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Ritu Sahu
M.G.M Allied Health Sciences
Institute (MAHSI), M.G.M
Medical College, Indore
Madhya Pradesh, India

Dr. Jharna Gupta
Assistant Professor, MAHSI,
Indore Madhya Pradesh, India

Dr. Nilesh Dalal
H.O.D., Department of Obs. &
Gynae. MGMMC, Indore
Madhya Pradesh, India

Dr. Usha Singh
Assistant Professor, MAHSI,
Indore Madhya Pradesh, India

A comparative study: Effectiveness of Jacobson’s progressive muscle relaxation technique and Benson’s relaxation technique on reducing fatigue and improving quality of life during 3rd trimester of non-complicated pregnancy

Ritu Sahu, Dr. Jharna Gupta, Dr. Nilesh Dalal and Dr. Usha Singh

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Abstract

This abstract explores and compares the effectiveness of two widely recognized relaxation techniques: Jacobson's Progressive Muscle Relaxation (PMR) and Benson's Relaxation Technique (BRT). Both methods aim to reduce stress and promote overall well-being, but they differ in their approach and application. Jacobson's PMR involves systematically tensing and then relaxing muscle groups, focusing on enhancing body awareness and achieving deep relaxation. It has been extensively used in clinical settings and shown promising results in managing anxiety, insomnia, and certain pain conditions. On the other hand, Benson's Relaxation Technique centers on achieving a meditative state by employing a specific mental repetition or phrase, fostering a state of tranquility and reducing the physiological effects of stress. It has gained popularity for its simplicity and accessibility in promoting relaxation and mindfulness. While both techniques have demonstrated positive outcomes, individuals may find one approach more suitable based on personal preferences and specific relaxation needs. Further research and individualized evaluation are essential for a comprehensive understanding of their respective benefits and applications.

Keywords: Insomnia, mindfulness, BRT, PMR

Introduction

Pregnancy is a physiological events which is go along with numerous physical and psychological changes causing vomiting, nausea, and fatigue affecting the mother’s quality of life. Fatigue is one of the common problems amongst pregnancy. Prospective causes of fatigue during pregnancy are medical conditions, respiratory distress and physical inactivity. During pregnancy fatigue is a physiological, psychological and potentially pathological condition from a decreased energy the condition can be create to severe problems for mother and child. The prevalence of fatigue during pregnancy is between 87-96%.

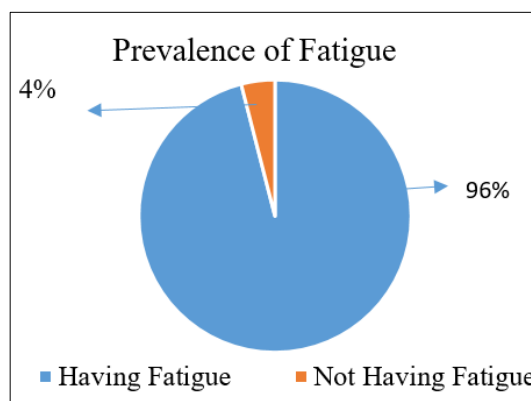


Fig 1: Prevalence of fatigue during whole pregnancy.

Corresponding Author:
Ritu Sahu
M.G.M Allied Health Sciences
Institute (MAHSI), M.G.M
Medical College, Indore
Madhya Pradesh, India

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Fatigue is the state of an CNS, muscles, viscera in which prior mental processing and physical activity, by the absence of sufficient rest, which results in cellular capacity insufficiency or processing by using normal resources or system-wide energy to maintain the original level of activity. There are 3 aspects to fatigue: Physiological, objective and subjective [3]. It has been related to stress, with pregnancy often reporting exhaustion or fatigue. few studies have focused on prenatal tiredness. Among those few studies, mothers perceived a higher level of fatigue in the evening as compare to the morning as well as fatigue is more severe from the 7th to 9th month of pregnancy. Although fatigue increases may start as early as 11 to 12 weeks of gestation. Prenatal fatigue is also related to preterm birth, anxiety, and is predictive of caesarean delivery.

Relaxation techniques that include breathing exercise and muscle relaxation are among the physiological mechanisms that connect the mind and the body, and as a non-pharmacological method, they have positive effects on anxiety and also on stress management in mental, physical, and social dimensions of general health. In pregnancy, relaxation exercises relieve mother's body and reduce fatigue. This can be produce minor soothe and common pregnancy discomforts is reported. This aims to decrement in pain intensity reduce muscle tension and bone and indirectly relief from pain and decrease tension related to body's physiological status [9, 10].

JPMRT (Jacobson's Progressive muscle relaxation technique) was developed by Edmund Jacobson and known in the literatures science 1938 Progressive muscle relaxation involves systematic sequential contraction of the muscles and then release the contractions. With PMR, mentally and physically, with pressive muscle relaxation exercises muscle tension can be reduced [6]. Progressive Muscle Relaxation (PMR) is a technique involving systemic sequential contraction of muscles (for 5-7 seconds) followed by relaxation (for 10-12 seconds) which induce a state deep relaxation [11].

Benson's relaxation therapy (BRT) is a meditative technique which was introduced by the physician Herbert Benson during 1970. It is simple, easy and safe in pregnancy and is easy to perform it is mainly achieved by focused breathing which reduces anxiety. It refers to a form of meditation technique which focuses on the deep complete relaxation of central nervous system and muscles followed by paced breathing [12].

Need of study

Fatigue is one of the most common worldwide complaints that reduces mother's quality of life affecting 87-96% population during the whole duration of pregnancy.

Various approaches are used to treat the fatigue during pregnancy. We found that very less evidences and researches showing that the Jacobson's progressive muscle relaxation technique and Benson's relaxation technique is helpful in reduction of fatigue. Hence, we found there is a need of study to determine the effectiveness of Jacobson's progressive muscle relaxation technique and Benson's relaxation technique in the management of fatigue and

improving quality of life during 3rd trimester of normal pregnancy.

Literature Review

Shao-Yu Tsai, *et al* (2012) [5] suggest that interventions designed to increase sleep duration and decrease depressive symptoms have the potential to prevent, enhance, or reduce fatigue in pregnant women. Depressive symptoms during pregnancy likely share some psychological and behavioral tendencies with fatigue and/or sleep disturbance which may complicate the evaluation of intervention effect study was a prospective, descriptive study where 38 third trimester nulliparous women completed sleep and depressive symptom questionnaires, wore a wrist actigraphy monitor for 7 consecutive days.

Andreas Hinz *et al* (2013) [13] conclude that the MFI-20 can be recommended for the assessment of general fatigue level and the total score of MFI-20 was superior to the single scales in most of the psychometric criteria. A survey was conducted 1,500 individuals completed a questionnaire that contained the MFI-20, as well as other questionnaires, and questions on sociodemographic variables and chronic diseases.

Masoume Rambod *et al* (2013) [21] highlighted the importance of Benson's relaxation technique in improvement of the sleep quality of the patients on hemodialysis. Thus, educational sessions are recommended to be planned on this cost effective and easy to use relaxation technique in order to improve hemodialysis patients' sleep quality. a randomized controlled trial with a pre—post-test design was conducted A total of 86 hemodialysis patients referring to hemodialysis units were assigned to either the intervention (receiving Benson's relaxation technique) or the control group (routine care) through block randomization.

Azam Sadeghi *et al* (2015) [9] found that in the prenatal clinical setting include the progressive muscle relaxation technique training program for general health of pregnant women's. This is effective method, less side effect and cost effective non pharmacological treatment during pregnancy. a clinical trial was conducted, 60 primigravida women were allotted for the study, the samples were randomly divided into control and experimental groups.

Tetti Solehati Yeni Rustina (2015) [10] found that Post-cesarean section women experience pain due to operative trauma. Pain sensation can be reduced by pain management. Pharmacological and non-pharmacological treatments can be used. The Benson Relaxation Technique is a non-pharmacological way suitable to reduce pain, but there are limited studies on its post-cesarean section use. This was a quasi-experiment study with pre and post-test design. A prospective, not blind, randomized assign Post cesarean section women with quota sampling who met the inclusion criteria were consecutively assigned to either experimental (n = 30) or control group (n = 30).

Mahboobeh Aalami *et al* (2016) [22] stated that the interventions (progressive muscle relaxation and breathing exercise) were effective on decreasing systolic and diastolic BP to normal range after 4 weeks in both the groups. The effects of both the interventions were more obvious on systolic BP compared to diastolic BP. This three-group clinical trial was conducted 60 pregnant (after 20 weeks of gestational age) women with systolic BP \geq 135 mmHg or diastolic BP \geq 85 mmHg were assigned to three groups.

Methodology**Research study design:** Comparative study.**Study setup:** Obstetrics and Gynaecology out Patient Department (OPD) of Maharaja Tukojirao Holkar Women's Govt. Hospital Indore M.P.**Type of sampling: Purposive sampling.****Study tools****1. Questionnaires**

- Multidimensional fatigue inventory questionnaire.
 - World health organization quality of life brief questionnaire.
2. Smart phone.
 3. Internet data
 4. Paper and pencil

Inclusion criteria

1. Females with 3rd trimester of pregnancy.
2. Age group- 20-35 year
3. Primigravida or multigravida (both).
4. Consent given for exercise.
5. Those who are using smart phone.
6. MFI-20 Score above 20.

Exclusion criteria

1. Females with 1st and 2nd trimester of pregnancy.
2. All high risk pregnancy (any cardiovascular disease, Gestational diabetes, Thyroid problem, hypertension).
3. Psychological disease- like anxiety or depression.
4. Any musculoskeletal disorders.
5. Those who not using smart phone.

Sample size: N: 80 Subjects.**Study duration:** 6 Months.

Preparation, Presentation and Submission of thesis proposal to Ethics committee – 2 Months.

Data collection, Intervention, Data analysis- 3 Months.

Report writing and submission of thesis- 1 Month.

Variables**Independent:** Jacobson's progressive muscle relaxation technique, Benson's relaxation technique.**Dependent:** Fatigue, Quality of life.**Data analysis and Results****Statistical analysis**

The data were analyzed by using statistical package for social sciences (SPSS) 25.0. The comparison of quantitative data was performed using Wilcoxon signed rank test and Mann Whitney U test was used to comparing data which did not show normal distribution which is non parametric test.

The total No. of 80 subject in 3rd trimester pregnancy with fatigue was selected for the study and all the pre and post collected information of all these samples was entered into the computer database.

Descriptive and inferential statistics was implemented as statistical tools to analyze the gathered data statistically. The descriptive statistical analysis was used to execute the main features and characteristic of subjects with fatigue and to analyze the values of fatigue and quality of life pre intervention and post intervention respectively. However, the inferential statistics is used for identification of test of significance.

The demographic and clinical information of study subjects such as age, education and average were Mean was used to measure the central tendency and standard deviation (Min-Max) was used to identify the dispersion of the data. And gestational age, abortion history, and gravida was also presented using Mean \pm Standard Deviation. Results on categorical measurements are presented in numbers with frequency and percentages (%).

The age, fatigue score and quality of life of 3rd trimester pregnant women. This was assumed that the observations recorded for continuous variables had not followed a normal distribution.

Therefore, a non-parametric test (Wilcoxon signed rank test, Mann Whitney U test) was used to identify the significance of mean difference of score of fatigue, quality of life in 3rd trimester of pregnant women between pre and post intervention of exercises in groups (group A and group B).

Normality of data was checked by Shapiro wilk test. Wilcoxon signed rank test was used to compare with in group (intragroup) variables where as Mann Whitney U test is used to compare 2 group variables after pre and post treatment.

The probability value, $p > 0.05$ was considered as statistically insignificant but the probability value from $p < 0.08$ to $p < 0.06$ was considered as suggestively or poorly significant. However, the probability value from $p < 0.05$ to $p < 0.02$ was considered as statistically significant while from $p < 0.01$ to $p < 0.001$ was considered as statistically highly/strongly significant.

Formula-

- 1) Wilcoxon signed rank test-

$$W = \left| \sum_{i=1}^{N_r} [\text{sgn}(x_{2,i} - x_{1,i}) \cdot R_i] \right|$$

Sgn= sign function

X_{1i}, x_{2i}= corresponding ranked pairs from two distributions.R_i= rank i.

- 2) Mann- Whitney U test-

$$U_1 = n_1 n_2 + \frac{n_1(n_1 + 1)}{2} - R_1$$

$$U_2 = n_1 n_2 + \frac{n_2(n_2 + 1)}{2} - R_2$$

U= test statistics.

N= n₁ and n₂ are the sample sizes.R= R₁ and R₂ are the sum of ranks for observation from sample 1 and 2 respectively.**Results**

The present chapter is comprised of tabulation, graphical presentation and statistically analyzed interpretations with inferences.

Demographic characteristics such as age, education, was analyzed using descriptive statistics. Collected data was summarized in terms of frequency and percentage and presented in the form of tables and diagrams.

Table 1: Mean and standard deviation of age of antenatal women in Group A and Group B.

Variable	JPMRT Group N=40	BRT Group N=40
	Mean ± SD	Mean ± SD
Age	25.80±3.29	25.68±3.50

The above table 1 shows the mean and standard deviation of age of antenatal women in both groups the mean of group A (JPMRT Group) is 25.80 and SD is 3.29 where as in group B (BRT Group) the mean age is 25.68 and SD is 3.50.

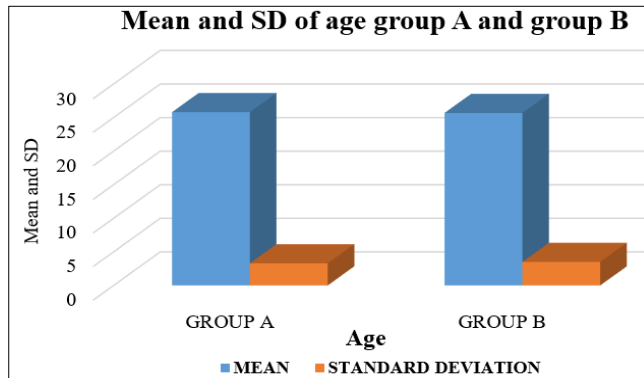


Fig 2: Mean and standard deviation of age of antenatal women in Group A and Group B.

Table 2: Age wise distribution of antenatal women in group A and Group B.

Age	JPMRT Group N=40		BRT Group N=40	
	Frequency	Percentage	Frequency	Percentage
20-25	17	42.5%	24	60%
26-30	21	52.5%	12	30%
31-35	2	5%	4	10%

The above table 2 depicts that the women was in the age group of 20-25 in Group A was 17 (42.5%) and in group B 24 (60%). In group A 21 (52.5%) and group B 12 (30%) antenatal women was in the age group of 26-30 years. In group A 2 (5%) and Group B 4 (10%) antenatal women was 31-35 years (Figure 3).

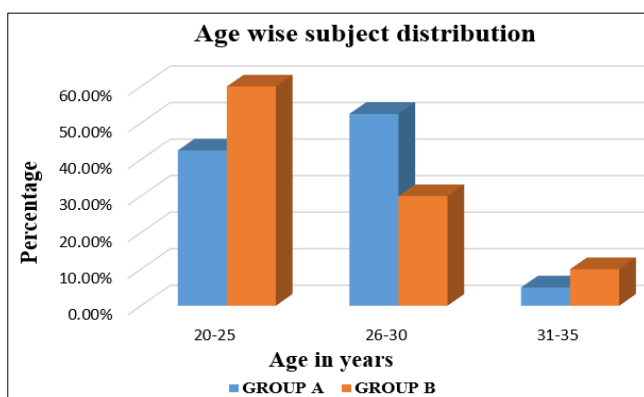


Fig 3: Age wise distribution of antenatal women in Group A and Group B.

Table 3: Educational status of Antenatal women in Group A and Group B.

Education	JPMRT Group N=40		BRT Group N=40	
	Frequency	Percentage	Frequency	Percentage
Primary school	12	30%	15	37.5%
High school	18	45%	13	32.5%
Graduation	7	17.5%	8	20%
Post-graduation	3	7.5%	4	10%

The above table 3 represents the distribution of antenatal women by education. The education of women ranges from primary school to post graduate. In group A 12(30%) and group B 15(37.5%) antenatal women had primary school education. In group A 18(45%) and group B 13(32.5%) women had high school education. (Figure 4). 7(17.5%) in Group A and in Group B 8(20%) of women was degree holders and in group A 3(7.5%) and group B 4(10%) antenatal women were postgraduates.

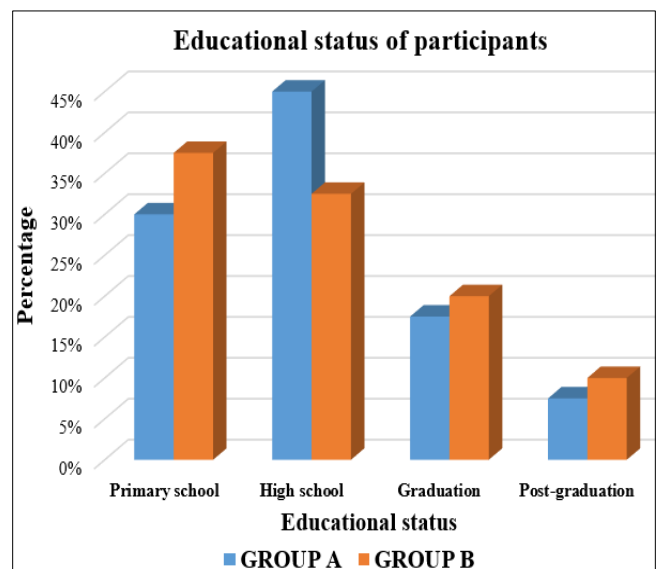


Fig 4: Educational status of Antenatal women in Group A and Group B.

Table 4: Comparison of Mean and standard deviation of Gestational age of antenatal women in group A and Group B.

Variable	JPMRT Group N=40	BRT Group N=40
	Mean ± SD	Mean ± SD
Gestational Age	30.03±2.15	30.40±2.35

Above table 4 represents the Mean and standard deviation of gestational age of antenatal women. In group A the mean of gestational age was 30.03 and Standard deviation was 2.15 in group B mean of gestational age was 30.40 and standard deviation was 2.35.

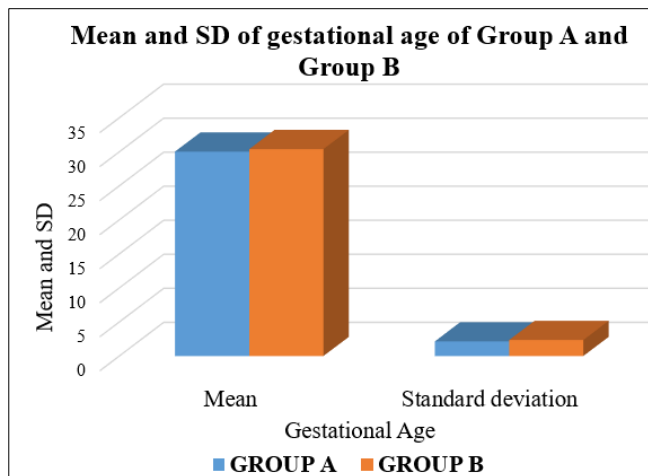


Fig 5: Comparison of Mean and standard deviation of gestational age of antenatal women in Group A and Group B.

Table 5: Comparison of Gravida of antenatal women in Group A and Group B

Gravida	JPMRT Group N=40		BRT Group N=40	
	Frequency	Percentage	Frequency	Percentage
Primigravida	28	70%	26	65%
Multigravida	12	30%	14	35%

The above table 5 represents the distribution of antenatal women by gravida. In Group A 28(70%) and Group B 26 (65%) majority of antenatal women was primigravida. About 12 (30%) in Group A and in group B 14(35%) was multigravida (Fig. 6).

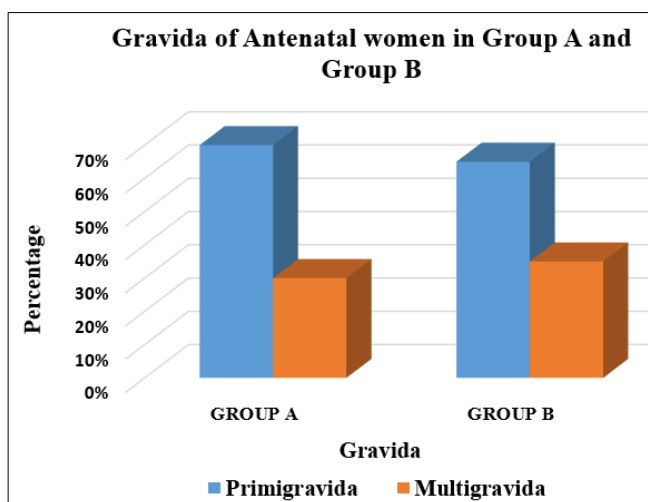


Fig 6: Comparison of Gravida of antenatal women in Group A and Group B.

Table 6: Comparison of Previous History of abortion in Group A and Group B

Abortion	JPMRT Group N=40		BRT Group N=40	
	Frequency	Percentage	Frequency	Percentage
	10	25%	8	20%

The above table 6 represent the previous history of antenatal women in Group A and Group B. In group A 10(25%) and in Group B 8(20%) of women had previous history of abortion.

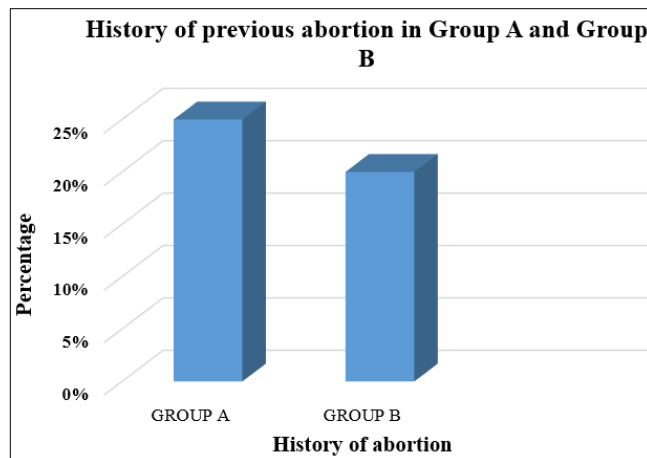


Fig 7: Previous history of abortion of antenatal women in Group A and Group B.

Table 7: Effect of Jacobson’s progressive muscle relaxation technique on MFI-20 Pre and Post treatment of Group A.

Variable	Pre-treatment	Post-treatment	Wilcoxon signed rank test value (Z value)	p-value
	Mean ± SD	Mean ± SD		
MFI-20	62.35±3.99	46.70±2.88	5.518	<0.0001

The above table 7 depicts the Fatigue scores obtained by the antenatal women before and after Jacobson’s progressive muscle relaxation technique in Group A it was identified that the mean score before and after Jacobson’s progressive muscle relaxation technique among group A was 62.35 and 46.70 respectively with a z- value was 5.518 Standard deviation was 3.99 and 2.88. While comparing with table value, it showed that the calculated p- value was lesser than the table value was highly significant at 0.001 level. Thus the research hypothesis, There will be significant effect of Jacobson’s progressive muscle relaxation technique on reducing fatigue and improving quality of life during 3rd trimester of non-complicated pregnancy in group A among antenatal women was accepted. After comparing inter group it was identified that there was significant difference in pre and post intervention.

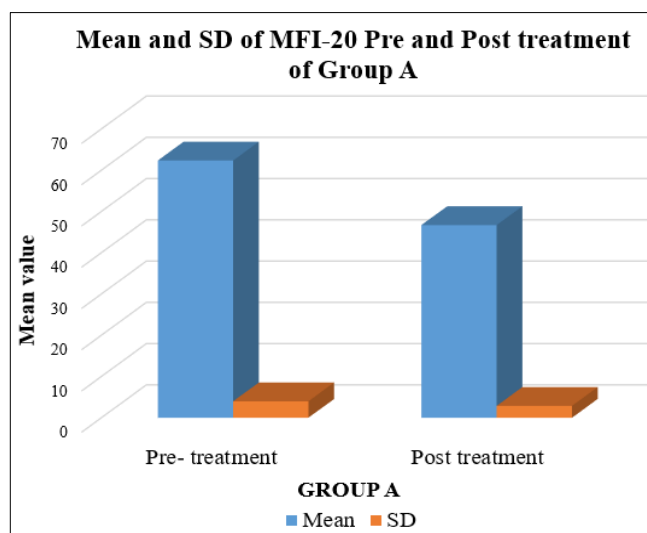


Fig 8: Mean value and standard deviation of MFI-20 Pre and Post treatment in Group A.

Discussion

Fatigue during pregnancy occurs due to imbalance of demand and supply of energy in the body. In other words, a pregnant female needs greater levels of energy in order to cope with pregnancy. Therefore, if she cannot fulfill her need for energy demand, she will experience fatigue (Gholamhossein Mahmoudirad *et al* 2017) [8].

Zehra Gok Metin *et al* (2019) [19] proven that Progressive Muscle Relaxation and Mind fullness Meditation both are effective interventions on fatigue and coping styles. In this study the breast cancer patients was selected for the study The participants were randomly assigned to either a 12-week (PMR) (n = 31) and MM (n = 32) interventions or control group (CG) (n = 29). A significant decrease in the BFI scores was reported in the PMR and MM groups when compared with the Control Group at weeks 12 and 14 of intervention (p = .002). likewise, the use of emotional support and positive reframing sub-dimension scores of Brief COPE was higher significant in the PMR and MM than in the CG at weeks 12 (p = .017) and 14 (p = .042). Moreover, the scores of planning and active coping sub-dimension was better significant in the PMR and MM than in the CG at week 14 (p = .000). Regarding QOL scores, there was no significant differences was observed between the groups at 12 weeks (p = .486) and 14 weeks (p = .095).¹⁹ Results of this study consistent with previous study which has shown that PMRT was effective in reduction of fatigue and improvement in quality of life during 3rd trimester of non- complicated pregnancy. There was statistically significant difference <0.0001 shown in pre and post intervention of fatigue score and WHOQOL Questionnaire domains 1, 2 and 3 shows significant (<0.0001) changes in pre and post intervention but in domain 4 (0.020) there was not shown any statistically significant changes in JPMRT group.

Gholamhossein Mahmoudirad *et al* (2017) [8] concluded that the effect of Benson's Relaxation Response on reducing fatigue in the first trimester of pregnancy. a significant increase in the mean score of fatigue in the control group during the study. However, this difference was statistically significant after the intervention (P = 0.001). Between group differences regarding the pretest-posttest mean difference of fatigue was also statistically significant (P = 0.002). The results of the paired-sample t test indicated a significant increase in the mean score of fatigue in the control group (P = 0.013) and a significant decrease in the mean score of fatigue in the intervention group (P = 0.035). This is cost benefit, simple, safe, and non-invasive technique can be used to reduction of fatigue among pregnant females.

In this study results consistent with previous study which has shown that BRT was effective in reduction of fatigue and improvement in quality of life during 3rd trimester of non- complicated pregnancy. There was statistically significant difference shown in pre and post intervention of fatigue score (<0.0001) and WHOQOL Questionnaire domains 1 and 2 shows statistically significant difference (<0.0001) in pre and post intervention where as domain 3 and 4 (0.008 and 0.031) not shown any statistically significant changes in BRT group.

Conclusion

This study concluded that there was significant effect of Jacobson's progressive muscle relaxation technique and Benson's relaxation technique on reducing fatigue and

improving quality of life during 3rd trimester of non-complicated pregnancy.

There was significant difference is shown in mean score of pre and post intervention of MFI-20 (<0.0001) and WHOQOL Domains in group A and Group B. WHOQOL Domain 1 and 2 showed significant difference (<0.0001) in before and after intervention but in Domain 3 and 4 (0.008 and 0.031) was not showed any statistically significant results in both Group.

However there was significant difference in between group comparison when comparing the mean score of MFI-20 and WHOQOL- BREF in Group A (JPMRT) and Group B (BRT). Group A shown more significant effect than in Group B.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Not available

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