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Development of A Mobile Application in Yoga Therapy for Elderly with Hypertension

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Authors' contributions

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

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ABSTRACT

Aims: 1) to develop mobile application in yoga therapy for elderly with hypertension and 2) to study the use of mobile application in yoga therapy for elderly with hypertension.
Study Design: A quasi-experimental design with a pretest-posttest design and a control design.
Place and Duration of Study: Sample: Nawamin 9 Hospital in Minburi, between December 2022 and November 2023.
Methodology: An in-depth interview was conducted with 136 patients, 10 developing mobile application specialists and 10 yoga specialists. 400 samples were used questionnaire to find out the need of usage mobile application with random sampling.
Results: First, found that the results of the evaluation of pre and posttest for usage mobile application in both experiment group and control group had the reduced level of the hypertension. Second, content of the mobile application contains learning object of hypertension and yoga

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exercises that consist of technique of reduce hypertension with no medicine, reduce salt, how to take care yourself, when sick of hypertension, hypertension reduction, recommendation of hypertension and yoga exercises for reduction hypertension.
Conclusion: The quality of this mobile application was at high level and then train 50 hypertension patients. Third, found that the overall satisfaction was at high level.

Keywords: Mobile application; yoga therapy; hypertension; elderly.

1. INTRODUCTION

Hypertension ranks as the third most significant risk factor for premature mortality and is responsible for congestive heart failure and cerebrovascular disease. Hypertension risk factors can be categorized as non-modifiable (age, gender, genetics) and modifiable (overweight, stress, smoking, lack of physical activity, excessive alcohol consumption, high salt intake, hyperlipidemia) [1]. Consuming saturated fat is closely connected to higher body weight, which is related with an elevated risk of hypertension. This is due to the link between the two. Saturated fat consumption is linked to a higher risk of atherosclerosis, a condition that can lead to hypertension [2].

Medications can be utilized to manage hypertension in older persons, similar to how they can be used for exercise or gymnastics [3]. Elderly individuals practicing yoga may see a rise in endorphin production. Endorphins, neuropeptides, are produced by the body during periods of calm and relaxation [4]. The brain and spinal cord both create endorphins. This hormone can function as an endogenous sedative produced by the brain [5]. It promotes relaxation and increases endorphin levels in the body, helping to lower high blood pressure [6,7].

In [8] most elderly volunteers diagnosed with hypertension who engaged in yoga three times a week experienced a reduction in their systolic blood pressure. Yoga interventions are generally advantageous for reducing body weight, blood pressure, high glucose levels, and cholesterol, while also promoting mental, physical, and emotional relaxation. Yoga is also efficacious in managing high blood pressure. Yoga can improve blood circulation in the body. It is intended to promote physical well-being.

The aim of this study is to analyze the impact of yoga on blood pressure and compare the differences in blood pressure between the control group and the intervention group in Bangkok before and after treatment.

2. MATERIALS AND METHODS

This research method is a quasi-experimental design that includes a pretest-posttest design and a control group. This study aims to analyze the blood pressure of elderly individuals before and after therapy in 2022. The study included elderly individuals who were undergoing medical treatment at Nawamin 9 Hospital in Minburi, Bangkok. This study included patients aged 61 to 68 with hypertension, defined as having a systolic blood pressure of 140 mm/Hg or higher and a diastolic blood pressure of 90 mm/Hg or higher, who were taking hypertension drugs. The study excluded elders who had already experienced a stroke.

This sample size is confirmed by previous studies on yoga practice in Thailand [8] and other countries [9-13]. The sample size used ranged from 6 to 38 cases. A sample size as small as 10 cases studied by Selvamurthy et al. [14] demonstrated a significant reduction in blood pressure in individuals with significant hypertension. Studies of Bera, Gore, and Oak [10].

Researchers utilized a mobile application, designed based on existing theory, as the research tool to assess the effectiveness of yoga therapy for older participants in this study. The researcher used a questionnaire to collect data and personally delivered it. The questionnaire used was based on the pre-existing notion.

2.1 Design and Development of the Yoga Module

The Scientific Yoga Module (SYM) is a specialist yoga plan for hypertension created after reviewing yoga science literature and consulting with yoga therapists and researchers, as outlined in Table 2 of the article. Forty experts confirmed the organization, sequence, and length of each activity inside the module in the following stage. Utilizing a rubric to evaluate the yoga positions and presenting the results in Table 1.

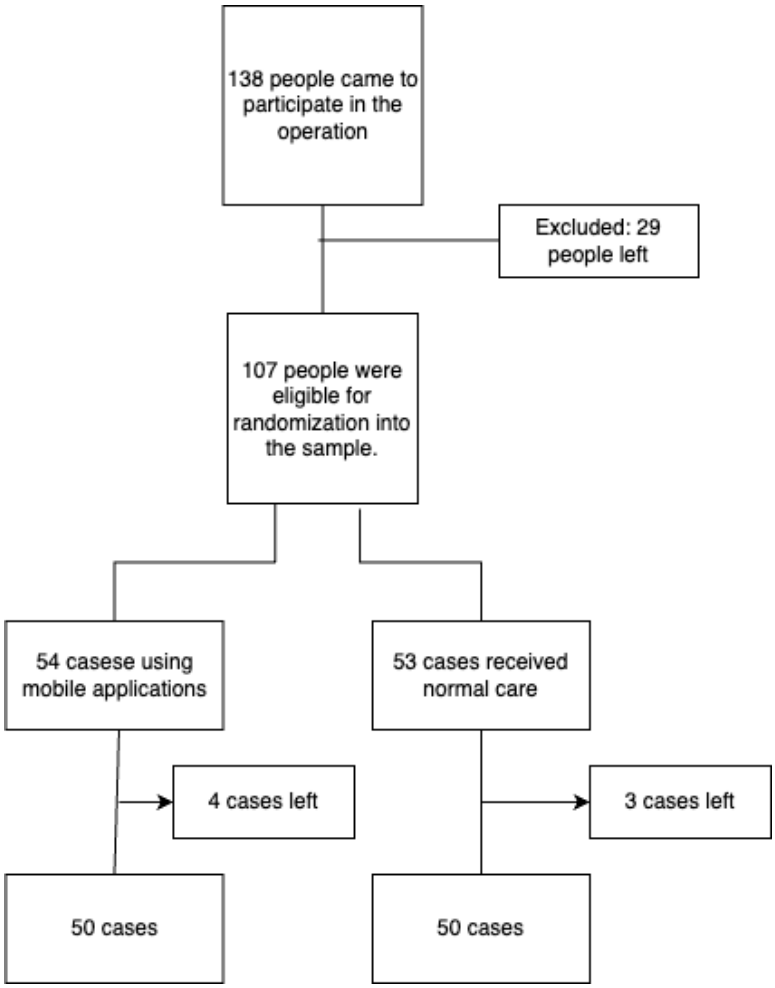


Fig. 1. Population and sampling in research

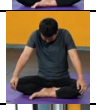
Table 1. Rubric for evaluate yoga pose

Category	Advanced Skill 3	Intermediate Skill 2	Basic Skill 1	No Effort Skill 0
Readiness	Is consistently enthusiastic about starting the yoga session.	Is often prepared and eager to start the yoga session.	Seldom prepared and capable of starting the yoga class.	Lack of effort
Inhaling and exhaling	Proficient in deep breathing techniques.	Capable of engaging in deep breathing exercises.	Respiration with reduced depth.	Lack of effort
Concentration	Focuses intently while maintaining positions.	Typically focuses intently while maintaining yoga positions.	Occasionally focuses intensely while maintaining yoga positions.	Lack of effort
Technique	The pose is always accurate.	The pose is typically accurate.	Sometimes the pose is right.	Lack of effort

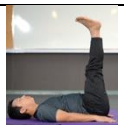
Fifty distinct practices were chosen after determining their Content Validity Ratio (CVR) with Lawshe's formula, which exceeded the threshold of 0.29. An online feasibility test was done in a community suffering from hypertension, supervised by trainer. The test

spanned a duration of two weeks, with one hour allocated for each day. The sample included fifty persons. All participants filled out a pre-tested questionnaire that asked about their experiences with the yoga module, specifically concentrating on its effectiveness, structure, teaching expertise, and general happiness. The feasibility study in hypertensive persons seeks to validate the effectiveness and suitability of the SYM.

Table 2. Yoga module for hypertension

No.	Yoga Practice	CVR	Benefit	Postures
Yoga for 10 minutes (Preparation for breathing)				
1	Shoulder stretch pose.	0.89	Relief of tension in the shoulders and neck.	
2	Shoulders raise with chin to chest pose.	0.93	Relief of tension in the shoulders and neck.	
3	Open chest stretch pose.	0.93	Relief of tension in the shoulders and neck.	
4	Back arch pose.	0.91	Relief of tension in the shoulders and neck.	
5	Combine Poses 1+2+3+4	0.85	Neck, shoulder, back, and abdominal tension are diminished. Improve circulation and respiratory function. Make preparations to engage in the yoga regimen.	
Yoga for 20 minutes				
1	Hip opener pose	0.91	Enhancing flexibility and mobility, alleviating lower back discomfort, promoting improved balance and posture, releasing trapped emotions, and relieving tension and tightness in the hip region. Hip joint health and strength are enhanced in tandem with increased range of motion.	
2	Butterfly pose	0.86	Helps loosen up your low back, hips, and inner thighs, which may ease discomfort and help you feel better overall. It can also have a calming, relaxing effect, which may help you manage and let go of stress.	
3	Head to knee pose	0.89	This gentle spinal twist further relaxes the mind while stretching the groyne, hamstrings, and spine. Anxiety, fatigue, and moderate depression have been reported to be alleviated by head-to-knee pose. Moreover, by stimulating and massaging the liver and kidneys, it may also assist with digestive issues.	

No.	Yoga Practice	CVR	Benefit	Postures
4	Seated sun pose	0.93	For spine elongation. Neck and shoulder tension is alleviated and blood circulation is enhanced.	
5	Seated forward bend pose	0.93	The entire vertebrae can be effectively elongated through the execution of hamstring stretches on the back of the legs. Specifically massages and targets the digestive organs. Relief from digestive discomfort, such as constipation Reaches alleviated sciatica-related discomfort. Prolongs the life of the nervous system.	
6	Sitting half spinal twist	0.91	Verniel stretch is achieved. An increase in spinal elasticity is achieved. Through the enlargement of the ribcage, oxygen delivery to the lungs is enhanced.	
7	Cobra pose	0.85	Enhances alignment, flexibility, and spinal posture Mitigates lumbar discomfort	
8	Child’s pose	0.89	Stretching the vertebrae. Developing back muscle relaxation.	
9	Cat pose	0.93	Massage the vertebrae gently to enhance mobility. Elasticates the neck and spine Enhances the flow of spinal fluid.	
10	Corpse pose	0.93	Parasympathetic sensor activation. Complete relaxation ensues in both the mind and body.	
Yoga for 30 minutes				
1	Standing sun pose	0.89	Allocate discomfort in the shoulders and neck. Develop and enhance the spinal flexibility.	
2	Standing side stretch pose	0.93	Enhances the health and mobility of the shoulder. Posture correction. Strengthens and extends the endurance of the upper body. Stretches the side of the body and relieves tension in the back and hips.	
3	Tree pose	0.93	Balancing is improved. Ankle extension. Ankles, legs, and spine are all fortified. Anatomically elongated. Enhanced concentration and focus.	

No.	Yoga Practice	CVR	Benefit	Postures
4	Standing forward bend pose	0.91	Leg posterior, hip, and spine elongation. Legs, thighs, and ankles are fortified. A tranquillizer for the psyche and nervous system. Boosts the liver and kidneys and enhances digestion. By performing this exercise with bowed knees, one can alleviate tension in the lower back.	
5	Sun piercing breath	0.85	Promotes gastric muscular activity. The organism is energized. Enhanced concentration and focus. Mood balancer. Temperature elevation of the body. Instructions: Sit in a comfortable pose. Right hand close the left nostril with the ring and little fingers. Draw the breath in with the right nostril, filling the lungs wholly. Open the left nostril and close the right nostril, breath out. This completes one breath. Keep going for 5 breaths Awareness: Perform as you can. (Reverse these instructions	
6	Moon piercing breath	0.91	Lowers body temperature. A indigestion reliever. Mind and body revitalization and invigoration. Hypertension is diminished. Fever reduction. Other mental burdens, including tension, are alleviated. Mental steadiness can be achieved through daily practice.	
7	Knee to chest pose	0.86	Gas, constipation, and irritable bowel syndrome are among the digestive issues that are alleviated. Treats menstrual discomfort. Lower back and spinal column elongation. Ankle extension. Perineal organ massage. Hypertension, anxiety, and rage are alleviated.	
8	Raised leg pose	0.89	Fortify the legs and hamstrings while alleviating lower back discomfort. Promote circulation and abdominal transit.	
9	Supine leg pull pose	0.93	Contributes to the alleviation of leg stiffness and discomfort.	

No.	Yoga Practice	CVR	Benefit	Postures
			Raise flexibility in the hips.	
10	Supine leg to the side pose	0.93	Relief of leg and hip stiffness is facilitated. Develop greater hip flexibility.	
11	Reclining pigeon pose	0.91	Sciatica relief. Benefits the pelvic by increasing blood flow. Removes tension from the lower body. Renales, lower back, and lower body circulation are enhanced. Decrease menstrual discomfort.	
12	Half bridge pose	0.85	Pain and tension in the lower back are alleviated, and fatigued back muscles are revitalized.	
13	Supine twist pose	0.89	Increases spinal length. Increases suppleness of the spine. Hips, spine, and low back discomfort are alleviated.	
14	Reclining knees to chest pose	0.93	Enhances the strength of the lower back musculature. Enhances spinal and upper back flexibility. Abdominal and pelvic regions are massaged. Colonic function is enhanced.	
15	Reclining knee-down twist pose	0.93	Assists in alleviating tension in the waist, hips, and lateral areas of the body.	
16	Corpse Pose	0.91	Aids in achieving a state of relaxation for both the mind and body, facilitating a return to a state of rest.	

2.2 Study Setting through Yoga

An educational approach used during the research. An introductory session took place on a virtual platform where an expert will discuss the pathophysiology of the ailment and introduce a mobile application that will guide you through each level sequentially for access. The research on yoga utilized a scientific module specifically designed for hypertension. Yoga initiatives aimed to spread yoga to a wider audience and enable individuals to practice yoga at their convenience. Recorded videos were cost-effective and can be a strong incentive for maintaining a regular yoga routine.

2.3 Yoga Intervention Group

An experienced and registered yoga therapist with over five years of experience instructed the yoga intervention group in practicing SYM via a mobile application. A mobile application, widely used for yoga, used to facilitate the yoga practice. Participants received a recorded video of the whole yoga module and picture-based practices after completing at least three supervised sessions to make up for any missed sessions caused by poor internet connection or personal reasons. This served to provide guidelines. A brochure with information on the ailment, its caused, diagnosis, prognosis, details about the yoga module, and the health benefits it sent to participants to provide educational material. Patients must maintain a yoga diary to track the number of times they practice SYM while watching the recorded video to make up for missed sessions due to poor internet connection or personal reasons. This research regularly monitored. A Yoga Performance Assessment Scale (YPA) used to assess the overall performance of each yoga practice on a scale from 0 to 4, where 0 means unable to practice

and 4 means able to practice effortlessly. The attendance sheet retrieved from the computer application log, and dropouts during the trial will be monitored. Furthermore, a distinct attendance record maintained for individuals who practiced using recorded video files.

2.4 Control Waitlist Group

Participants in the control waiting group instructed to abstain from starting any yoga practice routine and will be monitored during the investigation. They directed to maintain their usual routine and to notify any significant changes in their symptoms every two weeks. The changes may involve factors such as weight increase, periods of sadness, and various other factors. There were three specific time intervals for collecting data on the primary and secondary metrics. After the trial ends, participants had the chance to participate in SYM programs and activities.

2.5 Measurement of Blood Pressure

Participants were instructed to sit down and maintain that position for five minutes to relax. The patient's pulse rate and blood pressure were measured in the right upper extremity while they sat with their arm supported on the table and their back supported. The patient's legs and feet positioned on the floor without being crossed. Additionally, blood pressure was assessed. The Omron (HEM-7156-A) automatic blood pressure monitor, validated by the Association for the Advancement of Medical Instrumentation (AAMI) and the British Hypertension Society (BHS), was used to measure the patient's pulse rate, systolic blood pressure, and diastolic blood pressure at the brachial artery of the right arm. The instrument had an accuracy of ±4 mm Hg for blood pressure and ±5 for pulse rate. Blood pressure and pulse rate measured every minute until the difference between two consecutive blood pressure measures was less than five mm/Hg. The average values of systolic blood pressure (SBP) and diastolic blood pressure (DBP) used to calculate pulse pressure (PP) and mean arterial pressure (MAP) using the formulas PP = SBP – DBP and MAP = DBP + 1/3(PP). The computation of pulse pressure included these data.

2.6 Statistical Analysis of Data

Descriptive analysis used to identify the participants' characteristics and calculate the frequency, mean, and standard deviation. A paired sample t-test used to compare the differences in pre- and post-intervention values of blood pressure parameters and quality of life between the study group and the control group. An independent t-test used to compare the differences between the two groups using the same outcome measures. Data deemed statistically significant when the probability values were below 0.05.

3. RESULTS AND DISCUSSION

Comparison results of blood pressure levels before and post mobile application use for the experimental and control groups are presented.

3.1 Experiment Group

The experimental group comprised 29 males with an initial average high value of 146.86 mm/Hg before using the mobile application, with a standard deviation of 12.26. The mean systolic blood pressure after utilizing the mobile application was 140.94 mm/Hg. The standard deviation value is 11.70. The t-test yielded a t-value of 0.053 and a p-value of 0.026. The hypothesis is significantly accepted.

For 21 females, the average systolic blood pressure before using the mobile application was 146.19 mm/Hg with a standard deviation of 10.38. After utilizing the mobile application, the average systolic blood pressure decreased to 139.96 mm/Hg. The standard deviation is 8.99. A t-test was conducted, resulting in a t-value of 0.044 and a p-value of 0.022. The hypothesis is significantly accepted.

Table 3. Compare the mean systolic blood pressure before and after utilizing mobile applications

Sex	Sample	Mean(Before) mm/Hg	S.D.	Mean (After) mm/Hg	S.D.	t-Value	p-Value
Male	29	146.86	12.26	140.95	11.70	0.053	0.026
Female	21	146.19	10.38	139.96	8.99	0.044	0.022
Total	50	146.58	11.28	140.40	10.17	0.044	0.003

Table 4. Compare the mean diastolic blood pressure before and after utilizing mobile applications

Sex	Sample	Mean (Before) mm/Hg	S.D.	Mean (After) mm/Hg	S.D.	t-Value	p-Value
Male	29	93.21	5.10	89.36	5.39	0.010	0.005
Female	21	97.25	12.57	91.04	6.13	0.072	0.036
Total	50	94.76	9.01	90.30	5.82	0.004	0.002

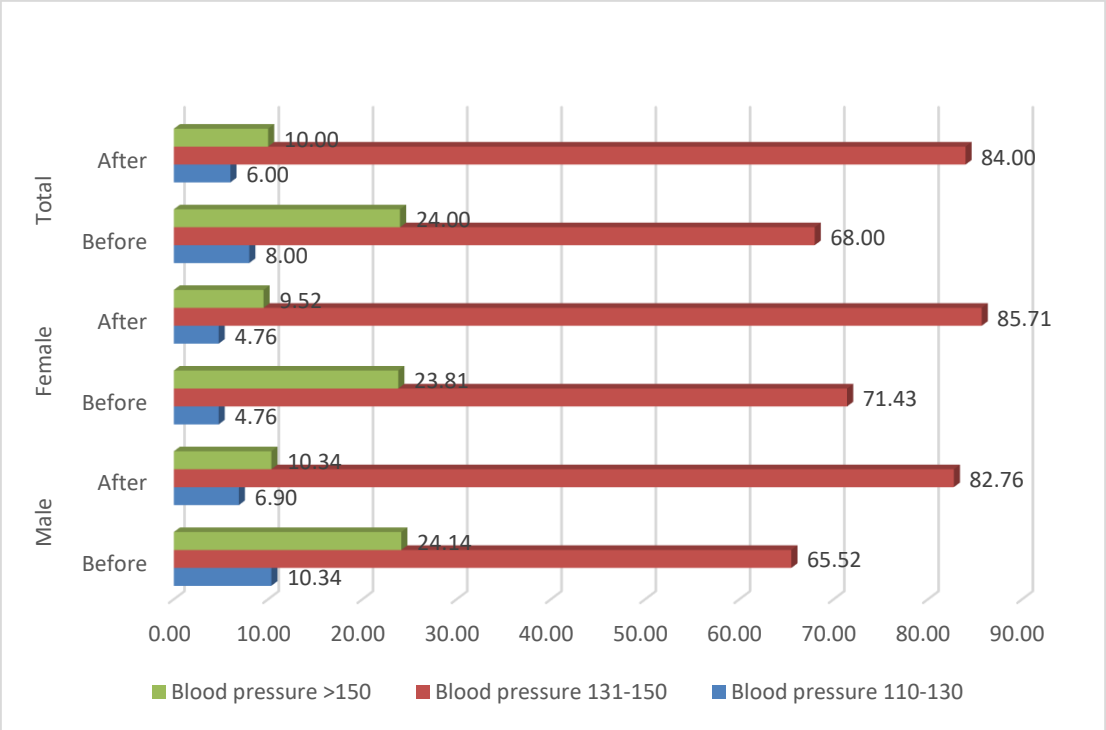


Fig. 2. Percentage of individuals with systolic blood pressure within each blood pressure range

The experimental group consisted of 50 individuals. The average high value before using the mobile application was 146.58 mm/Hg with a standard deviation of 11.28. After utilizing the mobile application, the mean high value decreased to 140.40 mm/Hg. The standard deviation value is 10.17. A t-test was conducted, resulting in a t-value of 0.044 and a p-value of 0.003. The hypothesis is deemed statistically significant.

The experimental group comprised 29 males with an initial average low value of 93.21 mm/Hg before using the mobile application, and a standard deviation of 5.10. The average low value after using the mobile application was 89.36 mm/Hg. The standard deviation is 5.39. The t-test yielded a t-value of 0.010 and a p-value of 0.005. The hypothesis is deemed statistically significant.

For 21 females, the initial average low value was 97.25 mm/Hg with a standard deviation of 12.57. After using the mobile application, the average low value decreased to 91.04 mm/Hg with a standard deviation of 6.13. The t-test value is 0.072 and the p-value is 0.036. The hypothesis is deemed statistically significant.

The experimental group consisted of 50 individuals. The average initial value before using the mobile application was 94.76 mm/Hg with a standard deviation of 9.01. The average value after using the mobile application was 90.30 mm/Hg. The standard deviation is 5.82. The t-test yielded a t-value of 0.004 and a p-value of 0.002. The hypothesis is deemed statistically significant.

The male experimental group had blood pressure levels categorized as follows: 10.34% had levels

between 110-130 mm/Hg, 65.52% had levels between 131-150 mm/Hg, and 24.14% had levels greater than 150 mm/Hg. The blood pressure reading post mobile application usage was 110-130 mm/Hg, with a 6.90% change. 131-150 mm/Hg pressure level was recorded in 82.76% of cases, whereas pressure levels over 150 mm/Hg were observed in 10.34%.

The female experimental group had the following blood pressure levels before utilizing the mobile application: 110-130 mm/Hg (4.76%), 131-150 mm/Hg (72.43%), and over 150 mm/Hg (23.81%). The blood pressure reading after utilizing the mobile application was 110-130 mm/Hg, with a 4.76% change. The pressure level ranged from 131 to 150 mm/Hg, representing 85.71 percent. The pressure level exceeded 150 mm/Hg, representing 9.52 percent.

Each experimental group had blood pressure levels categorized as follows: 110-130 mm/Hg at 8.00%, 131-150 mm/Hg at 68.00%, and over 150 mm/Hg at 24.00% before utilizing the mobile application. The blood pressure after utilizing the mobile application was 110-130 mm/Hg, with a 6.00% increase. The pressure level ranged from 131 to 150 mm/Hg in 84.00% of cases and was above 150 mm/Hg in 10.00% of cases.

The male experimental group had blood pressure levels categorized as follows: 71-80 mm/Hg at 3.45%, 81-90 mm/Hg at 17.24%, and 91-100 mm/Hg. 79.31% of users had a blood pressure reading of 71-80 mm/Hg after using the mobile application, 10.34% had a reading between 81-90 mm/Hg, and 41.38% had a reading between 91-100 mm/Hg. Additionally, 48.28% had a reading between 91-100 mm/Hg.

Prior to utilizing the mobile application, the female experimental group had blood pressure readings. The pressure levels were as follows: 81-90 mm/Hg at 23.81%, 91-100 mm/Hg at 66.67%, and greater than 100 mm/Hg at 9.52%. Pressure levels post mobile application use were as follows: 71-80 mm/Hg for 9.52% of users, 81-90 mm/Hg for 47.62%, 91-100 mm/Hg for 38.10%, and over 100 mm/Hg for 4.76%.

Each experimental group had varying blood pressure levels categorized as follows: 2.00% had a level of 71-80 mm/Hg, 20.00% had a level of 81-90 mm/Hg, 74.00% had a level of 91-100 mm/Hg, and 4.00% had a level above 100 mm/Hg. Pressure level post mobile application use: 71-80 mm/Hg, 10.00%. The pressure level was 81-90 mm/Hg, with a percentage of 44.00%. Pressure levels range from 91 to 100 mmHg account for 44.00%, while levels above 100 mmHg represent 2.00%.

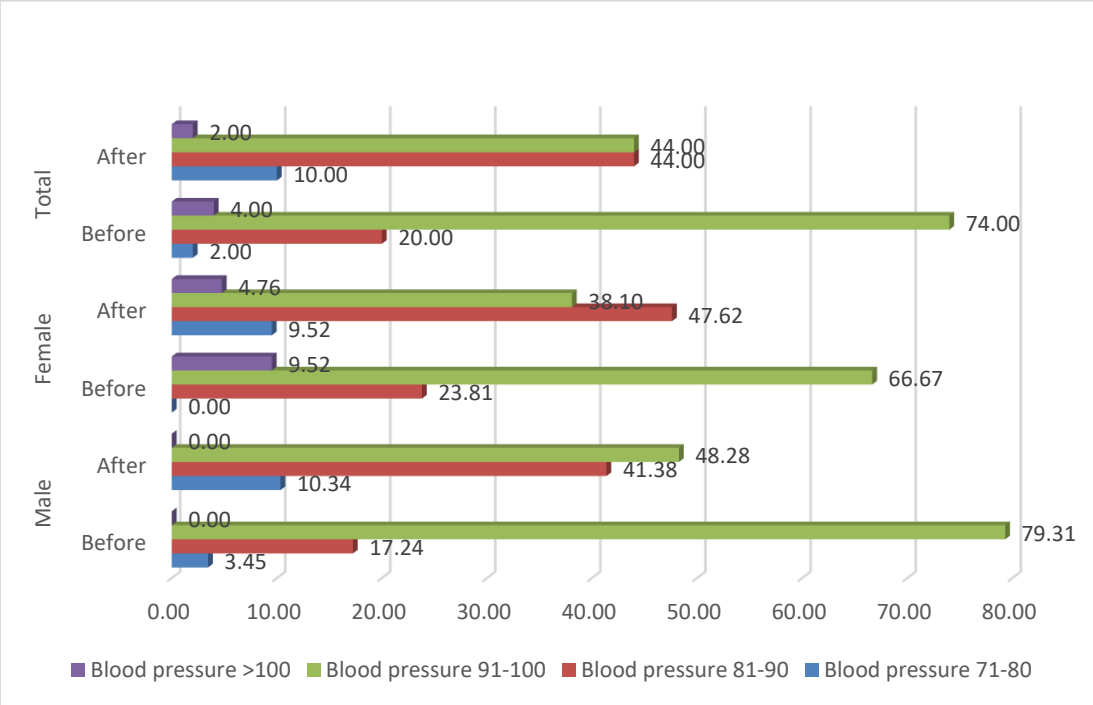


Fig. 3. Percentage of individuals having diastolic blood pressure within each blood pressure category

Table 5. Compare the mean systolic blood pressure before and after utilizing mobile applications

Sex	Control	Mean (Before) mm/Hg	S.D.	Mean (After) mm/Hg	S.D.	t-Value	p-Value
Male	20	142.80	12.18	134.13	10.59	0.176	0.088
Female	30	148.45	13.38	140.90	12.05	0.068	0.034
Total	50	145.06	12.85	136.84	11.57	0.001	0.003

Table 6. Compare the mean diastolic blood pressure before and after utilizing mobile applications

Sex	Control	Mean (Before) mm/Hg	S.D.	Mean (After) mm/Hg	S.D.	t-Value	p-Value
Male	30	93.50	8.30	89.36	6.38	0.101	0.050
Female	20	95.05	4.17	91.04	4.21	0.029	0.001
Total	50	94.12	6.93	90.30	5.71	0.005	0.120

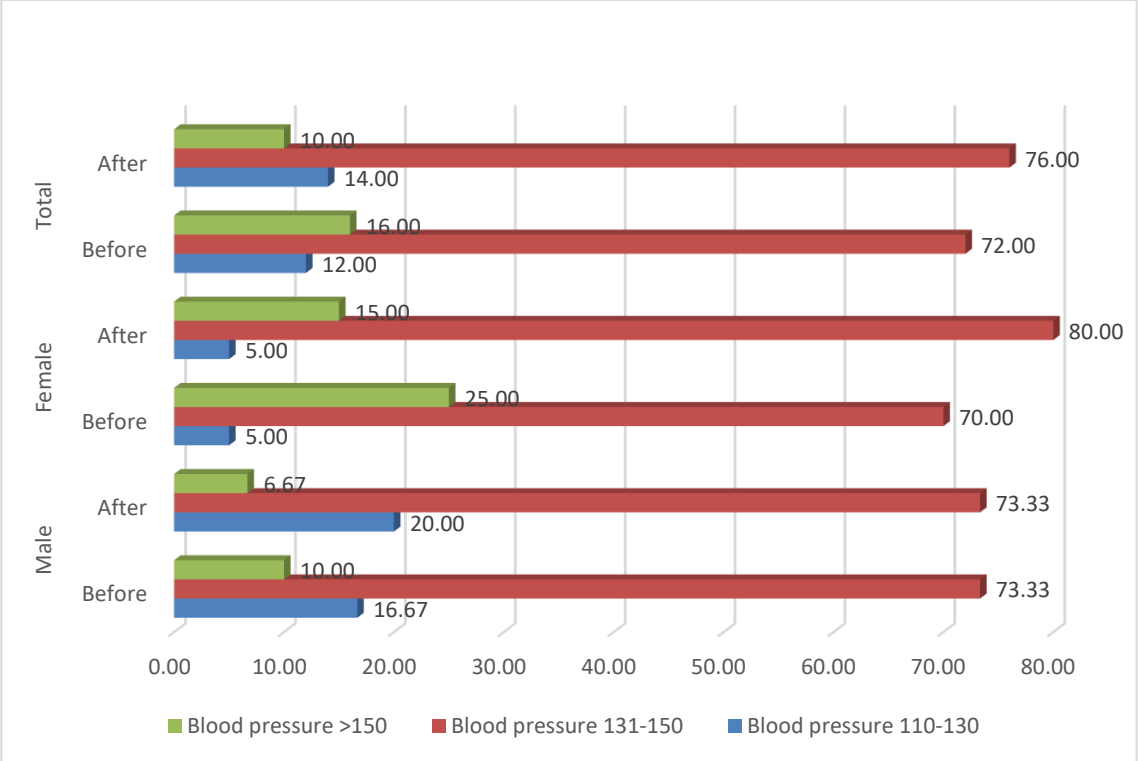


Fig. 4. Percentage of individuals with systolic blood pressure within each blood pressure category

3.2 Control Group

The control group comprised 20 males with an initial average high value of 142.80 mm/Hg and a standard deviation of 12.18. After using the mobile application, the mean high value decreased to 134.13 mm/Hg with a standard deviation of 10.59. The t-test resulted in a t-value of 0.176 and a significant p-value of 0.088, leading to the rejection of the hypothesis.

For 30 females, the initial average high value was 148.45 mm/Hg with a standard deviation of 13.38. After utilizing the mobile application, the mean high value decreased to 140.90 mm/Hg. The standard deviation value is 12.05. The t-test yielded a t-value of 0.068 and a p-value of 0.034. The hypothesis is significantly accepted.

The control group consisted of 50 individuals. Their average systolic blood pressure before

using the mobile application was 145.06 mm/Hg with a standard deviation of 12.85. After using the mobile application, the mean systolic blood pressure decreased to 136.84 mm/Hg. The standard deviation value is 11.57. The t-test yielded a t-value of 0.001 and a p-value of 0.003. The hypothesis is deemed statistically significant.

In the control group, there were 30 males. The average low value before using the mobile application was 93.50 mm/Hg with a standard deviation of 8.30. After using the mobile application, the average low value decreased to 89.36 mm/Hg. The standard deviation is 6.38. The t-test yielded a t-value of 0.101 and a p-value of 0.05. The hypothesis is deemed statistically significant.

Among 20 females, the initial average low value was 95.05 mm/Hg with a standard deviation of 4.17. After utilizing the mobile application, the mean low value decreased to 91.04 mm/Hg. The standard deviation value is 4.21. The t-test yielded a t-value of 0.029 and a p-value of 0.001. The hypothesis is deemed statistically significant.

The control group consisted of 50 individuals. The average low value before using the mobile application was 94.12 mm/Hg with a standard deviation of 6.93. After using the mobile application, the average low value decreased to 90.30 mm/Hg with a standard deviation of 5.71. A t-test was conducted with a t-value of 0.005 and a p-value of 0.12, leading to the rejection of the hypothesis.

The male control group had blood pressure readings ranging from 110-130 mm/Hg (16.67%), 131-150 mm/Hg (73.33%), and over 150 mm/Hg (10.10%) before utilizing the mobile application. The blood pressure reading after utilizing the mobile application was 110-130 mm/Hg, 20.00%. The pressure level ranged from 131 to 150 mm/Hg, equivalent to 73.33 percent. The pressure level exceeded 150 mm/Hg, equivalent to 6.67 percent.

The initial blood pressure levels of the female control group were categorized as follows: 5.00% had levels between 110-130 mm/Hg, 70.00% had levels between 131-150 mm/Hg, and 25.00% had levels greater than 150 mm/Hg. The pressure level after using the mobile application was 110-130 mm/Hg, with a 5.00% change. The pressure level ranged from 131-150 mm/Hg in 80.00% of cases and was above 150 mm/Hg in 15.00% of cases.

All control groups exhibited blood pressure levels categorized as follows: 110-130 mm/Hg, 12.00 percent; 131-150 mm/Hg, 72.00 percent; and greater than 150 mm/Hg, 16.00 percent, before

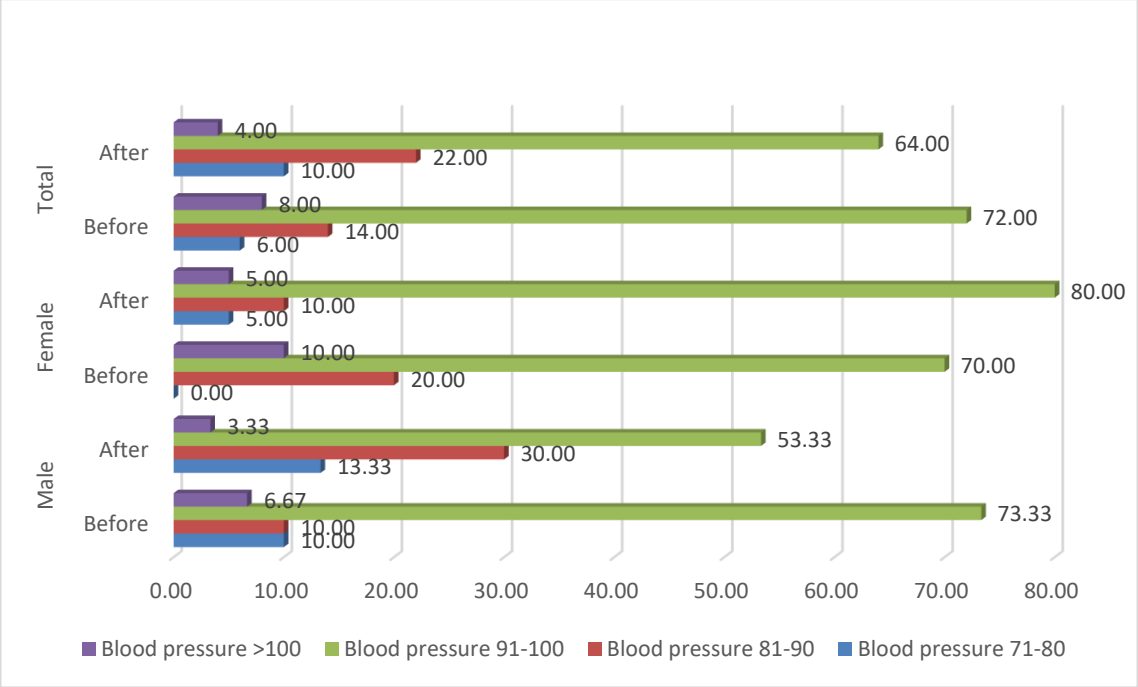


Fig. 5. Percentage of individuals having diastolic blood pressure within each blood pressure range

utilizing the mobile application. The blood pressure after utilizing the mobile application was measured at 110-130 mm/Hg, with a percentage of 14.00. The pressure level ranged from 131-150 mm/Hg in 76.00% of cases and was above 150 mm/Hg in 10.00% of cases.

Before utilizing the mobile application, the male control group had a blood pressure level ranging from 71-80 mm/Hg. 10.00% exhibited a blood pressure reading ranging from 81-90 mm/Hg. 10.00% exhibited a blood pressure reading ranging from 91-100 mm/Hg. 73.33% of the participants had a blood pressure over 100 mm/Hg. 6.67% had a change in blood pressure after utilizing the mobile application. 71-80 mm/Hg was recorded in 56.67% of cases, 13.33% had a pressure level between 81-90 mm/Hg, and 30.00% had a pressure level between 91-100 mm/Hg. Pressure between 91-100 mm/Hg accounts for 53.33% and pressure levels more than 100 mm/Hg account for 3.33%.

Prior to utilizing the mobile application, the female experimental group had blood pressure readings. The pressure levels are distributed as follows: 20.00% between 81-90 mm/Hg, 70.00% between 91-100 mm/Hg, and 10.00% greater than 100 mm/Hg. After utilizing the mobile application, the pressure level is now between 71-80 mm/Hg. 5.00% of individuals have a blood pressure reading between 81-90 mm/Hg. 10.00% have a pressure level between 91-100 mm/Hg, 70.00% have a pressure level more than 100 mm/Hg, and 10.00% have an unspecified pressure level.

The control groups had the following distribution of blood pressure values before utilizing the mobile application: 6.00% had levels between 71-80 mm/Hg, 14.00% had levels between 81-90 mm/Hg, 72.00% had levels between 91-100 mm/Hg, and 8.00% had levels above 100 mmHg. The pressure level after utilizing the mobile application was 71-80 mm/Hg, with a percentage of 10.00%. The pressure level was between 81-90 mm/Hg, at 22.00%. Pressure levels between 91-100 mmHg account for 64.00%, whereas levels above 100 mmHg account for 4.00%.

4. CONCLUSION

Among all treatment options, yoga therapy is the most suitable for overweight women and may be simply included by them. This study has a limited sample size and a follow-up period of only two months. We recommend doing a study with a substantial sample size and extended follow-up period to conclusively demonstrate the effectiveness of yoga therapy [15]. Yoga therapy can be seamlessly integrated into school and college curricula to address childhood obesity, which is a prevalent issue in developing nations. Yoga therapy should be a fundamental component of treating hypertension patients, addressing their physical, mental, social, and spiritual well-being comprehensively. Yoga treatment is mostly preventive but can also be utilized for therapeutic and restorative reasons in certain chronic illnesses. Our study showed substantial changes in physiological variables, indicating that yoga treatment is useful in improving women's quality of life by reducing stress levels and weight [16].

Yoga instructors were eager to teach yoga to individuals with hypertension, but they were concerned about the significant variation in the content of yoga classes and the skill level of some instructors. Thus, the absence of regulation is a concern that must be dealt with for individuals with hypertension or other health conditions, as well as for those without any health condition [14]. A manual and training guide for yoga providers on utilizing yoga to manage hypertension would help meet the training requirements of yoga practitioners. Furthermore, establishing a stronger connection between health service providers and yoga providers could help address the reluctance of health service professionals to prescribe yoga to individuals with hypertension and guide them to a yoga session tailored to their requirements. More substantial evidence is required before recommending the use and regulation of yoga for managing hypertension within the Ministry of Public Health.

CONSENT

As per international standards or university standards, patient(s) written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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