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Synergistic Effects of Walking and Acupressure on Stroke Risk Reduction in Individuals with Hypertension and Diabetes Melitus

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Abstract: Stroke is a leading cause of death and disability worldwide. Most strokes are associated with modifiable risk factors, such as hypertension, diabetes mellitus, and high cholesterol. These risk factors can be managed through non-pharmacological approaches, such as physical activity and complementary therapies. To analyze the effect of a combination of walking intervention and acupressure therapy on blood pressure, fasting blood glucose levels, and cholesterol levels in patients with stroke risk factors. Methods: This study used a quantitative method with a quasi-experimental two-group pretest–posttest design. A total of 60 respondents from the working areas of the Curup Community Health Center and the Perumnas Community Health Center were divided into an intervention group and a control group. The intervention group received a walking program combined with acupressure therapy and was monitored daily using a checklist. Blood pressure was measured using an Omron digital sphygmomanometer, while fasting blood glucose and cholesterol levels were measured using a Multimeter Auto Check device. Measurements were taken before the intervention and on the 12th day after the intervention. Data analysis used paired t-tests, Wilcoxon tests, and Mann–Whitney tests according to data distribution. Conclusion: There were significant differences in systolic blood pressure, fasting blood glucose levels, and cholesterol levels in the intervention group after the intervention ($p < 0.001$). However, changes in diastolic blood pressure did not show significant differences during the study period. The Mann–Whitney test also showed significant differences between the intervention and control groups in systolic blood pressure, fasting blood glucose, and cholesterol. Stroke prevention education has a positive impact on controlling stroke risk factors, particularly systolic blood pressure, fasting blood sugar, cholesterol, and knowledge levels. Health behavior monitoring using checklists has been implemented, but increased monitoring intensity is needed to support optimal clinical outcomes.

Keyword: Blood pressure; Blood sugar; Health behaviour; Stroke prevention education; Stroke risk factors

Introduction

Stroke remains one of the major global health problems and is a leading cause of mortality and long-term disability worldwide. Pathophysiologically, stroke occurs when blood flow to the brain is disrupted due to blockage or rupture of blood vessels, resulting in an inadequate supply of oxygen and nutrients to brain tissue. This condition can cause permanent damage to brain cells if not treated promptly. The neurological consequences of stroke may affect various bodily functions, including cognitive ability, communication, mobility, emotional regulation, and the ability to perform daily activities (Elendu et al., 2023). Therefore,

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stroke prevention efforts are very important to reduce mortality and disability associated with this condition.

According to the World Health Organization (WHO), stroke is the second leading cause of death in the world and one of the main causes of long-term disability globally. Globally, it is estimated that around 93.8 million people live with a history of stroke, with approximately 11.9 million new cases occurring each year. The lifetime risk of experiencing a stroke is estimated to reach 1 in 4 among individuals aged 25 years and older. Although the risk of stroke increases with age, the incidence of stroke is also relatively high among the productive age group of 15–49 years, indicating that stroke is not only a disease of older adults but also a significant health problem among the working-age population (WHO, 2025) .

The Global Stroke Fact Sheet published by the World Stroke Organization also shows that stroke is the second leading cause of death (approximately 7 million deaths) and the third leading cause of combined death and disability, as measured by disability-adjusted life years (DALYs; more than 160 million DALYs) worldwide. This represents the most comprehensive GBD stroke epidemiological study to date and shows that the number of people suffering from stroke, dying from stroke, or living with post-stroke disability has increased substantially worldwide (Feigin et al., 2025). The burden of this disease is higher in low- and middle-income countries due to limitations in risk factor control, early detection, and access to healthcare services. Interestingly, most stroke cases are actually preventable. Approximately 80–90% of stroke cases are associated with modifiable risk factors such as hypertension, dyslipidemia, diabetes mellitus, and lack of physical activity (Feigin et al., 2025). Therefore, controlling modifiable risk factors is a key strategy in stroke prevention.

In Indonesia, stroke is also a significant public health problem. Data from the 2023 Indonesian Health Survey reported a stroke prevalence of 8.3 per 1,000 population aged over 15 years. The high prevalence indicates that the control of stroke risk factors in the community still needs to be improved. Hypertension, as the most dominant risk factor, is estimated to contribute to approximately 50–70% of stroke cases, making blood pressure control an important component in stroke prevention (Mohammad et al., 2025). Setyopranoto et al. (2022) reported that around 65.7% of individuals with stroke risk factors, particularly hypertension, demonstrated low levels of stroke prevention behavior. In addition to hypertension, diabetes mellitus is also an important risk factor that contributes to vascular damage through impaired glucose metabolism and endothelial dysfunction. However, several studies indicate that stroke prevention behaviors in the community remain relatively low. It is estimated that nearly 80% of new stroke cases could be prevented through increased awareness of stroke risk factors and warning signs (Dar et al., 2019). In addition, behavioral change interventions that integrate motivational strategies have been shown to improve adherence to lifestyle modifications, thereby reducing stroke risk factors (Hall & Blake, 2024).

The results of a retrospective cohort study in China also proved that the combination of hypertension and diabetes mellitus can significantly increase the risk of stroke (Liu et al., 2021). The control of these risk factors is not only achieved through pharmacological therapy but can also be supported by non-pharmacological interventions focusing on healthy lifestyle modifications. Physical activity is one of the effective approaches to help control blood pressure and blood glucose levels. Walking is a simple form of physical activity that is easy to perform and has a low risk of injury. Regular walking has been shown to improve insulin sensitivity, enhance glucose metabolism, and help reduce blood pressure by improving cardiovascular function and blood circulation (Rizka et al., 2022).

In addition to physical activity, complementary therapies such as acupressure have increasingly been used as supportive approaches in the management of chronic diseases. Acupressure is a technique involving stimulation of specific points on the body aimed at improving blood circulation, restoring the body's energy balance, and supporting metabolic regulation. However, individual responses to the implementation of this health intervention may vary depending on several factors such as age, gender, education level, occupation, disease history, and lifestyle habits (Pan et al., 2021).

Although several studies have demonstrated the benefits of physical activity and complementary therapies in the management of chronic diseases, studies combining walking and acupressure interventions to stabilize blood pressure and blood glucose levels among patients with hypertension and diabetes mellitus remain limited. In fact, both conditions are major risk factors for stroke. Therefore, further research is needed to examine the effectiveness of the combined walking and acupressure interventions on clinical indicators related to stroke risk factors. Based on these considerations, this study aims to analyze the effect of walking and acupressure interventions on the stabilization of systolic and diastolic blood pressure as well as fasting blood glucose levels in patients with hypertension and diabetes mellitus as an effort to control stroke risk factors.

Method

This study used a quantitative approach with a quasi-experimental two-group pretest–posttest design. This design involved two groups: an intervention group and a control group, each of which was measured before and after the intervention. This design was chosen to evaluate the effect of stroke prevention education on changes in health behavior and indicators of stroke risk factor control.

Setting and samples

The study was conducted in 2025 in the working area of the Perumnas Community Health Center and the Curup Community Health Center, Rejang Lebong Regency. The population in this study were adults who had risk factors for stroke. The sampling technique used purposive sampling based on criteria determined by the researcher. Inclusion criteria included: aged ≥18 years, having at least one risk factor for stroke (hypertension, diabetes mellitus, or dyslipidemia), being able to communicate well, and being willing to be a respondent by signing an informed consent. Meanwhile, exclusion criteria included: having cognitive impairment or severe communication disorders, health conditions that prevented them from participating in the entire series of studies, not being present at the initial or final measurements. The total sample size was 60 respondents, divided into 30 respondents in the intervention group and 30 respondents in the control group.

Intervention

The intervention group received the intervention after a pretest. On the first day, respondents in the intervention group underwent blood pressure, fasting blood sugar, and cholesterol measurements as baseline data for the study. Following the initial measurements, respondents received an intervention consisting of walking training as a physical activity and acupressure training as a complementary therapy that could be performed independently throughout the study period. In addition, respondents were given a walking behavior monitoring sheet to record their activities during the intervention period. Re-measurements (posttests) of blood pressure, fasting blood sugar, and cholesterol levels were conducted on day 12 using the same procedures as the initial measurements. The control group was only measured on days 1 and 12, with no additional interventions provided during the study period (Alfailakawi, 2017).

Measurement and data collection

The independent variable in this study is the combination intervention of walking and acupressure. The dependent variables include systolic blood pressure, diastolic blood pressure, fasting blood glucose levels, and cholesterol levels as indicators of stroke risk factor control. This study was conducted among patients with hypertension and diabetes mellitus as the characteristics of the respondents. Blood pressure was measured using an Omron digital sphygmomanometer. Fasting blood sugar and cholesterol levels were measured using an Auto Check Multimeter.

Data collection was conducted in two stages: pretest (day 1): measurement of blood pressure, fasting blood sugar, and cholesterol, Posttest (day 12): re-measurement of all variables using the same procedure. The entire data collection process was carried out directly by the researcher.

Data analysis

Data were analyzed using inferential statistical analysis. Data distribution was first tested using the paired t-test (to analyze the difference between pretest and posttest data with normally distributed data), the Wilcoxon test (for non-normally distributed data), and the Mann–Whitney test (to analyze the difference between the intervention and control groups). Data analysis was performed using computer statistical software.

Ethical considerations.

This study has obtained ethical approval from the Health Research Ethics Committee (KEPK) under number: KEPK.BKL/440/05/2025. All respondents were provided with an explanation of the purpose, benefits, procedures, and rights and obligations as participants before the study was conducted. Respondents who agreed to participate in the study signed an informed consent form. The confidentiality of respondents' identities and data was fully maintained.

Result and Discussion

Analysis Univariate

The *Mean* age on group intervention that is around 54.37 years old, age youngest 45 years old and the oldest is 62 years old. Meanwhile on group control *Mean* age respondent 50.17 years old with age youngest 23 years old and oldest 60 years old as shown in Table 1.

Table 1. Characteristics Respondents Based on Age

Group	n	*Mean*	*Med*	*Min-Max*
Intervention	30	54.37	55.00	45-62
Control	30	50.17	50.50	23-60

Table 2. Distribution Characteristics Respondents (n,%) on Group Intervention And Control (N = 60)

Variables	Intervention Group		Control Group	
	n	%	n	%
Type Sex				
1. Male	5	16.7	7	23.3
2. Women	25	83.3	23	76.7
Education Final				
1. Elementary School	6	20.0	3	10.0
2. Junior High School	6	20.0	8	26.7
3. High School	17	56.7	16	53.3
4. S1	1	3.3	2	6.7
5. S3	-	-	1	3.3
Work				
1. No Work	1	3.3	-	-
2. Housewife	19	63.3	17	56.7
3. Farmers	2	6.7	2	6.7
4. Traders	4	13.3	3	10.0
5. Tailor	1	3.3	-	
6. Service Electronic	1	3.3	-	
7. Self-employed	1	3.3	3	10.0
8. Laborers	1	3.3	-	
9. Civil servants	-	-	3	10.0
10. Retired	-	-	1	3.3
11. Teacher	-	-	1	3.3

Table 2, shows that the distribution of respondent characteristics in the intervention and control groups shows variation in several demographic variables and medical history. Regarding gender, the majority of respondents in both groups were female, with 83.3% in the intervention group and 76.7% in the control group. This indicates that the study involved more female respondents than male respondents.

Regarding educational attainment, the majority of respondents in both groups had a high school education, with 56.7% in the intervention group and 53.3% in the control group. Meanwhile, the distribution of other educational attainments, such as elementary school, junior high school, and college, showed smaller proportions and was relatively balanced across groups.

Regarding occupation, the majority of respondents in both groups were housewives, with 63.3% in the intervention group and 56.7% in the control group. Other occupations, such as farmers, traders, self-employed workers, and civil servants, were smaller and more evenly distributed across both groups.

Table 3. Distribution Characteristics Respondents (n,%) on Group Intervention And Control (N = 60)

Variables	Intervention Group		Control Group	
	n	%	n	%
Riw . Disease				
1. Ht	11	36.7	15	50.0
2. DM	6	20.0	7	23.3
3. Ht + DM	13	43.3	8	26.7
Ht Time				
1. 1-5 years	12	50.0	11	47.8
2. 6-10 years	7	29.2	9	39.1
3. > 10 years	5	20.8	3	13.0
DM Time				
1. 1-5 years	12	63.2	8	53.3
2. 6-10 years	4	21.1	1	6.7
3. > 10 years	3	15.8	6	40.0
Riw . Smoking				
1. Yes	4	86.7	2	13.3
2. No	26	13.3	13	86.7
Riw . Family Affected by Stroke				
1. None	21	70.0	9	60.00
2. There is	9	30.0	6	40.00

Based on medical history, most respondents in the intervention group had a combination of hypertension and diabetes mellitus (43.3%), while in the control group, the majority of respondents had a history of hypertension alone (50.0%). The duration of hypertension in both groups was mostly between 1 and 5 years. Regarding smoking history, most respondents in both groups were non-smokers. Furthermore, most respondents had no family history of stroke.

Analysis bivariate

Based on table 3, results analysis on group intervention show, that pressure blood systolic own p value < 0.001 and pressure blood diastolic own p -value 0.004. Mark the show existence meaningful differences between pressure blood before and after given implementation. Temporary that, on group control, pressure blood diastolic show mark p 0.075 which means No there is difference meaningful between pressure blood before and after on respondents group control.

Table 4. Average difference pre post pressure blood systole and diastol on group intervention and control

Group	Variables	Mean ± SD	95% CI	p -value [a]
Intervention	Pressure Blood Systolic	16.467 ± 14.443	7.34 – 9.22	0.001 *
	Pressure Blood Diastolic	4.700 ± 8.979	1.347-8.053	0.004 *
Control	Pressure Blood Diastolic	5.967 ± 17.692	-0.640-12.573	0.075

[a] *Paired T-Test*

* Level of sign p<0.05

Based on table 4, results analysis on group intervention show that GDP variable has p value < 0.001 and cholesterol 0.021. On group control variables pressure blood systolic show p-value 0.465, GDP has p-value 0.760 and cholesterol own p-value 0.501. Results analysis show that No there is difference meaningful on pre post on variables pressure blood diastolic, GDP, and cholesterol.

Table 5. Average difference pre post pressure blood systole, GDP, and cholesterol on group intervention and control

Group	Variables	Z Value	p -value [a]
Intervention	GDP	-4.475 [b]	< 0.001 *
	Cholesterol	-2.312 [b]	0.021 *
Control	Pressure Blood Systolic	-4.722 [b]	0.465
	GDP	-0..305 [c]	0.760
	Cholesterol	-0.673 [c]	0.501

[a] *Wilcoxon*
* Level of sign p<0.05

Table 6. Analysis results Man Whitney test on group control and intervention to decline pressure blood systole, sugar blood fasting, and cholesterol respondents

Variables	Man Whitney U	Z Value	p -value [a]
Pressure Blood Systole	295.500	-2.285	0.022*
GDP	228.000	-2.989	0.003 *
Cholesterol	194.500	-2.285	0.018 *

[a] Test *Man Whitney*
* Level of sign p<0.05

Based on table 5, the results of the Man Whitney test in the intervention group and the control group show that the systolic blood pressure variable has a p value of 0.022, GDP has a p value of 0.003, and cholesterol has a p value of 0.018. results This there is difference change pressure blood systolic, GDP, and significant cholesterol between group intervention and group control.

Table 7. Analysis t-test results on group control and intervention to decline pressure blood diastole

Variables	Mean Difference	95% CI	p -value [a]
Pressure Blood Diastol	1.267	-5.984 – 8.517	0.078

[a] Test *Independent T Test*
* Level of sign p<0.05

Based on table 7, the T-Test results in the intervention group and the control group show that the diastolic blood pressure variable has a p value of 0.078. This is means No There is difference meaningful on pressure blood diastolic and level knowledge between group intervention and control.

Discussion

The results of this study indicate that the walking intervention combined with acupressure therapy had a positive impact on controlling several clinical indicators related to stroke risk factors, particularly systolic blood pressure, fasting blood glucose levels, and cholesterol levels in the intervention group. These findings suggest that a non-pharmacological approach combining simple physical activity with complementary therapy may help stabilize physiological conditions in patients with hypertension and diabetes mellitus. Both conditions are recognized as major risk factors for stroke that can be modified through lifestyle changes and metabolic risk control (Chang et al., 2022).

However, this study did not find a significant change in diastolic blood pressure. This finding indicates that physiological responses to lifestyle interventions may vary across different hemodynamic parameters. Systolic blood pressure is known to be more sensitive to changes in arterial elasticity and cardiac output, whereas diastolic blood pressure is more closely related to peripheral resistance, which generally changes more slowly (Saghiv & Sagiv, 2020). Therefore, physical activity interventions conducted within a relatively short period tend to produce faster effects on systolic blood pressure than on diastolic blood pressure.

The walking intervention used in this study plays an important role in improving cardiovascular function. Light to moderate physical activity such as walking can improve endothelial function through increased shear stress, which stimulates the production of nitric oxide (NO) by endothelial cells (Biernat et al., 2024). Nitric oxide is a vasodilator that promotes the relaxation of blood vessels, thereby reducing vascular resistance and lowering blood pressure. Systematic reviews and meta-analyses have shown that regular walking programs can reduce systolic blood pressure by approximately 4,11 mmHg in individuals with hypertension. This reduction is clinically meaningful because every 4,11 mmHg decrease in systolic blood pressure is associated with a 10–13% reduction in stroke risk (L.-L. Lee et al., 2021). These findings are consistent with the study conducted by (Malem et al., 2024), which reported that walking activity is effective in reducing blood pressure in patients with hypertension.

In addition to its effect on blood pressure, walking also plays an important role in glucose metabolism. Muscle contraction during physical activity can increase the translocation of glucose transporter type 4 (GLUT4) to the muscle cell membrane, thereby enhancing glucose uptake from the bloodstream (Richter, 2021). This mechanism improves insulin sensitivity and helps reduce fasting blood glucose levels. A study conducted by Asfaw reported that regular physical activity can

improve glycemic control and reduce fasting blood glucose levels in patients with diabetes mellitus.

These findings are also supported by studies conducted in Europe, which showed that a walking-based physical activity intervention for 15 weeks significantly reduced systolic blood pressure and improved metabolic profiles in patients with hypertension and diabetes mellitus (Lee et al., 2021). Furthermore, cohort studies conducted in several European countries reported that walking for at least 30 minutes per day was associated with a significant reduction in the risk of cardiovascular disease and stroke (Ungvari et al., 2023). Other studies have also shown that regular aerobic physical activity and exercise can improve lipid profiles by lowering total cholesterol and LDL levels in individuals with risk factors. Walking, a simple form of aerobic physical activity, can also provide similar benefits (Madan & Sawhney, 2024). These results reinforce that simple physical activity such as walking can serve as an effective preventive strategy in controlling stroke risk factors.

In addition to physical activity, this study also used complementary therapy in the form of acupressure as part of the intervention. Acupressure is a technique that stimulates specific points on the body and originates from traditional Chinese medicine. It has been widely used in the management of various chronic diseases. The mechanism of acupressure is associated with modulation of the autonomic nervous system by increasing parasympathetic activity and reducing sympathetic activity. This balance in autonomic nervous system activity can lower blood pressure through vascular relaxation, reduced heart rate, and improved peripheral blood circulation. In this study, acupressure stimulation was applied to several points associated with cardiovascular and metabolic regulation. In patients with hypertension, the points used included Tai Chong (LR3), Taixi (KI3), Sanyinjiao (SP6), Hegu (LI4), Shenmen (HT7), and Neiguan (PC6). These points are known to help reduce blood pressure through vascular relaxation and decreased sympathetic nervous system activity (Dewintasari et al., 2025; Restawan et al., 2023; Yasa et al., 2024). Stimulation of these points may also improve blood circulation and reduce vascular tension.

In addition to these points, patients with diabetes mellitus also received stimulation at the Zusanli (ST36) point, which is known to play an important role in energy metabolism and glucose regulation. A study conducted in China demonstrated that stimulation of the ST36 point can improve insulin sensitivity and help reduce blood glucose levels in patients with diabetes mellitus through activation of neuroendocrine pathways and increased vagal nerve activity (Lee et al., 2018) . In addition to its role in regulating blood pressure and glucose metabolism, research conducted by Sukarja et al. (2024) reports that regular acupressure therapy can improve lipid profiles by lowering total cholesterol and LDL levels and increasing HDL in patients with metabolic disorders. Thus, acupressure therapy not only provides relaxation and regulation of the autonomic nervous system, but also has the potential to contribute to controlling cholesterol levels as an important risk factor for stroke.

The combination of walking and acupressure interventions in this study indicates a potential synergistic effect in controlling stroke risk factors. Walking primarily works by improving cardiovascular function, increasing insulin sensitivity, and enhancing energy metabolism. Meanwhile, acupressure exerts its effects through modulation of the autonomic nervous system, improved blood circulation, and hormonal regulation related to glucose metabolism. The combination of these mechanisms may help stabilize blood pressure and blood glucose levels, which are major risk factors for stroke.

Community-based intervention programs that integrate physical activity, lifestyle modification, and complementary therapy have also been shown to reduce blood pressure and improve metabolic health outcomes (Vempati et al., 2025). In addition, randomized controlled trials have demonstrated that the combination of acupressure and walking can improve circulation and glycemic control, thereby significantly reducing stroke risk scores in at-risk populations (Govori et al., 2024).

Participant characteristics may also influence responses to the intervention. Most respondents in this study were adults to early elderly individuals who physiologically have a higher risk of hypertension, diabetes mellitus, and stroke. Aging is closely associated with decreased vascular elasticity, endothelial dysfunction, and metabolic changes that can affect the regulation of blood pressure and glucose levels (Kengne, 2021).

In addition to age, gender differences may also influence risk profiles and responses to health interventions. Research by Bai et al. (2024) indicates that men and women differ in lifestyle patterns, physical activity, and physiological responses to health intervention programs. Social factors such as education level and occupation may also influence the success of lifestyle interventions. Individuals with higher educational levels tend to better understand and implement health recommendations (Ayal et al., 2026; Woldetsadik et al., 2022). Occupation is also associated with physical activity levels and lifestyle patterns that may indirectly influence changes in blood pressure, blood glucose levels, and cholesterol levels.

Furthermore, variations in the duration of hypertension and diabetes mellitus among respondents may influence the speed of clinical response to the intervention. Chronic conditions that have persisted for a long time generally require a longer intervention period to produce significant physiological changes. This may explain why diastolic blood pressure did not show significant changes during the intervention period in this study. Smoking history and family history of stroke identified in some respondents are also important risk factors that may worsen clinical conditions and influence the effectiveness of the intervention (Boehme et al., 2017; Liu et al., 2021). Therefore, controlling stroke risk factors requires a comprehensive and continuous approach.

Overall, the findings of this study suggest that the combination of walking and acupressure interventions has the potential to serve as an effective non-pharmacological approach to help stabilize blood pressure and blood glucose levels in patients with hypertension and diabetes mellitus. This intervention is relatively simple, safe, and easy to implement, making it suitable for integration into promotive and preventive programs in primary healthcare services as well as community nursing practice. With consistent implementation and continuous monitoring, this approach has the potential to contribute to reducing stroke risk among high-risk populations.

Implication and limitations

The results of this study indicate that stroke prevention education is effective in improving risk factor control, specifically systolic blood pressure, fasting blood sugar, cholesterol levels, and respondents' knowledge levels. These findings strengthen the role of nurses as educators and counselors in primary healthcare and emphasize the importance of structured educational interventions as part of chronic disease management. Integrating stroke prevention education programs into routine services at primary healthcare facilities has the potential to improve the quality of nursing care and strengthen promotive and preventive approaches within the healthcare system. From a policy perspective, these results support the development of standardized, community-based education programs for the control of hypertension and diabetes mellitus to reduce the risk of cardiovascular complications.

However, interpretation of this study's results requires consideration of several limitations. The relatively short observation period does not adequately reflect the long-term sustainability of the intervention's effects. Furthermore, this study did not strictly control for external factors such as diet, stress levels, and medication adherence, which can influence changes in risk factors. Obstacles in the respondent follow-up process, particularly difficulties in scheduling re-evaluations, also potentially impacted the consistency of monitoring and the completeness of data. Therefore, further research is recommended to use a longer observation period, more comprehensive control of lifestyle variables, and a more structured monitoring system to strengthen the validity and sustainability of the findings.

Conclusions

Stroke prevention education had a positive impact on controlling stroke risk factors. Significant changes were particularly evident in systolic blood pressure, GDP, cholesterol, and knowledge levels in the intervention group. Meanwhile, changes in diastolic blood pressure did not show any significant differences during the observation period of this study. Future researchers are advised to also monitor respondents' dietary patterns, as even with physical activity such as walking and massage, optimal control of blood pressure, diabetes, and cholesterol levels will be more optimal if accompanied by appropriate dietary management.

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Author contribution

L.M. was responsible for the study design, submission of the study for ethical approval, leading the data collection process, and drafting the initial manuscript. Y.S. and M.A.J. assisted in data collection, participated in data analysis, and contributed to the development of the manuscript. R.S.M. and T.E.P. participated in data analysis and contributed to the development of the manuscript. All authors reviewed and approved the final manuscript.

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Conflict of interest

Authors declare no conflict of interest.

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