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Research Article

Yoga for Antenatal Mothers

Yoga and Exercise for Fetal Heart Rate, Body Mass Index, And Blood Pressure of Antenatal Mothers

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Abstract: Yoga is a traditional practice with Indian roots that has many therapeutic benefits. Pranayama and dhyana on body mass index (BMI) and mean blood pressure (MBP) of the antenatal mother (AM) and fetal heart rate (FHR) are critical for the antenatal mothers. Our aim is to determine Asana's impact in antenatal mothers. This Single blinded placebo-controlled trial was conducted at Saveetha Medical College and Hospital, Chennai, India. Consecutive sampling was used to select the samples conveniently. Then, they were randomly assigned into four groups using a random number table: control (CN), yoga group (YG), and Antenatal exercise group (EG), and Yoga and Antenatal exercise group (YAE) with 33 samples in each group. The CN group received conventional management, the YG and EG groups received Yoga intervention and antenatal exercises, respectively, and the YAE group received both Yoga and antenatal. The groups received their respective treatment 2 days a week for 16 consecutive weeks. BMI, BP of the AMs, and FHR were assessed at the end of the 4th week, 8th week, 12th week, and 16th week. A total of 132 samples accounted for the study results, which showed that the YAE group subjects performed significantly better than the YG, EG, and CN groups in all temporal outcomes (P<0.001). The CN group subjects did not progress significantly compared to the YG and EG group samples. The study concluded that instead of using Yoga as an individual tool in the training AM, adding antenatal exercise will be more beneficial in normalizing BMI, BP, and FHR among AMs.

Keywords: Yoga, Pranayama, Asana, dhyana, antenatal mother, body mass index, blood pressure, and fetal heart rate

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1. INTRODUCTION

Antenatal mothers (AM) who are obese face specific considerations and potential risks associated with pregnancy. A BMI of more than 30 or higher is considered obese, and it can have implications for both the mother and the developing baby.[1] Obese women are at a higher risk of experiencing complications during pregnancy, such as gestational diabetes, preeclampsia (high blood pressure during pregnancy), blood clots, and a high possibility of cesarean delivery[2]. These complications can impact the mother's health and the pregnancy outcome. Maternal obesity can have consequences for the developing baby. It increases the risk of congenital disabilities, such as neural tube defects and heart abnormalities. There may also be an increased likelihood of the baby being large for gestational age, which can lead to difficulties during delivery. [3–5]. Obesity is a risk factor for developing gestational diabetes, which can pose risks to both the mother and the baby, including an increased likelihood of cesarean delivery and the baby developing type 2 diabetes later in life. [3] AMs can increase the possibility of acquiring hypertension while pregnant. Preeclampsia and gestational hypertension (GHT) are two conditions in addition to the mother's chronic hypertension. GHT, or elevated blood pressure, often declines after childbirth and appears after the 20th week of pregnancy in first-time pregnancies and multiple pregnancies (e.g., twins). If left unmanaged, gestational hypertension can progress to a more severe condition called preeclampsia, which is a serious condition characterized by high blood pressure and organ damage, usually affecting the kidneys and liver. [6] Both maternal body mass index (BMI) and gestational hypertension can have an impact on the fetal heart rate during pregnancy.[7] Hypertension can lead to reduced blood flow through the placenta, which may affect the oxygen and nutrient supply to the fetus. Inadequate oxygenation and nourishment can impact the fetal heart rate. Fetal distress occurs when the oxygen supply is compromised, leading to changes in the fetal heart rate patterns. It can manifest as an abnormal or non-reassuring fetal heart rate pattern. [8]Given the many cascade effects linking the mother's blood pressure and BMI to the functioning of the foetal heart, it is known that research should consider the mother and fetal progression. There are pharmacological and non-pharmacological approaches to the management of obesity among AM. As pharmacological management is not in the scope of this paper, the non-pharmacological approaches are discussed. Body weight management among AM is challenging as their exercise tolerance and adherence are highly compromised. Exercise during pregnancy has been linked to decrease instances of poor foetal growth, miscarriages, an increased risk of musculoskeletal injuries, and the potential for an early birth. Even though there are a lot of misunderstandings around these belief models (especially in the diverse Indian community), the real issue is frequently a lack of professional supervision and workout recommendations.[10,11] Physical activity is the safest and most desirable if no potential complications or contraindications are observed in the AM. AM should be encouraged to be involved in safe exercise programs. [12] There are many non-pharmacological approaches for managing obesity and hypertension among AM; some of them are physical-based, and some are mind-based. Relaxation techniques, biofeedback [13], progressive muscle relaxation techniques, guided imagery techniques, and [14] prenatal music stimulation methods [15] have been provided to manage fetal heart performance and mothers' BP effectively. Yoga has also been a mainstay in managing antenatal mothers and fetal performance. It is proved from the literature that components of Yogic practice can reduce stress levels by altering sympathetic and parasympathetic stimulation.[16,17] Various outcomes have been tested with Yogic training among the AM. Still, to our knowledge, no study has tested the effect of Asana, Pranayama, and dhyana (mindfulness practice) in managing mother and fetal physiology.

2. MATERIALS AND METHODS

This single-blinded placebo-controlled trial was conducted at Saveetha Medical Hospital, Chennai, India.

2.1. Ethical statement

Ethical clearance was obtained from the Saveetha Institute of Medical and Technical Sciences. (SIMATS) Deemed University (Approval No 004/02/2023/IEC/SMCH.) All the participants read the written consent in Tamil and English and signed. All Participants were prescreened with Dr Nidhi Sharma, Obstetrician, in Saveetha Medical College Hospital and alloted the samples for Intervention. All Study participants accepted and signed consent for withdrawing a blood sample of 2ml at 16 weeks of gestation period as a pretest. At the 36th week of gestation, a 2ml intravenous sample was drawn again for the same posttest proposed.

2.2. Inclusion criteria

Antenatal mothers aged between 20 to 35 years who are booked and presented with 20 weeks of gestation currently with singleton fetuses in the antenatal clinic and willing to undergo yoga practice and those who are planning to give birth at Saveetha Medical College and Hospital (SMCH). Antenatal mothers attending the antenatal clinic for consultation and mothers seeking treatment during the antenatal period at the antenatal clinic, SMCH.

2.3. Exclusion criteria

Mothers with chances of high-risk pregnancy, history of psychiatric disturbances which may affect the interventional compliances, subjects with different religious thoughts and perceived Yoga from a religious background, pregnancy from in vitro fertilization, intrauterine growth restriction in any of the previous pregnancy, fetal abnormality on ultrasound scanning; and previous exposure to yoga or subjects with previous history of trauma while attempting to performing Yoga and other bad experiences were excluded from the study.

2.4. Sample size

The sample size was estimated using the effective size achieved from the previous similar study [16] and was calculated using the g-power software, version 3.1. The total number of samples required for the study was 118. The sample size was increased by 10% to account for dropouts. Hence, a total sample size was arrived at 132.

2.5. Sampling Technique

The samples were conveniently selected through consecutive sampling and allotted randomly using a random number tabulation into four groups, namely control (CN), Yoga group

(YG), Antenatal exercise group (EG), and Yoga and Antenatal exercise group (YAE), with 33 samples in each group.

2.6. *Procedure*

After getting consulted by the obstetrician, the primary researcher screened all the participants for the selection criteria. Following this, all the participants were assigned a numbered concealed envelope with a computer-generated random number to allocate them to any of the four groups. As this was a physical intervention-based study, the participants and intervention providers could not be blinded; the team of nurses who performed the assessments and the statistician were blinded from the study objective and group allocation.

2.7. *Group Interventions*

The CN group received conventional management, the YG and EG groups received Yoga intervention and antenatal exercises, respectively, and the YAE group received both Yoga and antenatal. The groups received their respective treatment 2 days a week for 16 consecutive weeks. BMI, BP of the AMs, and FHR were assessed at the end of the 4th week, 8th week, 12th week, and 16th week. During the prenatal stage, standard care included general counseling, health education, dietary recommendations, and guidance on changing one's lifestyle and behavior. Throughout the 16-week intervention, the participants were willing to share any questions or concerns about their health with the researcher. The Yoga intervention for the study consisted of Asanas, pranayama, and dhyana techniques that proved useful in the past literature [16,18]. The detailed intervention for YG is presented in Table 1. The EG received orientation for 10 minutes every session regarding the safety measures in doing the session exercises and their benefits, followed by stretching exercises mainly to the hip adductors, internal rotators, knee flexors and extensors, and calf muscles. The upper limb muscles were also stretched, with the total flexibility session lasting 10 minutes. This was followed by breathing techniques, including coastal expansion exercises, diaphragmatic breathing exercises, and deep breathing with holds for 10 minutes. This was followed by generalized strengthening exercises for all body muscles, focusing on the upper trunk and abdomen in one session and lower limb and back muscles in the following sessions. This lasted 15 minutes during the 1st 8 weeks and 10 minutes in the 2nd 8 weeks. Kegels and pelvic floor strengthening exercises were done for 5 minutes during 1st 8 weeks and 10 minutes in the 2nd 8 weeks. This was followed by a progressive relaxation technique for 10 minutes. Including the rest, both YG and EG performed the intervention 60 minutes a session, 2 sessions a week for 16 consecutive weeks.

Table 1 – Exercise procedure used by the Yoga group

Domains of Yoga		1st 8 weeks	2nd 8 weeks
Orientation	Duration	15min	10min
	Orientation about Yoga and health benefits, indications and contraindications, do's and don'ts	Yes	Yes
Pranayama (Breath control techniques)	Duration	10min	15min
	Hasta ayamasvaasanam (hands-in & hands out breathing)	Yes	Yes
	Hasta vistarasvasana (Hands stretching breathing)	Yes	Yes
	Gulphavistā raśvasanam (Ankle stretch breathing)	Yes	Yes
	Vyā ghraśvasanam (Tiger breathing)	Yes	No
	Naadishudhi pranayama (Alternate nostril breathing)	Yes	Yes
	Sooryanaadiprananyama (Right nostril breathing)	Yes	No
Asana	Duration	15min	10min
Standing asana	Tad asana (tree pose)	Yes	Yes
	Ardhakatichakrasana (Lateral arc pose)	Yes	Yes
	Trikonasana (Triangle pose)	Yes	Yes
Sitting asana	Vajrayana (Ankle posture)	Yes	Yes
	Siddhas Ana (Sage pose)	Yes	Yes
	Badhakonasana (Bound angle pose)	No	Yes
	Malasada (Squatting pose)	No	Yes
	UT katakonasana (Goddess pose)	No	Yes
Bandha	Duration	--	5 min
	Dayna bandha	No	Yes
Deep relaxation technique	Duration	10min	10min
Dhyana	Duration	10min	10min

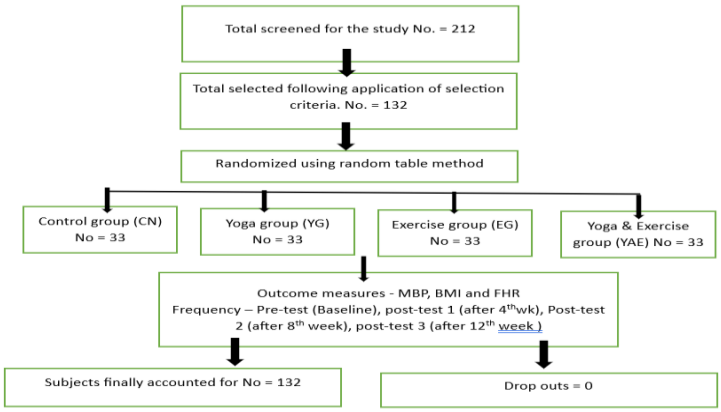
Following an orientation to help participants understand yoga's ideas, dos and don'ts, this table covers the many parts of the yoga program.

2.8. *Outcomes measures*

Three standard outcomes were used to assess the treatment impact in this study. BP, BMI, and FHR were used. The Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were assessed, and the mean blood pressure (MBP) was calculated using the formulae MBP = diastolic blood pressure (DBP) + 1/3 [SBP–DBP]. This was performed using a conventional sphygmomanometer and a stethoscope by an expert with a minimum of 5 years of experience. The BMI was calculated using the formulae weight in kilograms divided by height in meters squared. Auscultation of the fetal heart rate is a widely used method in obstetrics. It is considered a reliable and valid test when performed by trained healthcare professionals. [19]. The outcomes were applied before the intervention (Pretest), after 4 weeks (post 1), after 8th week (post 2), after 12th week (post 3) and after 16th week (Post 4). The detailed procedure adopted in the study is presented in flow chart 1.

2.9. *Statistical analysis*

The study data was assessed using SPSS software version 26, with P<0.001 as the significance level and 95% as a confidence interval. The distribution analysis was done using the Shapiro-Wilk test and Kolmogorov-Smirnov test. The demographic data were assessed for homogeneity using Chi-square analysis. Parametric outcomes used in the study were assessed between-group differences using analysis of variance (ANOVA), and for the within-group analysis repeated measures, ANOVA was used.



Flow chart 1 – illustrating the study procedure

3. RESULTS

A total of 132 AM satisfying the selection criteria accounted for the study results. They were selected from 212 women receiving antenatal care at our hospital.

3.1. *Clinical and demographic characteristics of the participants*

The following demographic data were collected - Age in years, Education, Income per month in rupees, Religion, Type of marriage, Duration of marital life, and Dietary Patterns. The demographic distribution in each group is presented in Table 2. The analysis of these factors' distribution clearly shows no significant difference between the two groups.

3.2. *Analysis of the Outcome Measures*

The outcome analysis of the MAP showed that there was no significant difference between pre-test scores at baseline, and there was a significant difference in all other temporal outcomes. (Table 3) The post hoc analysis showed that the control group differed significantly from the other two groups in all four measures. The post-tests 1,2, and 3 did not differ significantly between the three groups, namely YG, EG, and YEG group, indicating that the intervention had the same effects. However, the within-group analysis showed critical observation. Though there was a significant difference in the control group, it was not in reducing MAP. Instead, there was a significant deterioration of MAP. The other three groups showed significant differences with a gradual reduction of MAP (Table 4). Moreover, the MAP was significantly reduced consistently throughout the intervention period except for the posttest 3 vs. posttest 2 period (p=0.199) in YEG. The other two groups did not show such a phenomenon (Fig 1). The BMI analysis showed that from a baseline homogeneity, there was a significant difference between the groups in the other three instances (Table 5). The YEG group always scored significantly better than the controls, but the other two groups were like the control until posttest 2. The YEG group significantly improved compared to the other three groups (vs. control-0.001, vs. YG-0.049, vs. EG – 0.002). The within-group analysis revealed that the control group gradually increased BMI levels significantly. YG and EG did not show any changes during the intervention period, which substantiates that antenatal women tend to increase their body weight during this period. However, the striking feature was that the YEG group showed a significant BMI reduction in the 16 weeks despite the expected gradual increase in body weight. (Table 6 and Figure 2). The analysis of FHR clearly showed that the groups were similar at baseline and post-test 1. The changes were observed only in posttest 2 and 3 (Table 7), where no difference existed between the control, EG, and YG. However, the YEG significantly differed from all three groups in posttests 2 and 3. The within-group analysis showed that the control group had no significant change, but all other groups showed significant change (Table 8). YEG showed an early and consistent improvement with significant differences between all four pairs analyzed in the post hoc analysis, unlike the other two intervention groups, which showed significant improvement only in the long term.

Table 2: Demographic data and homogeneity analysis.

Demographic data	CON	YG	EG	YEG	Sig
Age in years					
20-25	4	6	7	5	Chi sq - 2.039
26-30	18	14	16	15	P=0.91
31-35	11	13	10	13	
Education					
Illiterate	4	3	6	5	
Primary education	4	2	2	5	Chi sq - 7.136
Higher secondary education	8	10	8	5	P= 0.84
Undergraduate (UG)	12	14	12	10	
Postgraduate (PG)	5	4	5	8	
Income per month in rupees					
Less than Rs. 10,000	2	1	3	5	
10,000-15,000	12	8	10	9	Chi-sq - 6.206 P = 0.719
15,000-20000	14	18	17	16	
Above 20000	5	6	3	3	
Religion					
Hindu	24	23	25	22	
Muslim	3	5	4	5	Chi-sq = 1.50
Christian	5	4	3	5	P = 0.99
Others	1	1	1	1	
Type of marriage					
Consanguineous	6	3	5	4	Chi-sq = 1.28.
Non consanguineous	27	30	28	29	P=0 .732
Duration of marital life					
Less than 2 years	11	12	13	11	Chi-sq=5.92
2-4 years	12	14	10	16	P = 0.747
4-6 years	6	3	5	1	
More than 6 years	4	4	5	5	
Dietary Pattern					
Vegetarian	8	10	12	7	Chi-sq = 2.21
Mixed (both veg & Non veg)	25	23	21	27	P = 0.52

The demographic data were analyzed to know if there was any difference between the groups in terms of age in years, education, income, religion, type of marriage, duration of marital life, and dietary pattern. The analysis shows that the groups were similar for all components.

Table 3: Between-group difference in MAP

		Sum of Squares	df	Mean Square	F	Sig.
MAP - PRE-TEST	Between Groups	193.2	3	64.432	2.697	0.069
	Within Groups	3057.4	128	23.886		
	Total	3250.7	131			
MAP - POST TEST 1	Between Groups	2032.5	3	677.523	29.351	0.001*
	Within Groups	2954.7	128	23.084		
	Total	4987.2	131			
MAP - POST TEST 2	Between Groups	3664.9	3	1221.636	67.169	0.001*
	Within Groups	2328.0	128	18.188		
	Total	5992.9	131			
MAP - POST TEST 3	Between Groups	6917.6	3	2305.886	171.673	0.001*
	Within Groups	1719.2	128	13.432		
	Total	8636.9	131			

Significant difference

An analysis of variance (ANOVA) employed to demonstrate the between-group MAP value analysis in the table revealed that all other tests showed significant differences between the four groups except for the pre-test outcomes.

Table 4: Within-group analysis of MAP

		Sum of Squares	Df	Mean Square	F	Sig.
MAP - CON	Between Groups	911.455	3	303.818	10.600	0.001*
	Within Groups	3668.727	128	28.662		
	Total	4580.182	131			

MAP - YG	Between Groups	954.000	3	318.000	11.023	0.001*
	Within Groups	3692.727	128	28.849		
	Total	4646.727	131			
MAP - EG	Between Groups	584.182	3	194.727	18.618	0.001*
	Within Groups	1338.727	128	10.459		
	Total	1922.909	131			
MAP - YEG	Between Groups	1850.386	3	616.795	58.082	0.001*
	Within Groups	1359.273	128	10.619		
	Total	3209.659	131			

Significant difference

The within-group analysis of the groups was performed using ANOVA, which showed a significant improvement in all four groups at $p < 0.05$. This confirmed that all the interventions effectively changed the mean arterial pressure.

Table 5: Between-group analysis of BMI

		Sum of Squares	Df	Mean Square	F	Sig.
BMI - PRETEST	Between Groups	12.967	3	4.322	1.376	0.253
	Within Groups	402.022	128	3.141		
	Total	414.990	131			
BMI-POST1	Between Groups	31.580	3	10.527	3.983	0.009*
	Within Groups	338.288	128	2.643		
	Total	369.868	131			
BMI-POST2	Between Groups	128.658	3	42.886	19.412	0.001*
	Within Groups	282.785	128	2.209		
	Total	411.444	131			
BMI-POST3	Between Groups	229.405	3	76.468	43.140	0.001*
	Within Groups	226.887	128	1.773		
	Total	456.292	131			

Significant difference

The table presents the between-group analysis of BMI value using an analysis of variance(ANOVA), which showed that apart from the pretest values, all the other tests showed significant differences between the four groups with $p<0.05$.

Table 6: Within-group analysis of BMI

		Sum of Squares	Df	Mean Square	F	Sig.
BMI - CON	Between Groups	115.184	3	38.395	10.912	0.001*
	Within Groups	450.359	128	3.518		
	Total	565.543	131			
BMI - YG	Between Groups	2.343	3	.781	0.339	0.797
	Within Groups	294.775	128	2.303		
	Total	297.117	131			
BMI - EG	Between Groups	9.407	3	3.136	1.058	0.369
	Within Groups	379.308	128	2.963		
	Total	388.715	131			
BMI - YEG	Between Groups	41.473	3	13.824	14.095	0.001*
	Within Groups	125.542	128	.981		
	Total	167.015	131			

Significant difference

The within-group analysis of the groups was performed using Repeated measures ANOVA for BMI, which showed a significant improvement in all four groups at $p < 0.05$. this Cleary showed that all the interventions effectively changed the Body mass index.

Table 7: Between-group analysis of FHR

		Sum of Squares	Df	Mean Square	F	Sig.
FHR-PRE	Between Groups	313.727	3	104.576	1.962	0.123
	Within Groups	6822.606	128	53.302		
	Total	7136.333	131			
FHR-POST1	Between Groups	142.023	3	47.341	0.966	0.411
	Within Groups	6271.273	128	48.994		
	Total	6413.295	131			

FHR-POST2	Between Groups	1346.727	3	448.909		
	Within Groups	5044.000	128	39.406	11.392	0.001*
	Total	6390.727	131			
FHR-POST3	Between Groups	3195.818	3	1065.273		
	Within Groups	4579.152	128	35.775	29.777	0.001*
	Total	7774.970	131			

Significant difference

The table presents the between-group analysis of FHR value using an analysis of variance(ANOVA), which showed that pretest and posttest 1 did not show any difference between the groups; however, there was a significant difference between the four groups at posttest 2 and posttest 3 values. with $p<0.05$.

Table 8: Within-group analysis of FHR

		Sum of Squares	Df	Mean Square	F	Sig.
FHR-CON	Between Groups	403.909	3	134.636		
	Within Groups	8637.273	128	67.479	1.995	0.118
	Total	9041.182	131			
FHR-YG	Between Groups	767.659	3	255.886		
	Within Groups	7095.273	128	55.432	4.616	0.004*
	Total	7862.932	131			
FHR-EG	Between Groups	739.424	3	246.475		
	Within Groups	4230.485	128	33.051	7.457	0.001*
	Total	4969.909	131			
FHR-YEG	Between Groups	7877.182	3	2625.727		
	Within Groups	2754.000	128	21.516	122.038	0.001*
	Total	10631.182	131			

Significant difference

The within-group analysis of the groups was performed using Repeated measures ANOVA for BMI, which showed that apart from the control group, there was a significant improvement at $p < 0.05$ in all the other groups. This confirmed that all the experimental interventions effectively changed the fetal heart rate.

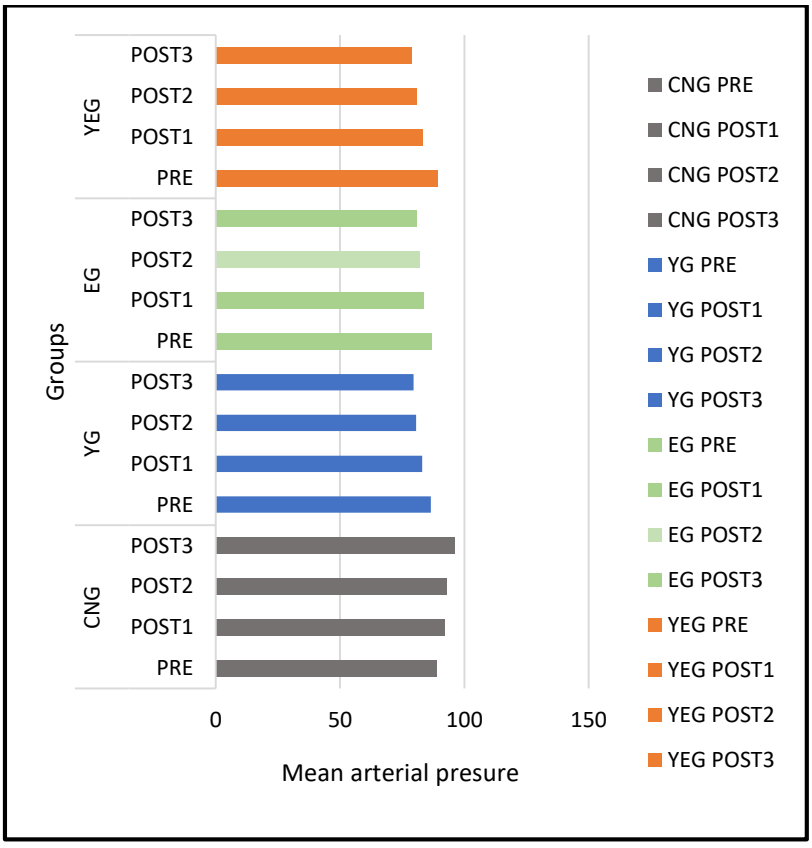


Fig1: Group performance – MAP

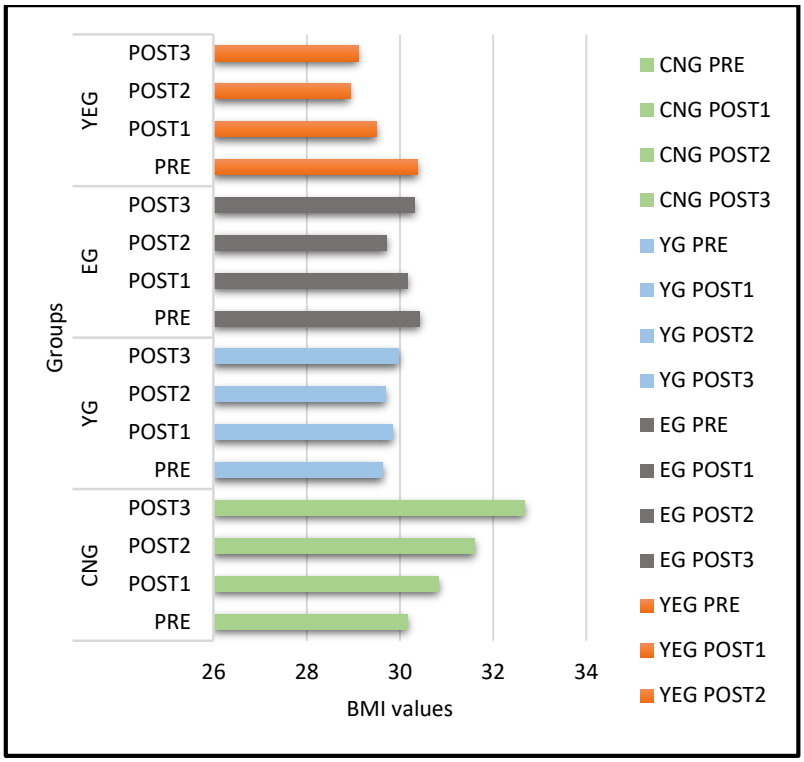


Fig 2: Group performance – BMI

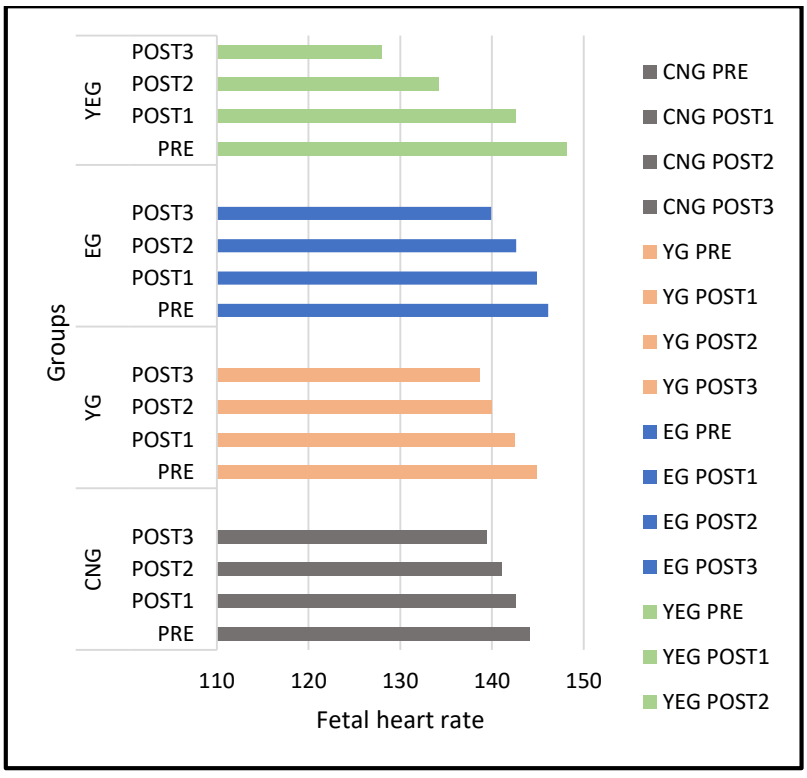


Fig 3: Group performance – FHR

4. DISCUSSION

This study tried to test the effect of Asana, pranayama, and dhyana on BMI and BP of the AM and FHR among AM. Yoga is a centuries-old practice that has gained significant popularity in recent decades. It involves physical postures, breathing exercises, meditation, and ethical principles that promote physical, mental, and spiritual well-being. [20,21] While yoga has been widely embraced and practiced by millions worldwide, there is still much to explore and understand about its potential benefits and mechanisms of action. While many individuals report positive effects from practicing yoga, scientific research is needed to provide empirical evidence and validate these claims. Rigorous studies can help identify physiological, psychological, and cognitive changes during and after yoga practice and assess their long-term impact on overall health. [22] There is an emerging evidence suggesting that yoga may have various health benefits, including reducing stress, anxiety, and depression, improving cardiovascular health, enhancing flexibility and balance, relieving chronic pain, and promoting better sleep. Further research can help establish the efficacy, optimal dosage, and potential

mechanisms underlying these effects, enabling healthcare professionals to prescribe yoga as a complementary therapy. Yoga can offer numerous benefits for pregnant women. Yoga can help improve strength, flexibility, and endurance, which are beneficial during pregnancy and labor. It focuses on gentle stretches, postures, and movements that help relieve common pregnancy discomforts like back pain, hip pain, and muscle tension. Additionally, yoga can enhance overall body awareness, posture, and alignment, promoting better balance and coordination. [22–24]The topic of exercise versus yoga and its benefits has been discussed and researched within the scientific community. While both forms of physical activity can positively affect health, there are differences in their approaches and potential outcomes. It's worth noting that research findings can rarely vary due to differences in study design, participant characteristics, and the specific aspects of exercise or yoga being studied. [25] Regular exercise, particularly aerobic activities, can contribute to weight loss or management by increasing energy expenditure and promoting fat burning. While not typically considered a high-calorie burning activity, yoga can still be a valuable component of a weight management program. It can enhance body awareness and mindfulness and help individuals make healthier choices related to nutrition and overall well-being. However, more research is needed to directly compare the effects of yoga and exercise on weight loss.[26–28] The current study's findings unequivocally demonstrate that doing yoga and exercising together is healthier than doing either yoga or workouts. An additional benefit of this combination was seen in fetal health, as shown by the FHR. The weight loss achieved by combining exercise and yoga has demonstrated that this combination can also be a useful management technique for obese individuals in other categories. [29] The findings of our study on foetal health were in line with earlier research[30].

Health counselling

pranayama

Antenatal exercise

Pelvic floor exercise

Antenatal Butterfly Posture Asana

Fig 4: Images during the intervention

5. LIMITATIONS OF THE STUDY

The study has a few limitations, such as a lack of objective outcome measures (biomarker or imaging technique) to prove the effect. The study did not involve a long-term follow-up to understand the sustainability of the interventional effects. The study was done from a single medical setup and cannot be generalized to a diverse population with different cultures and practices.

6. FUTURE RECOMMENDATION

Future studies should consider testing the same with a larger sample size and in a heterogeneous population. The same intervention should be tested with more sensitive tools like biomarkers and imaging techniques like ultrasound.

7. CONCLUSION

The study concludes that combining Yoga and exercises can be a better option than providing Yoga and exercises individually to improve maternal and fetal health regarding MAP, BMI, and FHR. This proves that both modern interventions in the form of prescribed exercises and ancient tools like yoga can be a better combination in treating AM, and this needs future research for ascertaining the same results using other outcomes like biomarkers, which can be more objectively quantified.

8. AUTHOR CONTRIBUTION STATEMENT

Dr. S. Kala Barathi conceptualized and designed the study. Mrs. Sathiyabama collected the data and executed the study. Dr. Nidhi Sharma reputed the samples for the study population and supported the Manuscript preparation.

9. ACKNOWLEDGEMENT

Saveetha Institute of Medical and Technical Sciences (Deemed to be University), especially Research Department. Thandalam, Chennai, Tamilnadu, India.

10. CONFLICT OF INTEREST

Conflict of interest declared none.

11. REFERENCES

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