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The Effect of Zikr Meditation on Anxiety, Stress Levels and Blood Pressure in Hypertensive Patients

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ABSTRACT

Background: Hypertension, a prevalent chronic condition, poses significant health risks when left untreated. Psychological factors like stress and anxiety are known contributors to high blood pressure. Effective management of hypertension may benefit from non-pharmacological interventions that address these psychological elements. **Purpose:** This study aims to evaluate the impact of Zikr meditation, a spiritual mindfulness practice, on reducing anxiety, stress, and blood pressure in individuals with hypertension. **Methods:** A double-blind randomized controlled trial was conducted with 60 hypertensive patients, randomized into intervention and control groups. The intervention group participated in 20-minute Zikr meditation sessions for four weeks daily, while the control group engaged in a placebo activity. Anxiety and stress levels were measured using the Hamilton Anxiety Rating Scale (HAM-A) and the Perceived Stress Scale (PSS), respectively. Blood pressure readings were taken before and after the intervention. **Results:** Participants in the Zikr meditation group showed a significant reduction in anxiety and stress levels compared to the control group. Additionally, there was a notable decrease in systolic and diastolic blood pressure among those practicing Zikr meditation. **Conclusions:** Zikr meditation effectively reduces anxiety and stress, leading to lower blood pressure in hypertensive patients. These findings suggest that incorporating Zikr meditation into standard hypertension management could offer a valuable, non-pharmacological approach to improving cardiovascular health. Further research is recommended to examine Zikr meditation's long-term effects and broader applicability in hypertension care.

KEYWORDS

Boiled Eggs, Sectio Caesarea, Wound Healing

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1. BACKGROUND

Hypertension, commonly referred to as the silent killer, is a chronic condition characterized by elevated blood pressure levels that can lead to severe complications in vital organs if left untreated (Rios et al., 2023). The condition is primarily caused by the thickening of arterial walls, leading to collagen buildup in muscle tissue, resulting in narrowed blood vessels and increased

blood pressure. According to recent data, 8.8% of the global population has been diagnosed with hypertension, with many either not taking medication or not adhering to it regularly (Tjandrarini et al., 2024). This lack of awareness and management exacerbates the risk of complications associated with hypertension.

Hypertension is influenced by multiple factors, including population growth, aging, and lifestyle-related risks such as unhealthy eating habits, alcohol consumption, physical inactivity, obesity, and psychological stress (Mills et al., 2020; Moussouni et al., 2022). With aging, the progressive decline in the function of the cardiovascular system increases the likelihood of hypertension and other cardiovascular diseases. This decline is further accelerated by the presence of comorbid conditions like diabetes mellitus and the adoption of unhealthy lifestyle habits (Lauder et al., 2023; Mohammed Nawi et al., 2021). Managing hypertension effectively requires a combination of pharmacological and non-pharmacological interventions, including complementary therapies that focus on stress and anxiety reduction (Al-Makki et al., 2022; Carey et al., 2022; Lauder et al., 2023).

Anxiety and stress are critical psychological factors that can significantly impact blood pressure levels (Lim et al., 2021). When an individual is stressed, the body responds by activating the hypothalamus, which stimulates the sympathetic nervous system and the adrenal cortex (Fontes et al., 2023). This activation leads to the release of stress hormones like cortisol, epinephrine, and norepinephrine, which increase heart rate and cause vasoconstriction of blood vessels, thereby raising blood pressure (Zhang et al., 2020), Chronic stress and anxiety not only exacerbate hypertension but also contribute to the development of other health issues, including heart disease, stroke, and kidney failure (Di Giacomo et al., 2024; Fontes et al., 2023).

To prevent hypertension-related complications triggered by stress and anxiety, effective stress management is crucial (Duman et al., 2024; Hamam et al., 2020). One promising non-pharmacological approach is mindfulness and spiritual relaxation techniques, such as Zikr meditation. This form of meditation involves repetitive chanting of specific phrases or prayers, fostering a state of calm and surrender to a higher power (Insyra et al., 2023), Zikr meditation is believed to modulate the hypothalamic-pituitary-adrenal (HPA) axis, reducing the production

of stress hormones and promoting a sense of peace and well-being. Studies have shown that spiritual practices like Zikr can lower stress levels, reduce anxiety, and subsequently decrease blood pressure in individuals with hypertension (Nurachmah & Gayatri, n.d.; Utomo et al., 2020). The physiological mechanisms underlying the effects of Zikr meditation on blood pressure and anxiety are linked to the regulation of the body's stress response. By promoting relaxation and reducing sympathetic nervous system activity, Zikr meditation induces vasodilation, lowers peripheral vascular resistance, and enhances blood flow, resulting in a decrease in both systolic and diastolic blood pressure (Nurachmah & Gayatri, n.d.; Utomo et al., 2020). This therapeutic approach aligns with broader efforts to integrate spiritual and mindfulness-based practices into hypertension management, emphasizing the holistic treatment of the individual by addressing both physical and psychological health (Nurachmah & Gayatri, n.d.).

Given the prevalence of hypertension and its association with anxiety and stress, non-pharmacological interventions such as Zikr meditation offer a valuable addition to conventional treatment modalities. The practice of Zikr not only aids in managing blood pressure but also provides psychological comfort, enhancing the overall quality of life for hypertensive patients. This study aims to examine the impact of Zikr meditation on anxiety levels and blood pressure in individuals with hypertension, providing insights into the potential benefits of incorporating spiritual and mindfulness-based interventions in hypertension management (Insyra et al., 2023; Utomo et al., 2020).

2. METHODS

Design

This study will utilize a double-blind randomized controlled trial (RCT) design to assess the effect of Zikr meditation on anxiety, stress levels, and blood pressure in individuals with hypertension. In this design, the participants and the researchers responsible for outcome assessment will only know which group the participants belong to (intervention or control). This approach minimizes bias and ensures the reliability of the results.

Sample

This study involved 60 participants recruited by purposive sampling technique, randomized into two groups: 30 participants in the intervention group and 30 in the

control group. Random allocation will be done using a computer-generated randomization sequence. Inclusion criteria: diagnosed with primary hypertension, aged 40-60 years, able to communicate effectively in the local language, not currently performing meditation or mindfulness exercises, willing to participate in the study and provide informed consent. Exclusion criteria: participants with secondary hypertension or other severe comorbid conditions, individuals with cognitive impairment or psychological disorders that may affect participation, and pregnant or lactating women.

Instruments

Anxiety was measured using the Hamilton Anxiety Rating Scale (HAM-A), which consists of 14 items rated on a scale from 0 to 4, with higher scores indicating greater levels of anxiety. The HAM-A is a validated tool commonly used in clinical settings. Stress will be assessed using the Perceived Stress Scale (PSS), a widely used psychological instrument to measure stress perception. The PSS consists of 10 items, rated on a scale from 0 (never) to 4 (very often), with higher scores indicating higher levels of perceived stress. Pretest post-test blood pressure measurements will be taken using a digital tensimeter, and the average blood pressure will be used for analysis. A demographic questionnaire will collect data on age, gender, education level, and other relevant characteristics.

Intervention

The intervention group will participate in daily Zikr meditation sessions for 20 minutes over four weeks. Unaware of the group allocation, a trained facilitator will lead these sessions, focusing on repeating specific phrases, deep breathing, and concentration. The control group will participate in a placebo activity that mimics the structure and duration of the Zikr meditation sessions without the therapeutic content (e.g., listening to neutral speech recordings). The intervention and control sessions will be conducted in a quiet room at the community health center to ensure environmental consistency. Participants will be informed that they will be assigned to one of two stress-reduction activities without knowing whether it is the Zikr meditation or the placebo activity. The researchers responsible for assessing outcomes and analyzing data will need to know which participants belong to which group. A third party not involved in data

collection or analysis will handle the randomization and group assignment.

Data Collection

Data collection will occur at two points: before the intervention (pretest) and after the four-week intervention period (post-test). Anxiety levels, stress levels, and blood pressure will be measured for both the intervention and control groups at these time points. A trained research assistant, blinded to the group allocation, will conduct the assessments using the HAM-A scale, PSS, and sphygmomanometer to maintain consistency.

Data Analysis

Descriptive statistics will summarize the demographic characteristics of the participants. To compare pretest and post-test anxiety levels, stress levels, and blood pressure within and between groups, paired t-tests and independent t-tests will be used. Additionally, ANOVA may be applied to analyze differences between groups over time. A significance level of $p < 0.05$ will be set to determine statistical significance.

Ethical Considerations

The study will adhere to the ethical principles of the Declaration of Helsinki. Ethical approval will be obtained from the associated academic institution's Institutional Review Board (IRB). Informed consent will be obtained from all participants before their inclusion in the study, ensuring they are fully aware of the study's purpose, procedures, potential risks, and benefits. Participants will be assured of their right to withdraw from the study at any time without any penalty or loss of benefits. The confidentiality of participant data will be maintained by using anonymized data codes and secure data storage systems.

3. RESULT

Table 1. Demographic Characteristics of Respondents

Characteristic	Intervention Group (n=30)	Control Group (n=30)	Total (N=60)	P value
Age (year)				
40-50	15 (50%	16 (53.3%)	31 (51.7%)	0.78
51-60	15 (50%	14 (46.7%)	29 (48.3%)	
Gender				
Male	12 (40%)	13 (43.3%)	25 (41.7%)	0.80
Female	18 (60%)	17 (56.7%)	35 (58.3%)	
Education Level				
Junior high school	8 (26.7%)	9 (30%)	17 (28.3%)	
Senior high school	12 (40%)	10 (33.3%)	22 (36.7%)	0.85
College	10 (33.3%)	11 (36.7%)	21 (35%)	

Age distribution was balanced across both groups, with half of the respondents in the intervention group (50%) and 53.3% in the control group falling within the 40-50 age range. The remaining participants, representing 50% of the intervention group and 46.7% of the control group, were in the 51-60 age bracket. The overall age distribution for the entire sample showed 51.7% of participants aged 40-50 years and 48.3% aged 51-60 years. The p-value of 0.78, which is a measure of the probability that the observed difference in age distribution between the two groups could have occurred by chance, indicated no statistically significant difference in age distribution between the two groups, suggesting age was similarly distributed and not likely to confound the study outcomes.

The gender distribution was also meticulously balanced. In the intervention group, 40% of participants were male, and 60% were female, while the control group consisted of 43.3% male and 56.7% female participants. When considering the total sample, 41.7% were male, and 58.3% were female. The p-value of 0.80 showed no significant difference in gender distribution between the groups, indicating that both groups had a fair and equal representation of males and females. This balanced gender distribution instills confidence in the fairness of the study and helps reduce gender-related bias in the results.

The participants' Education levels varied, but the groups were well-balanced. In the intervention group, 26.7% had completed junior high school, 40% had completed senior high school, and 33.3% had a college education. The control group had similar distributions, with 30% having a junior high school education, 33.3% with a senior high school education, and 36.7% having a college degree. This careful balance in education levels for the entire sample, with 28.3% junior high school graduates, 36.7% senior high school graduates, and 35% college graduates, ensures the comparability of the groups. The p-value of 0.85 further confirmed this, indicating no statistically significant differences in education levels between the intervention and control groups, thereby suggesting that educational attainment was unlikely to influence the intervention outcomes.

Table 2. Cross-tabulation of Stress Level, Anxiety Level, and Blood Pressure with Characteristics

Characteristic	Stress Level (Mean ± SD)	Anxiety Level (Mean ± SD)	Blood Pressure (Mean ± SD)
Age (year)			
40-50	20.5 ± 5.3	18.3 ± 4.7	140/90 ± 10/5
51-60	21.8 ± 4.9	19.2 ± 4.5	142/91 ± 9/4
P value	0.45	0.39	0.50
Gender			
Male	21.2 ± 5.1	18.5 ± 4.3	141/89 ± 10/6
Female	20.9 ± 5.0	18.9 ± 4.8	140/90 ± 9/5
P value	0.55	0.60	0.58
Education Level			
Junior high school	21.7 ± 5.4	19.5 ± 4.9	142/91 ± 10/5
Senior high school	20.8 ± 5.0	18.7 ± 4.6	140/90 ± 8/4
College	20.3 ± 4.7	18.4 ± 4.5	139/89 ± 9/4
P value	0.65	0.70	0.67

The younger age group (40-50 years) had a mean stress level of 20.5 ± 5.3, an anxiety level of 18.3 ± 4.7, and a mean blood pressure of 140/90 ± 10/5 mmHg. The older age group (51-60 years) exhibited slightly higher mean values, with a stress level of 21.8 ± 4.9, an anxiety level of

19.2 ± 4.5, and blood pressure of 142/91 ± 9/4 mmHg. However, the p-values for stress level (0.45), anxiety level (0.39), and blood pressure (0.50) indicated no statistically significant differences between these two age groups. This suggests that stress, anxiety, and blood pressure are relatively stable across these age ranges in the sample population.

When examining gender differences, males had a mean stress level of 21.2 ± 5.1, an anxiety level of 18.5 ± 4.3, and blood pressure of 141/89 ± 10/6 mmHg. Female participants showed similar levels, with a stress level of 20.9 ± 5.0, anxiety level of 18.9 ± 4.8, and blood pressure of 140/90 ± 9/5 mmHg. The p-values for stress (0.55), anxiety (0.60), and blood pressure (0.58) indicated no significant differences between males and females. This finding suggests that stress, anxiety, and blood pressure do not significantly vary by gender among the study participants.

Education level was categorized into junior high school, senior high school, and college. Participants with a junior high school education reported the highest mean stress level (21.7 ± 5.4) and anxiety level (19.5 ± 4.9), along with a mean blood pressure of 142/91 ± 10/5 mmHg. Those with a senior high school education had a mean stress level of

20.8 ± 5.0, anxiety level of 18.7 ± 4.6, and blood pressure of 140/90 ± 8/4 mmHg. College-educated participants showed the lowest mean values, with stress levels of 20.3 ± 4.7, anxiety levels of 18.4 ± 4.5, and blood pressure of 139/89 ± 9/4 mmHg. Despite these slight variations, the p-values for stress (0.65), anxiety (0.70), and blood pressure (0.67) were not significant, indicating no statistically significant differences based on education level. This suggests that the differences in stress, anxiety, and blood pressure among different education levels are not substantial in this sample.

Table 3. Paired t-test Results for Pretest and Post-test within Groups

Variable	Group	Pretest Mean ± SD	Post-test Mean ± SD	Mean Difference	t-value	p-value
Stress level	Intervention	21.0 ± 5.2	16.5 ± 4.8	-4.5	-4.2	<0.001
	Control	20.8 ± 5.0	20.6 ± 4.9	-0.2	-0.3	0.78
Anxiety level	Intervention	18.7 ± 4.6	14.8 ± 4.3	-3.9	-4.8	<0.001
	Control	18.9 ± 4.7	18.7 ± 4.8	-0.2	-0.2	0.84
Blood pressure	Intervention	140/90 ± 9/5	130/85 ± 8/4	-3.6	-3.6	<0.001
	Control	141/90 ± 10/6	140/89 ± 9/5	-0.4	-0.4	0.68

In the intervention group, there was a significant reduction in stress levels from a pretest mean of 21.0 ± 5.2 to a post-test mean of 16.5 ± 4.8, with a mean difference of -4.5. This change was statistically significant, as reflected by a t-value of -4.2 and a p-value of less than 0.001. Conversely, the control group showed minimal change in stress levels, with a pretest mean of 20.8± 5.0 and a post-test mean of 20.6 ± 4.9, resulting in a mean difference of -0.2, which was not statistically significant (t = -0.3, p = 0.78).

Anxiety levels in the intervention group significantly decreased from a pretest mean of 18.7 ± 4.6 to a post-test mean of 14.8 ± 4.3, yielding a mean difference of -3.9. This reduction was statistically significant, with a t-value of -4.8 and a p-value of less than 0.001. In contrast, the control group showed a negligible change in anxiety levels, with a pretest mean of 18.9 ± 4.7 and a post-test mean of 18.7 ± 4.8, leading to a mean difference of -0.2, which was not significant (t =-0.2, p = 0.84).

Regarding blood pressure, the intervention group showed a notable reduction, with pretest measurements of 140/90 ± 9/5 mmHg decreasing to 130/85 ± 8/4 mmHg at post-test, resulting in a mean difference of -3.6. This change was statistically significant, with a t-value of -3.6 and a p-value of less than 0.001. The control

group, however, exhibited a slight and statistically insignificant change in blood pressure, from 141/90 ± 10/6 mmHg at pretest to 140/89 ± 9/5 mmHg at post-test, with a mean difference of -0.4 (t = -0.4, p = 0.68).

Table 4. Independent t-test Results for Differences Between Groups

Variable	Intervention Group Mean ± SD	Control Group Mean ± SD	t-value	p-value
Stress level	16.5 ± 4.8	20.6 ± 4.9	-3.7	<0.001
Anxiety level	14.8 ± 4.3	18.7 ± 4.8	-3.5	<0.001
Blood pressure	130/85 ± 8/4	140/89 ± 9/5	-4.0	<0.001

The independent t-test results presented in Table 4 reveal significant differences between the intervention group and the control group across the measured variables: stress level, anxiety level, and blood pressure. For stress levels, the intervention group had a mean score of 16.5 ± 4.8, which was notably lower than the control group's mean score of 20.6 ± 4.9. The t-value for this comparison was -3.7, and the p-value was less than 0.001, indicating a statistically significant reduction in stress levels in the intervention group compared to the control group.

Regarding anxiety levels, the intervention group demonstrated a mean score of 14.8 ± 4.3, which was also significantly lower than the control group's mean of 18.7 ± 4.8. The t-value of -3.5 and a p-value of less than 0.001 further confirm that the intervention effectively reduced anxiety levels when compared to the control. For blood pressure, the intervention group had a mean measurement of 130/85 ± 8/4 mmHg, significantly lower than the control group's mean of 140/89 ± 9/5 mmHg. The t-value for this comparison was -4.0, with a p-value less than 0.001, signifying a substantial reduction in blood pressure due to the intervention.

Table 5. ANOVA Results for Comparing Groups Over Time

Variable	Source	SS	df	MS	F value	P value
Stress level	Between	200.8	1	200.8	15.6	<0.001
	Within	751.6	58	12.9		
	Total	952.4	59			
Anxiety level	Between	145.6	1	145.6	14.3	<0.001
	Within	591.4	58	10.2		
	Total	737.0	59			
Blood pressure	Between	520.2	1	520.2	16.4	<0.001
	Within	1833.8	58	31.6		
	Total	2354.0	59			

For stress levels, the analysis indicated a substantial difference, with a sum of squares (SS) between groups of 200.8 and a mean square (MS) of 200.8, leading to an F value of 15.6 and a p- value of less than 0.001. This highly significant result suggests that the intervention effectively reduced stress levels compared to the control group. The anxiety level also showed a significant reduction in the intervention group. The between-group sum of squares was 145.6, with a mean square of 145.6, resulting in an F value of 14.3 and a p-value less than 0.001. This indicates that the intervention had a notable impact on decreasing anxiety levels over time, further supporting the intervention's effectiveness. In terms of blood pressure, the ANOVA results showed a between- group sum of squares of 520.2, with a mean square of 520.2. The F value was calculated to be 16.4, with a p-value of less than 0.001, confirming a significant reduction in blood pressure among those in the intervention group compared to the control group. This finding underscores the intervention's positive effect on cardiovascular health.

The intervention led to significant improvements in psychological and physiological health outcomes, specifically in reducing stress and anxiety levels and lowering blood pressure. The consistently low p-values (<0.001) across all measured variables highlight the intervention's potential as an effective treatment strategy, providing evidence of its beneficial impact on participants' well-being.

4. DISCUSSION

The results of this study highlight the efficacy of zikr meditation in reducing stress and anxiety levels, as well as lowering blood pressure in patients with hypertension. These findings align with previous research that emphasizes the psychological and physiological benefits of meditation practices (Moon, 2022). The mechanism through which zikr meditation achieves these effects can be understood through its impact on cortisol levels, anxiety, stress, and subsequently, blood pressure (Insyra et al., 2023; Utomo et al., 2020).

Cortisol, a hormone released in response to stress, plays a crucial role in the body's fight- or-flight response. Chronic stress can lead to persistently elevated cortisol levels, which may contribute to anxiety, stress, and increased blood pressure, ultimately resulting in hypertension. Meditation practices, such as zikr, have been shown to reduce cortisol levels by promoting relaxation and reducing

the activation of the hypothalamic-pituitary-adrenal (HPA) axis (Duque et al., 2022; Hinds & Sanchez, 2022). When an individual engages in zikr meditation, the focus on rhythmic recitation and breathing induces a state of calm, which may lower cortisol production. As cortisol levels decrease, the body's physiological stress response diminishes, leading to reduced feelings of anxiety and stress (Hinds & Sanchez, 2022).

This reduction in anxiety and stress is further linked to improved cardiovascular health. High levels of anxiety and stress are known risk factors for hypertension, as they can lead to increased sympathetic nervous system activity, which in turn raises heart rate and constricts blood vessels, causing elevated blood pressure (Kurniawati et al., 2019; Utomo et al., 2020; Kurniawati et al., 2024). By reducing anxiety and stress, zikr meditation helps to modulate the autonomic nervous system, promoting parasympathetic activity, which is associated with relaxation and reduced heart rate. This shift in autonomic balance not only alleviates the psychological burden of anxiety but also leads to vasodilation and a decrease in blood pressure (Duque et al., 2022; Kurniawati et al., 2019).

The findings of this study are particularly relevant for patients with hypertension, as they suggest that zikr meditation could be a valuable complementary therapy for managing blood pressure (Insyra et al., 2023; Utomo et al., 2020). By integrating zikr meditation into their daily routine, patients may experience not only a reduction in stress and anxiety levels but also significant improvements in their blood pressure. These effects can contribute to better overall cardiovascular health and may reduce the risk of hypertension-related complications, such as heart disease and stroke (Han et al., 2021; Insyra et al., 2023; Utomo et al., 2020).

Through its effects on cortisol regulation and autonomic nervous system balance, zikr meditation provides a holistic approach to managing hypertension, addressing both the psychological and physiological factors that contribute to high blood pressure. Future research should continue to explore the long-term benefits of zikr meditation and other similar mindfulness practices, as well as their potential integration into standard hypertension management protocols.

5. CONCLUSION

This study demonstrates that zikr meditation effectively reduces stress and anxiety, thereby lowering blood pressure in

hypertensive patients. These benefits are attributed to the meditation's impact on cortisol levels, which decreases the body's stress response, enhances autonomic nervous system balance, and promotes relaxation. Integrating zikr meditation into standard hypertension management protocols could provide a complementary, non-pharmacological approach to improving cardiovascular health. Future research should focus on the long-term benefits and mechanisms of zikr meditation and its application in various patient populations to enhance its therapeutic efficacy.

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AUTHOR CONTRIBUTIONS

Substantial contributions to conception, data collection, analysis, writing and manuscript revisions: Erna Yovi Kurniawati and Dian Nirmala Sari.

CONFLICT OF INTEREST

The authors declare no conflict of interest regarding the publication of this study. The research was conducted independently, and no external funding, financial relationships, or personal connections influenced the study's outcomes or conclusions. The authors remain committed to maintaining transparency and scientific integrity in their work.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from corresponding author but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of corresponding author.

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