurus Ringan (17 - 18.4)	0	0
Normal (18.5 - 25)	16	29.1
Light Fat (25.1 - 27)	11	20
Heavy Fat (>27)	27	49.1
Blood pressure		
Normal 120/80 mmHg	21	38.2
So Hypertension 121-139/81-89 mmHg	8	14.5
Hypertension Grade 1 140-159/90-99 mmHg	4	7.3
Hypertension Grade 2 >160/>100 mmHg	16	29.1
Isolated Systolic Hypertension >140/<90 mmHg	6	10.9
Blood Sugar During		
Normal: < 200 mg/dL	50	90.9
Diabetes: > 200 mg/dL	5	9.1

Based on the data in table 2, the results of the examination showed that the prevalence of heavy obesity reached 49.1%, reflecting almost half of the total respondents. In addition, nearly half of the respondents (29.1%) were recorded to have grade 2 hypertension, which is a serious clinical condition with a high potential for cardiovascular complications. A small percentage of

respondents (10.9%) showed isolated systolic hypertension conditions, which although diastolic pressure was within normal limits, remained at risk of cardiovascular disorders. In addition, a small percentage (9.1%) of respondents had blood sugar levels that exceeded 200 mg/dL, indicating a possible impaired glucose tolerance and requiring further evaluation to establish a diagnosis of diabetes.

Table 3. Frequency Distribution of RW 12 Residents Present in Posyandu Activities based on Risk Factors for Hypertension (n = 55)

Variabel	Frequency (*f*)	Percentage (%)
Eat Vegetables and Fruits every day (Ideal 5 servings/day)		
Ya		
No	14	25.5
	41	74.5
Consumption Habits of High-Sodium Foods (such as Salted Fish, Instant Noodles, Fast Snacks)		
Not at all	6	10.9
Once a Week	34	61.8
2 - 3 times a week	10	18.2
Every day	5	9.1
Consumption Habits of High-Fat Foods (such as Swallows, Fried Foods, Offal)		
Not at all	15	27.3
Once a Week	15	27.3
2 - 3 times a week	22	40
Every day	3	5.5
Consumption Habits of High-Sugar Foods (such as Hot Rice, Cakes, Soft Drinks/Coffee)		
Not at all	6	10.9
Once a Week	14	25.5
2 - 3 times a week	33	60
Every day	2	3.6
Sports of the Week		
More than 5 times	0	0
3 - 5 times	6	10.9
1 - 3 times	20	36.4
No Sport	29	52.7
Smoke		
Ya	6	10.9
No	49	89.1

Based on table 3, the results of the examination showed that a small percentage of respondents had ideal vegetable and fruit consumption habits (25.5%), while most of the respondents consumed unhealthy foods more often, such as high-sodium foods (69.1% consumed 1-3 times per week or daily) and high-sugar foods (60% consumed 2-3 times per

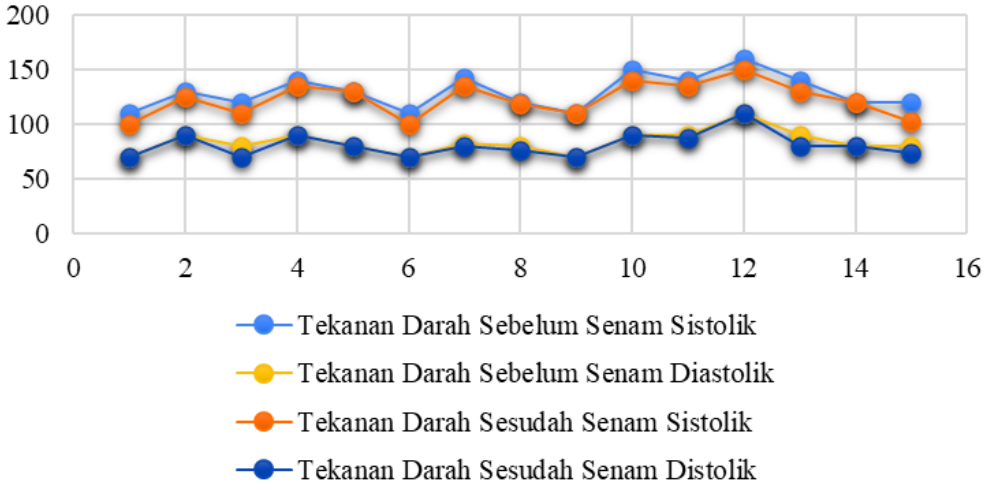
week). In addition, almost half of the respondents also consumed high-fat foods (45.5% consumed 2-3 times per week or daily). Exercise habits were also very low, with the majority of respondents not exercising at all (52.7%), while only a small percentage of respondents exercised 3-5 times a week (10.9%). Although the prevalence of smoking was only a small fraction of respondents (10.9%), unhealthy diets and low physical activity require serious attention to prevent the risk of non-communicable diseases, such as hypertension, diabetes, and obesity.

Table 4. Results of Measurement of the Level of Knowledge of RW 12 Residents Who Attended the Posyandu Activity on Hypertension Education (n = 55)

Hypertension Knowledge	**Minimum**	**Maximum**	**Average**	**p-*value***
Before Education	2	9	5.33	.000
After Education	5	10	7.69	

Hypertension education activities involved 55 respondents, so data normality testing was carried out using *the Kolmogorov-Smirnov test* which is suitable for the number of samples above 50. The test results showed a significance value of 0.000 *(p < 0.05)*, indicating abnormal data distribution. Therefore, the analysis was continued using the non-parametric *Wilcoxon Sign Rank Test test*. The test results showed the same p-value (0.000), which showed a significant increase in knowledge after education. Before education, respondents' knowledge scores ranged from 2–9 (average 5.33), and increased to 5–10 (average 7.69) after the intervention, as listed in table 4. These findings indicate that the education provided is effective in improving participants' understanding of hypertension

Figure 1. Chart Diagram of Blood Pressure Measurement Results Before and After Hypertension Exercise (n = 15)



Based on figure 1, a comparison of blood pressure before and after hypertension exercises can be seen in 15 participants. The light blue and yellow lines indicate blood pressure before gymnastics, while the orange and dark blue (navy) lines indicate blood pressure after gymnastics. In general, the graph shows that after gymnastics, the participants' blood pressure decreases. This decrease is most clearly seen in systolic blood pressure (light blue to orange lines).

Table 5. Blood Pressure Measurement Results Before and After Hypertension Exercise (n = 15)

Blood pressure	**Before Gymnastics**			**After Gymnastics**			**p-*value***
	Min.	**Max.**	**Average**	**Min.**	**Max.**	**Average**	
Systolic	110	160	129.47	100	150	122.73	.000
Diastome	70	110	83.53	70	110	81.13	.027

Hypertension gymnastics activities in this study involved as many as 15 participants. Given that the number of samples was less than 50, the normality test was carried out using *the Shapiro-Wilk* method. The results of the normality test of systolic blood pressure before and after the intervention showed significance values of 0.239 and 0.452, both of which exceeded the threshold of 0.05. This indicates that the data is distributed normally, so the test is continued using a parametric *dependent t-test*. Based on table 5, the test results showed a significance value of 0.000 *($p < 0.05$)*, which indicates a statistically significant difference between systolic blood pressure before and after the exercise of exercise. Prior to the intervention, participants' systolic blood pressure was in the range of 110–160 mmHg with an average of 129.47 mmHg. After hypertension gymnastics was performed, there was a decrease in the range to 100–150 mmHg, with an average decrease to 122.73 mmHg.

Meanwhile, normality testing for diastolic blood pressure data showed different results. Significance values of 0.037 and 0.026, respectively, indicate that the data is not normally distributed. Therefore, the analysis was continued using the non-parametric *Wilcoxon Sign Rank Test*. The test results showed a significance value of 0.027 *(p < 0.05)*, which indicated a significant difference between diastolic blood pressure before and after the intervention. As shown in table 5, the participants' diastolic blood pressure before gymnastics was in the range of 70–110 mmHg, with an average of 83.53 mmHg. Although the range after the intervention remained the same, the average blood pressure decreased slightly to 81.13 mmHg. Although this change is not as large as the decrease in systolic pressure, the significance value suggests that the difference remains statistically relevant.

Discussion

Non-Communicable Disease (NCD) management requires a comprehensive approach, especially towards hypertension which is one of the leading causes of premature death worldwide (World Health Organization (WHO), 2023). In the management of hypertension, community-based interventions such as early detection, health education, and physical activity have been shown to be effective in controlling hypertension (Flor et al., 2020). Early detection is important to be done regularly to find out blood pressure and other risk factors early on (Putri et al., 2021). This is reinforced by the findings Shaninnabila et al. (2024), which showed that the implementation of blood pressure screening at the Bagaswaras Gurah Posyandu succeeded in finding 22% of previously undiagnosed hypertension cases. These findings confirm the importance of routine screening in reducing the incidence of hidden hypertension, especially in the elderly group. Furthermore, early detection integrated into public health programs through routine monitoring by health workers has also been proven to be able to increase adherence to medication and encourage healthy lifestyle changes, such as increasing fruit and vegetable consumption, increasing physical activity, and reducing salt, fat, cigarette and alcohol consumption (Xiao et al., 2020).

In RW 12 Sukamentri Village, almost half of the respondents (49.1%) were classified as severely obese, which shows the high prevalence of obesity as one of the main risk factors for hypertension. Obesity has long been associated with various metabolic disorders such as type 2

diabetes mellitus, hypertension, and coronary heart disease (Powell-Wiley et al., 2021). Community-based lifestyle interventions are one of the important strategies in addressing this problem. Study Lisón et al. (2020) showed that a community-based weight management program through nutrition education and online modules for 12 months was able to reduce the average Body Mass Index (BMI) by 0.4 kg/m² ($p = .005$) and reduce diastolic blood pressure by 1.8 mmHg ($p = .03$). These results reinforce that a community-focused approach to education and behavior change can have a significant impact on hypertension control, especially in individuals with obesity.

Furthermore, the study found that almost a third of respondents had 2nd degree hypertension (29.1%). This condition is a more severe form of hypertension and is at high risk of cardiovascular complications such as heart failure and stroke (Flack & Adekola, 2020). In addition, a small percentage of respondents (10.9%) experienced isolated systolic hypertension—a condition in which systolic pressure increases ≥140 mmHg while diastolic pressure remains normal (<90 mmHg). Although often undetected, isolated systolic hypertension remains a high risk of cardiovascular events, especially in the elderly population (Hosseinzadeh et al., 2022). These findings reinforce the importance of sustainable early detection and healthy lifestyle interventions at the community level. The presence of comorbidities such as blood sugar levels when they are above 200 mg/dL in 9.1% of respondents indicates the need for an integrated approach between the management of hypertension and other metabolic disorders. Study by Sangouni et al., (2024) showed that the application of the DASH diet consistently lowered systolic blood pressure to 6.97 mmHg, diastolic 5.16 mmHg, and significantly lowered glucose and triglycerides, underscoring the effectiveness of evidence-based nutrition approaches in the simultaneous control of hypertension and diabetes.

The high prevalence of hypertension in RW 12 also shows the importance of assessing the lifestyle of respondents. Only 25.5% of respondents consumed fruits and vegetables ideally, while most had a habit of consuming foods high in sodium (69.1%), sugar (60%), and fat (45.5%). This diet is known to contribute to an increased risk of Non-Communicable Diseases (NCDs) such as hypertension, diabetes, and heart disease (Thapsuwan et al., 2024). Education programs involving families such as the Family Self-Management Program (FMSP) have been proven to be able to significantly lower blood pressure through nutrition education and self-

monitoring (Susanto et al., 2024). This is directly related to the biological mechanism by which excess sodium causes fluid retention and increased blood volume (Bailey & Dhaun, 2024), while sugar and fat intake worsens insulin resistance and accelerates atherosclerosis (Antar et al., 2023; Maki et al., 2021).

The lack of physical activity is also a challenge, with 52.7% of respondents not doing physical activity at all and only 10.9% exercising regularly. In fact, physical activity is very important in increasing insulin sensitivity and lowering blood pressure (Małkowska, 2024). The World Health Organization (WHO) (2020) recommends that individuals do at least 150 - 300 minutes of moderate-intensity aerobic activity each week to support metabolic and cardiovascular health (Bull, 2020). Interestingly, research by Noone et al. (2020) mentioning that the effectiveness of regular aerobic exercise can even match pharmacological therapy in lowering blood pressure in mild to moderate hypertension.

Although the prevalence of smoking in this study was relatively low, at only 10.9%, smoking remains a significant risk factor for the development of cardiovascular and metabolic diseases (Mambo et al., 2024). Smoking can cause vasoconstriction, increased blood pressure, and endothelial dysfunction, which worsens blood pressure control in people with hypertension. GENTSMOKING study by Gaya et al. (2024) showed that smoking cessation for 12 weeks lowered systolic blood pressure from 131 to 125 mmHg and diastolic from 79 to 77 mmHg, reinforcing the urgency of integrating smoking cessation counseling in hypertension management programs. Overall, the combination of unhealthy diet, lack of physical activity, and smoking habits contributes significantly to the burden of hypertension disease at the community level. In facing these challenges, the educational interventions applied in this study include information related to hypertension, including definition, causes, signs and symptoms, classification, treatment, adherence to treatment, healthy lifestyle, diet, and complications. The results proved to be effective in increasing respondents' knowledge of hypertension. Before the education, the respondents' knowledge score ranged from 2 to 9, with an average of 5.33, while after education, the score increased in the range of 5 to 10, with an average of 7.69 *(p = 0.000)*. Education includes information about hypertension and its management, encouraging understanding and behavior change. This is in line with studies Debela et al. (2023), which showed a 9% and diastolic decrease in systolic blood pressure after 3 months of lifestyle

education. Similarly, the study Kurnia et al. (2020) shows that the provision of educational programs significantly increases knowledge *(p = 0.000)* and attitudes *(p = 0.008)* patients in hypertension management, thus emphasizing the important role of health education, especially in rural areas.

Improving health literacy plays a crucial role in improving health outcomes and empowering communities, by enabling individuals to make better decisions about their health (Andriani et al., 2024). Good health literacy allows people with hypertension to better understand the importance of regular blood pressure monitoring, avoiding the consumption of high-sodium foods, and adhering to established therapy regimens. This reinforces that educational interventions should be an integral part of hypertension management efforts in the community. In addition, the success of health education in increasing public understanding and compliance is also highly dependent on the methods and media used. Study Ernawati et al. (2020) showed that the use of leaflet media significantly improved respondents' knowledge compared to the control group *(p < 0.001)*. In the context of this study, the educational methods delivered to the residents of RW 12 and its supporting media are believed to contribute to increasing respondent involvement, thereby strengthening their understanding of blood pressure control and prevention of hypertension complications more effectively.

In addition to education, the results of this study also show that hypertension gymnastics makes a significant contribution to lowering blood pressure. The average systolic blood pressure decreased from 129.*47* mmHg to 122.73 mmHg *(p = 0.000)*, and diastolic blood pressure decreased from 83.53 mmHg to 81.13 mmHg *(p = 0.027)*. These results are in line with the findings Setiawan et al. (2024) in RW 04 and 13 Ciwalen Village, which reported a decrease in blood pressure from 155/85 mmHg to 125/80 mmHg after one hypertension exercise. Exercise triggers a variety of physiological responses, including increased oxygen requirements by tissues, increased cardiac output, and vasodilation of blood vessels after activity stops. This vasodilation results in a post-exercise decrease in blood pressure in the range of 30–120 minutes, a phenomenon known as *post-exercise hypotension* (Martani et al., 2022). Furthermore, regular physical activity such as hypertension gymnastics has long-term benefits in improving vascular structure and function. This happens through a reduction in microvascular remodeling, normalization of capillary density, and increased release of nitric oxide which causes relaxation

of blood vessels (De Ciuceis et al., 2023). In addition, regular physical activity also increases insulin sensitivity and improves glycemic control, thus helping to prevent metabolic disorders such as type 2 diabetes mellitus, obesity, and cardiovascular diseases that contribute to the occurrence of hypertension (Małkowska, 2024).

Therefore, by considering the effectiveness of health education, hypertension gymnastics, and early detection activities, all three need to be integrated in an ongoing manner in hypertension management programs at the community level. The implementation of routine gymnastics, structured health counseling, and periodic blood pressure checks are important components in strengthening promotive and preventive strategies in RW 12. Although the results of this study show the positive potential of the integrated approach, there are limitations that need to be observed, namely the relatively small number of hypertensive exercise samples (15 people) and the short duration of the intervention so that it is not enough to assess the sustainability of behavior change and long-term effects. Therefore, generalization of findings must be done carefully. Further research is recommended to involve a larger sample count with a control group to strengthen the validity of the results, use a longitudinal design to evaluate the long-term impact of interventions, and assess cultural, social, and psychological factors that influence community compliance. In addition, the development of more comprehensive evaluation instruments, such as measures of quality of life or other clinical outcomes (e.g., blood sugar and lipid profiles), will further enrich the understanding of the effectiveness of these integrative models.

Conclusion

This study shows that hypertension management through early detection, education, and hypertension gymnastics has a positive impact on increasing knowledge and reducing blood pressure for residents of RW 12 Sukamentri Village. Early detection successfully identifies obesity, hypertension, and unhealthy lifestyle habits, effective education improves public understanding, while hypertension gymnastics contributes to a decrease in systolic and diastolic blood pressure. Posyandu cadres are expected to continue this activity regularly with the assistance of health center nurses.

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