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Original Article

Therapeutic Effects of Benson's Relaxation on Maternal Stress and Physiological Indicators in Antenatal Mothers with Pregnancy Induced Hypertension

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ABSTRACT

Background: Hypertension during pregnancy, particularly Pregnancy-Induced Hypertension (PIH), presents a major challenge in maternal healthcare. It increases the risk of complications such as preeclampsia, eclampsia, and preterm birth. In addition to physical risks, PIH often contributes to elevated emotional stress, especially in hospitalized antenatal mothers, which can further worsen blood pressure and adversely affect maternal and fetal health. To assess the effectiveness of Benson's Relaxation Therapy in reducing stress levels and physiological indicators, specifically blood pressure, among antenatal mothers with PIH. **Materials and Methods:** A quasi-experimental study was conducted with 60 antenatal mothers diagnosed with PIH, selected through purposive sampling and evenly divided into intervention and control groups. The intervention group received Benson's Relaxation Therapy-comprising slow, deep nasal breathing with abdominal involvement and passive thought release-three times daily for 20 min over five consecutive days, in addition to standard medical treatment. The control group received only standard medical care. Pre- and post-intervention measurements of stress levels and blood pressure were compared between groups. **Results:** Post-intervention analysis showed a statistically significant reduction in perceived stress and blood pressure in the intervention group compared to the control group ($p<0.005$). **Conclusion:** Benson's Relaxation Therapy is an effective, low-cost, and non-pharmacological approach for managing stress and blood pressure in antenatal mothers with PIH. Its simplicity and clinical applicability support its integration into routine prenatal care. Further studies with larger and more diverse populations are recommended to validate these findings.

Keywords: Benson's relaxation therapy, Pregnancy Induced Hypertension (PIH), Stress, Physiological outcomes.

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INTRODUCTION

Pregnancy-Induced Hypertension (PIH) is a clinically relevant illness that affecting about 5-8% of pregnancies worldwide and significantly increases maternal and fetal morbidity and mortality (Soma-Pillay, *et al*., 2016; Ford *et al*., 2022). In India, PIH prevalence varies between 6.9% and 15%, reflecting a critical public health challenge, especially in tertiary care settings (Mathew *et al*., 2023). Severe forms such as preeclampsia and eclampsia are yearly cause of responsible over70,000 maternal and 500,000 fetal deaths (Ford, *et al*., 2022), with hypertensive complications linked to poor placental perfusion, restricted fetal growth, and preterm birth (Krielessi, *et al*., 2012).

The findings suggest that maternal psychological stress not only exacerbates PIH but may also serve as a modifiable risk factor influencing blood pressure regulation (Coussons-Read, 2013). Yet, routine antenatal care in many Indian settings still lacks integrated strategies for non-pharmacological stress management. Benson's Relaxation Therapy-a simple, cost-effective technique that triggers the parasympathetic "relaxation response"-has demonstrated potential in reducing stress and improving physiological stability in clinical populations (Benson, 1976; Ryff, 2014). However, its application in the antenatal management of PIH remains underexplored in the Indian context. Hence, the present study is planned to assess how well Benson's relaxation

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therapy works to lower stress levels and improving physiological parameters in pregnant women diagnosed with PIH in a tertiary care hospital setting. By addressing this knowledge gap, the research contributes to a more holistic, low-resource approach to managing hypertensive complications during pregnancy.

MATERIALS AND METHODS

The quasi-intervention study was carried out for three weeks at Dhiraj Multispecialty Hospital and Sumandeep Vidyapeeth an institution deemed to be University, Vadodara with ethical approval from the Institutional Ethics Committee (SVIEC No: SVIEC/ON/NURS/SRP/May/24/69).

Based on previous studies and using non-probability purposive sampling, a total of 60 pregnant women diagnosed with PIH were enrolled, from that 30 allocated to the intervention group and 30 to the control group. Inclusion criteria comprised antenatal mothers between 20 to 38 weeks of gestation, admitted to the hospital with a PIH diagnosis. Mothers with chronic illness, on IV antihypertensive therapy, or unwilling to participate were excluded. All participants gave their informed consent. Benson's Relaxation Therapy was administered to intervention group participants in addition to standard medical care. The intervention was administered three times daily for five days, for duration of 20 min per session. The therapy included breathing awareness, progressive muscle relaxation, and guided mental relaxation in a quiet, comfortable environment. The control group continued to receive routine care without the Benson's relaxation therapy.

Data were collected using four tools:

1. Demographic Profile Sheet: Age, occupation, education, income, BMI, type of family, diet pattern, and residence.
2. Physiological indicators Sheet: Vital signs, including blood pressure, are evaluated.
3. Cohen's Perceived Stress Scale (PSS-10): A validated 10-item scale with a score range of 10-30 is used to measure subjective stress.
4. Groningen Sleep Quality Scale: A 15-item questionnaire assessing sleep quality, where higher scores indicated poorer sleep.

All tools underwent content validation by 7 subject experts and were pilot-tested for reliability. The data were collected by the principal investigators who were trained and certified in Benson's Relaxation Therapy. Per day, four participants were recruited, equally distributed between both groups. Data were coded and then imported for analysis into SPSS (Version 25.0). For baseline data, descriptive statistics (mean, SD, and frequency) were employed. The pre- and post-intervention differences were assessed using paired and unpaired t-tests scores for stress and blood pressure in each group. Statistical significance was defined as a p-value of less than 0.05. Tables and the proper graphical representations were used to present the results.

RESULTS

The goal of the current quasi-experimental study was to assess how well Benson's Relaxation Therapy affected the physiological measures, subjective stress, and sleep quality of expectant mothers who had Pregnancy-Induced Hypertension (PIH). The results showed that Benson's relaxation therapy was highly successful in lowering stress levels and enhancing blood pressure and heart rate, but that the intervention group's improvement in sleep quality was less pronounced than that of the control group.

Characteristics of Sociodemographic variables

Most antenatal mothers in both the control and Intervention groups were in the age groups of 21-25 years, while maximum antenatal mothers were working in mild to secondary level work. Most of them belonged to low-income families (Rs. 2000-4000/month) who had secondary education as their highest qualification. As for BMI, the number of undernourished mothers was greater in the group receiving intervention (27%), whilst in the control group the mothers with normal BMI predominated (73%). In Diet, more than half of both groups had a normal diet, but only over 1/3 of the control group reported salt-free diets, which indicates stricter dietary changes. The groups were similar in general with small differences in BMI, occupational intensity, and family type (Table 1).

Level of stress

At the start of the study, a small portion (6.7%) of mothers in the intervention group experienced high levels of perceived stress, while none in the control group did. After introducing the Benson's relaxation therepy, none of the intervention group mothers reported high stress, showing a complete reduction, whereas the control group saw a slight rise to 3.3%. At first, the majority of mothers in both groups had moderate stress: 93.3% in the control group and 83.3% in the intervention group. However, after the intervention, the number of mothers experiencing moderate stress in the intervention group dropped sharply to 33.3%, while the control group showed no change at all. When it came to low stress levels, only a small number of mothers (10% intervention, 6.7% control) reported feeling less stressed initially. Remarkably, after the intervention, two-thirds (66.7%) of the mothers in the intervention group moved into the low-stress category, compared to just 3.3% in the control group (Table 2).

Physiological Parameters in both groups' pre and post intervention

At baseline, the distributions of heart rate and blood pressure were comparable for both groups. However, following Benson's relaxation therapy, the intervention group showed notable improvements. A greater proportion had lower heart rates

(60-71 bpm) and much reduce both the diastolic and systolic blood pressure. There was minimal change in the control group, with more participants remaining in higher blood pressure and heart rate ranges. Before the intervention, both groups shared comparable sleep quality scores. The control group's mean score was marginally lower at 6.90 (SD=1.807), whereas the intervention groups was 8.00 (SD=2.068). Both groups had a median score of 7, suggesting comparable baseline sleep patterns. However, after the intervention, sleep quality outcomes diverged between the groups. In the post-intervention group, only 36.7% of participants reported good sleep quality, while 63.3% continued to experience poor sleep. In contrast, the post-control group showed a notable improvement, with 66.7% of participants reporting good sleep quality and only 33.3% reporting poor sleep (Table 3).

Association between Socio-Demographic Variables with pretest Perceived Stress

The analysis showed that most socio-demographic variables-including age, occupational status, family income, education status, family type, BMI, and dietary pattern-had no significant association with perceived stress levels among the participants. Stress levels appeared consistent across different categories in each of these factors.

However, a significant association was observed with residence (*Chi-square*=6.429, *p*=0.011), indicating that participants' place of living (rural vs. urban) influenced their stress perception. Those from rural areas reported different stress patterns compared to urban residents.

Table 1: Frequency and percentage distribution of socio demographic variables of antenatal mothers with PIH.

Socio Demographic Proforma		Intervention Group (%)	Control Group (%)	Intervention Group (*n*=30)	Control Group (*n*=30)
Age in year	15-20 years	27%	17%	8	5
	21-25 years	40%	43%	12	13
	26-30 years	23%	27%	7	8
	>30 years	10%	13%	3	4
Occupational status	Mild work	43%	57%	13	17
	Secondary work	43%	40%	13	12
	Heavy work	13%	3%	4	1
Family income per month	< Rs. 2000	20%	23%	6	7
	Rs. 2000-4000	43%	57%	13	17
	Rs. 4000-6000	23%	17%	7	5
	> Rs. 6000	13%	3%	4	1
Education status	Non-formal education	20%	17%	6	5
	Secondary	43%	47%	13	14
	Higher secondary	27%	27%	8	8
	Graduate	10%	10%	3	3
Types of Family	Nuclear family	83%	67%	25	20
	Joint family	17%	33%	5	10
Residence	Rural	70%	63%	21	19
	Urban	30%	37%	9	11
BMI	Normal	50%	73%	15	22
	Obese	23%	23%	7	7
	Undernourished	27%	3%	8	1
Dietary pattern	Normal regular diet	53%	53%	16	16
	Salt restricted diet	37%	30%	11	9
	Salt free diet	10%	17%	3	5

Table 2: Comparison within the group with paired and unpaired T Test of stress scores.

		Stress Score				Paired *t* Test		
	Pretest		Posttest					
Group	N	Mean	SD	Mean	SD	d_f	*t*	Result
Experimental Group	30	18.47	4.133	12.13	2.788	29	9.152	*p* value=<0.001 Significant
Control Group	30	19.367	3.681	18.17	3.524	29	1.863	*p* value=0.073 Non-Significant
Unpaired T Test	d_f	58		d_f	58			
	T	0.891		T	7.354			
	Result	*p* value=0.377 Non-Significant		Result	*p* value=<0.001 Significant			

Table 3: Frequency and percentage distribution of physiological parameters variables.

Physiological Parameter Proforma		Experimental (%)	Control (%)	Experimental (*n*=30)	Control (*n*=30)
Pre-Heart rate	60-71	27%	20%	8	6
	72-100	50%	53%	15	16
	101-120	23%	27%	7	8
Pre-Systolic blood pressure	110-120	7%	3%	2	1
	121-130	37%	43%	11	13
	131-140	47%	47%	14	14
	141-150	10%	7%	3	2
Pre-Diastolic blood pressure	70-80	7%	3%	2	1
	81-90 (Stage 1)	37%	43%	11	13
	81-90 (Stage 2)	57%	53%	17	16
Pre-Sleep Quality score	Good Sleep Quality (7-15)	73%	63%	22	19
	Poor Sleep Quality (0-6)	27%	37%	8	11
Post Heart rate	60-71	67%	23%	20	7
	72-100	27%	43%	8	13
	101-120	7%	33%	2	10
Post Systolic blood pressure	110-120	40%	10%	12	3
	121-130	50%	47%	15	14
	131-140	10%	43%	3	13
	141-150	0%	0%	0	0
Post Diastolic blood pressure	70-80	33%	10%	10	3
	81-90 (Stage 1)	53%	43%	16	13
	81-90 (Stage 2)	13%	47%	4	14
Post Sleep Quality score	Good Sleep Quality (7-15)	37%)	67%	11	20
	Poor Sleep Quality (0-6)	63%)	33%	19	10

DISCUSSION

According to this study, prenatal moms with Pregnancy-Induced Hypertension (PIH) who received Benson's relaxation therapy saw a significant improvement in cardiovascular parameters and a reduction in stress. Mothers in the intervention group practiced deep breathing, abdominal expansion, and passive mental focus, which collectively promote parasympathetic activation and reduce sympathetic overactivity (Benson and Klipper, 1976; Urech, *et al.*, 2010).

Our results are in consistant with those of Elgamal, *et al.*, (2023) who demonstrated notable changes high-risk pregnant women's anxiety levels, sleep patterns, and physiological stability after Benson's relaxation therapy. Similarly, Ibrahim *et al.*, (2022) confirmed the therapy's effectiveness in reducing anxiety and enhancing sleep in pregnant women with high blood pressure. Complementary evidence is provided by Thabet *et al.*, (2023) who found that a handheld relaxation technique significantly reduced stress in women with preeclampsia, highlighting the broader efficacy of non-pharmacological stress management. Ghorbannejad *et al.*, (2022) further demonstrated that the cardiovascular advantages seen in our study were further supported by the effective improvement of blood pressure and fetal outcomes that increasing muscle relaxation brought about.

While our findings on sleep quality were less robust, research by Umam, *et al.*, (2020) and Valiani, *et al.*, (2023) shown substantial improvements using similar mind-body practices. The partial alignment underscores the necessity of more investigation into methodological or environmental elements affecting sleep responses. Importantly, chronic pregnancy-related stress is associated with poor results for both the mother and the newborn, including postpartum depression and impaired infant development (Coussons-Read, 2013; Ryff, 2014). This underlines the broader psychosocial value of interventions like Benson's technique, not only for immediate clinical outcomes but also for long-term maternal well-being.

Additional support comes from Annal *et al.*, (2019) and Reethi Jazna *et al.*, (2016) who found that Benson's relaxation significantly improved both stress levels and management of blood pressure in pregnant women with PIH. Educational approaches, such as those applied by Soliman *et al.*, (2017) also demonstrated effectiveness in improving patient knowledge, stress, and blood pressure through guided relaxation.

Furthermore, recent studies such as Modak *et al.*, (2023) have highlighted the urgency of addressing maternal mental health and mood disorders, particularly during high-risk pregnancies, making such interventions increasingly relevant. Similarly, Jacobs (2001) emphasized the physiological importance of the relaxation response in mitigating stress-related hormonal and cardiovascular imbalances.

In conclusion, this study supports a growing body of literature that positions Benson's relaxation therapy as a simple, cost-effective, and impactful strategy to enhance maternal health outcomes during pregnancy. While the therapy shows strong efficacy in reducing stress and stabilizing blood pressure, further investigation with larger, diverse samples is warranted-particularly to clarify its role in sleep quality improvements.

CONCLUSION

This study shows that Benson's relaxation therapy is a useful and efficient way to help pregnant women with Pregnancy-Induced Hypertension (PIH) manage their blood pressure and reduce stress. The findings reveal statistically significant improvements in both psychological and physiological parameters in the intervention group, highlighting the therapeutic value of a simple, non-invasive technique that can be seamlessly integrated into routine prenatal care. Given the high emotional and clinical burden associated with PIH, implementing such complementary approaches can enhance maternal well-being, promote better pregnancy outcomes, and reduce the reliance on pharmacological methods.

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CONFLICT OF INTEREST

Regarding the content of this manuscript, the authors state that they have no conflicts of interest. All affiliations and interests, both financial and non-financial, that can be viewed as possible sources of bias have been declared. This covers any associations, sources of financing, or personal ties that could have an impact on the study, interpretation, or analysis of the data in this journal article.

CONSENT TO PUBLISH

Consent for the publication of the data has been obtained from all study participants.

ABBREVIATIONS

BMI: Basal metabolic index; **PIH:** Pregnancy induced hypertension; **PSS:** Perceived stree scale.

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