International Journal of Community Medicine and Public Health
Rakhecha G et al. Int J Community Med Public Health. 2022 Jun;9(6):2596-2603
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20221541

Original Research Article

Effectiveness of nurse-led educational intervention package on back pain and activity of daily living in primigravidae women with back pain

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Received: 14 April 2022
Revised: 08 May 2022
Accepted: 09 May 2022

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ABSTRACT

Background: The primigravida women often have more complaints of back pain during pregnancy. Pregnant women reported that back pain might affect the activities of daily routine e.g. walking, climbing stairs, sitting, and women may expect help from family members.
Methods: A quasi-experimental study was directed on primigravidae women visiting antenatal outpatient department (OPD) of All India Institute of Medical Sciences (AIIMS) Jodhpur. An absolute of 60 primigravidae women (30 in each experimental and control group) were incorporated through the non-probability consecutive sampling method.
Results: The pre-test score uncovered that the majority of the women (70%) in the experimental group and (60%) in the control group revealed moderate pain. The post-test score uncovered that (56.6%) in the experimental group detailed mild pain and 53.3% of women in the control group reported severe pain. When compared with the pre-test, the pain score of members in the experimental group was diminished and in the control group, the pain score was increased in post-test ($p \leq 0.000$). No critical contrast was found in the activity of daily living in the experimental and control group. For analysis, paired and unpaired t-test, x^2, and Fisher exact tests were used.
Conclusions: The majority of primigravidae women had back pain during pregnancy and participants recognized prolong sitting as the most well-known aggravating factor. It was discovered that there was a significant distinction in pain scores between pre-test and post-test in the experimental and control group.

Keywords: Level of back pain, Activity of daily living, Aggravating factor, Primigravidae, Nurse-led educational intervention package

INTRODUCTION

Back pain is normal among pregnant women during pregnancy. During pregnancy mellowing and extending in tendons and muscles happens to help in transformation during pregnancy and to help and facilitate the labor, this causes strain on joints and bone, which prompts back pain in pregnant women.

The uterus grows gradually and becomes an abdominal organ, and there is an increase in the body weight (normal weight gain 11-16 kg), to support the back bents forward naturally to maintain body posture and balance.

Quite possibly the most well-known musculoskeletal issues in pregnancy are low back pain and pelvic support pain, most pregnant ladies experience back pain in the third trimester of pregnancy. Low back pain is characterized as pain between the thoracic twelfth vertebrae to gluteal muscle folds, and pelvic support pain implies women experience pain in the sacroiliac joint, symphysis pubis, and gluteal fold.[1]

Pain is an individual encounter for every person, factors, for example- dread, tension, weariness, assumption, and interruption from pain influence the impression of pain and coping with pain.[2]

Around 50-80% of pregnant ladies have complained of back agony during pregnancy because of postural or hormone changes. The most common musculoskeletal disorder symptom experienced during pregnancy is back pain. Women who perform regular exercise during pregnancy have more energy, low mood swing, and better coping to manage stress, and have more sleep compared to pregnant women having sedentary life.[3]

The rate of back pain during pregnancy is high and researchers around the world expressed that it could be between 30% to 70%. Women can likewise encounter upper back pain, Sacro-iliac joint pain, muscle cramps, carpal passage condition, foot discomfort.[4]

The primigravida women often have more complaints of back pain during pregnancy, younger women are more sensitive to hormone changes and perception of pain than multigravida or older pregnant mothers. Pregnant women reported that back pain might affect the activity of daily routine e.g. walking, climbing stairs, sitting, standing and women may expect help from family members.[5]

Pregnancy results in the increased overall mass of the body and the center of gravity also shift during pregnancy, as the pregnancy progress, the body adapts the posture according to the weight changes.[6] The primary or accurate reason for back pain in pregnancy is as yet unclear, the extending uterus causes the adjustment in the gravity center anteriorly which applies strain on the low back and pelvic girdle.

Hormone changes (e.g. relaxin) that happen during pregnancy cause the mellowing of ligaments and joints, for most of the pelvis, prompts encourage the movements and empowers the fetus to go through the birth canal without any problem. This results in the loosening of the joint and a decrease in instability.[6]

A health care provider can help pregnant women to manage the back pain in pregnancy, management includes yoga, antenatal classes, taking consultation from a physiotherapist or other health care provider. Back pain can affect the mother during pregnancy, the intensity and duration of pain during pregnancy are perceived by every pregnant mother differently. In most cases, the back pain resolves in the puerperium period.

About 85% of the women were suffering from back pain during pregnancy but they didn't receive aught remedy or treatment from their care provider. Only 1% of women were treated by therapy. They reported that pain was relieved after therapy.[7]

Half of the pregnant ladies' experience back pain/ inconvenience with close to nothing or without treatment from the medical services provider. During pregnancy, primigravida expects the alleviation measures to diminish the back pain and decrease inconvenience, from the guardian and medical care provider.[2]

Pregnant women mainly complain about low back pain, carpal tunnel syndrome, sacroiliac joint pain, this can occur due to forward shifting of the center of gravity, weight gain during pregnancy, and hormones during pregnancy. The practice of exercise during the antenatal period provides strength to the muscles and relieves discomfort. Studies recommended that women should perform exercise during pregnancy and it is not harmful to pregnant women and foetuses. Regular exercise helps to preserve the cardio and respiratory aptness, facilitate parturition and post-natal recovery.[8]

As indicated by the American College of Obstetricians and Gynaecology (ACOG), gravid women can promulgate the activity of moderate force at any rate for 30 moments, and pregnant women ought to be assessed for clinical and obstetrical danger before endorsing any exercise.[9]

If a woman not having any obstetrical or medical complications, she should perform physical activity of moderate intensity daily and exercise three times a day for a minimum of 15 minutes.[10] An increment in the body mass index during pregnancy is a risk factor in the event of low back pain.

The intensity of back pain impacts the activity of daily living of a pregnant woman, especially in the third trimester. The impact of back pain on ADL varies from woman to woman.

Objectives

Objectives of the study were: to assess and compare the level of back pain among primigravidae in control and experimental group; to assess and compare the activity of daily living among primigravidae in control and experimental group; and to determine the association of level of back pain with selected personal variable.

METHODS

The current study approach was the quantitative approach and quasi-experimental design and with pre-and post-test. The study sample included primigravidae women with back pain attending antenatal OPD at AIIMS, Jodhpur.

The inclusion criteria of this study were: primigravidae (age 18-35 year) more than 34 weeks of gestation with back pain; and primigravidae who was willing to participate in the study. Exclusion criteria were: primigravidae women with a high-risk pregnancy; and primigravidae women with a musculoskeletal disorder resulting in back pain existing before the pregnancy.

Based on the non-probability consecutive sampling technique, 60 primigravidae women were included in this study and then 30 women enrolled non-randomly in the experimental and control group. The sample size was calculated by continuous outcome variable formula considering σ_{1^2} (17.59), σ_{2^2} (14.57), $Z_{1-\alpha/2}$ (1.96), Z $_{1-\beta}$ (0.84), M_1 (31.1), M_2 (45.2), 95% confidence interval, and power of 80 %.[5]

$$N = (\sigma_{1^2} + \sigma_{2^2})\,[\,Z_{1-\alpha/2} + Z_{1-\beta}]^2/(M_1 - M_2)^2$$

The data were gathered by using a personal variable, visual analog scale, self-structured checklist of activity of daily living. Personal variables include age, religion, educational status, occupation, education of husband, family income per month, height, weight, BMI and aggravating factor for back pain, self- structured checklist for ADL and It consisted of 10 activities (ambulation, bathing, toileting, feeding, sitting, standing, sleeping, grooming, climbing stairs, and cooking) and the ADL were categorized under 3 categories (perform independently, partially dependent and dependent). Scoring was interpreted as follows. The maximum score (2), possible score (1), and the minimum score were (0). Visual analog scale (VAS) is a pre-validated standardized tool, with reliability (r=0.94, p<0.001), and a structured scale was sent to 7 experts for content validity. Based on the suggestion of the expert the tool was found to be valid and appropriate and CVI for the structured checklist of ADL was 1 and the reliability of the ADL checklist was found to be 1.0 through test re-test method.

Primigravidae women fulfilling the inclusion criteria were selected through the non-probability consecutive sampling technique. The personal variable was obtained from the primigravida women of the control and experimental group. The level of low back pain and activity of daily living was assessed from primigravidae both in the control and experimental group by using VAS and a structured scale for ADL. The nurse-led educational intervention package was administered to the primigravidae women in the experimental group, and they were asked to follow instructions and perform the exercise as per the given schedule at home, and the control group received routine antenatal care. Primigravidae women in the experimental group were given an exercise compliance schedule to be maintained at home for the next 7 days. A post-test was done to assess the level of back pain and activity of daily living after 1 week of administration of a nurse-led educational intervention package in the control and experimental group by VAS scale and a self-structured ADL checklist. The total time period of this study was 01 June 2020 to 05 March 2021.

Statistical analysis

The analysis was done by using statistical package for the social sciences (SPSS) version 26 (SPSS inc., IBM Corporation). Descriptive statistics like frequency, percentage, and inferential statistics like X^2 were used for the analysis of the data. T-test was used to compare the mean of two groups and X^2 and fisher's exact test was used to determine the association of level of back pain with selected personal variable. P value <0.05 was taken as statistically significant.

Ethical consideration

Ethical permission was obtained from the ethical committee of All India Institute of Medical Sciences (AIIMS), Jodhpur. Informed consent was taken from participants and they were explained about the study and their confidentiality and anonymity were assured.

RESULTS

Level of back pain

Sixty primigravidae women were enrolled in this study and grouped into experimental and control groups by non-randomization. Each group incorporates 30 primigravidae women. The frequency and percentage distribution in experimental and control groups in terms of personal variable and anthropometric measurement (Tables 1 and 2). The p value of calculated Chi-square statistics for all the personal variables is greater than 0.05. It shows that there was no significant difference among all the sample characteristics between the experimental and control group at baseline.

The maximum number of participants in the experimental group (36.5%) and (43.9%) in the control group identified prolong sitting as the most common aggravating factor (Table 3).

The pre-test score revealed that most of the women (70%) in the experimental group and (60%) in the control group reported moderate pain and the X^2 value showed that participants in both the experimental and control group were homogenous concerning the level of back pain and they significantly similar at baseline (Table 4). The mean score of the experimental and control group was found to be 5.13 and 4.93 with an standard deviation (SD) of 1.776 and 1.837 respectively (Table 5).

The post-test score revealed that most of the women (56.6%) in the experimental group reported mild pain. About 53.3% of women in the control group reported severe pain (Table 6). The mean pain score of the experimental and control group was found to be 2.4 and 7.8 with an SD of 1.653 and 1.669 respectively. Significance difference was found (at the level p<0.05) in the experimental and control group (Table 7).

The mean score of pre-test and post-test were found to be 5.13 and 2.4 with an SD of 1.776 and 1.653 respectively in the experimental group and the mean score of pre-test and post-test in the control group were 4.93 and 7.8 with an SD of 1.837 and 1.669 respectively. When compared with the pre-test, the pain score of participants in the experimental

group was decreased significantly while that of the control group was found to be increased significantly (Table 8). The nurse-led educational intervention package was found to be effective in reducing back pain in the experimental group. Therefore, the null hypothesis (H01) was rejected.

The activity of daily living

About 83.3% in the experimental group and 76.6% in the control group participants were completely independent during pre-test and post-test (Table 9). The mean score for participants in the experimental group was 19.76 with an SD of 0.626 while the participants in the control group had a mean score of 19.63 with an SD of 0.764. The results showed that there was no significant difference in ADL of primigravidae in the experimental and control group in pre and post-test (Table 10).

Since the results suggest that there was no significant difference in activity of daily living among participants in the experimental and control group. Therefore, the null hypothesis (H_{02}) was accepted.

Table 1: Personal variables of the study participants.

Variable	Experimental (n-30), f (%)	Control (n-30), f (%)	X^2/Fisher's exact test	df	P value
Age (years)					
Mean±SD	26.07±2.778	26.97±3.479			
20-30	6 (20)	4 (13.3)	1.417	3	0.701^{NS}
24-27	17 (56.7)	15 (50.0)			
28-31	5 (16.7)	8 (26.7)			
32-35	2 (6.7)	3 (10.0)			
Religion					
Hindu	29 (96.7)	29 (96.7)	0.000*	1	1^{NS}
Muslim	1 (3.3)	1 (3.3)			
Educational status					
No formal education	-	1 (3.3)			
Primary education	1 (3.3)	-			
High school education	3 (10.0)	5 (16.7)	7.283	4	0.122^{NS}
Higher secondary education	-	4 (3.3)			
Graduation and above	26 (86.7)	20 (66.7)			
Occupation					
Government job	2 (6.7)	2 (6.7)			
Private job	6 (20.0)	6 (20.0)	0.358	3	0.949^{NS}
Self- employed	1 (3.3)	2 (6.7)			
Homemaker	21 (70.0)	20 (66.7)			
Education of husband					
High school education	1 (3.3)	4 (13.3)			
Higher secondary education	1 (3.3)	4 (13.3)	4.32	2	0.115^{NS}
Graduation and above	28 (93.3)	22 (73.3)			
Family income per month					
10,000 or less	3 (10.0)	3 (10.0)			
10,001-50,000	17 (56.7)	15 (50.0)	0.307	2	0.858^{NS}
More than 50,000	10 (33.3)	12 (40.0)			

*Fisher's exact test was used, NS- non-significant at level of significance p≤0.05.

Table 2: Anthropometric measurement of study participants.

Variable	Experimental f (%) (n-30)	Control f (%) (n-30)	X^2	df	P value
Height (cm)					
Mean±SD	156.36±6.338	152.793±13.016			
141-145	1 (3.3)	2 (6.7)			
146-150	5 (16.7)	6 (20.0)	1.582	5	0.903^{NS}
151-155	8 (26.7)	7 (23.3)			
156-160	8 (26.7)	8 (26.7)			
161-165	5 (16.7)	6 (20.0)			

Continued.

Variable	Experimental f (%) (n-30)	Control f (%) (n-30)	X^2	df	P value
166-170	3 (3.3)	1 (3.3)			
Weight (kg)					
Mean±SD	69.09±10.001	72.24±19.699	0.364	3	0.948^{NS}
Below 60	6 (20.0)	6 (20.0)			
61-70	11 (36.7)	9 (30.0)			
71-80	9 (30)	10 (33.3)			
Above 80	4 (13.3)	5 (16.7)			
BMI (kg/m^2)					
Mean±SD	28.39±4.674	28.99±3.788	2.932	2	$.231^{NS}$
Below 25	8 (26.7)	3 (10.0)			
25-30	11 (36.7)	15 (50.0)			
Above 30	11 (36.7)	12 (40.0)			

NS- Non-significant at level of significance p≤0.05.

Table 3: Aggravating factor for back pain for study participants.

Aggravating factor for back pain*	Experimental f (%) n-30	Control f (%) n-30
Prolong sitting	15 (36.5)	18 (43.9)
Prolong standing	8 (19.5)	11 (26.8)
Changing position	4 (9.7)	5 (12.2)
Banding from back	3 (7.3)	4 (9.7)
Lifting heavy object	3 (7.3)	-
Sleeping on the soft mattress	4 (9.7)	2 (4.8)
Touching the area of pain	1 (2.4)	-
Others	3 (7.3)	1 (2.4)

*Multiple responses were given by primigravidae.

Table 4: Level of back pain among participants in a pre-test in the experimental and control group.

S. no.	Level of back pain (VAS score)	Experimental f (%) (n-30)	Control f (%) (n-30)	X^2	df	P value
1	Mild (1-3)	5 (16.6)	8 (26.6)	5.746	3	0.765^{NS}
2	Moderate (4-6)	21 (70)	18 (60)			
3	Severe (7-9)	3 (10)	3 (10)			
4	Worst (10)	1 (3.3)	1 (3.3)			

NS- Non-significant at level of significance p≤0.05.

Table 5: Mean and standard deviation of pain score among participants in a pre-test in the experimental and control group.

S. no.	Groups	Mean	SD	t value	P value
1	Experimental	5.13	1.776	0.429	0.67^{NS}
2	Control	4.93	1.837		

NS- Non-significant at level of significance p≤0.05.

Table 6: Level of back pain among participants in post-test in the experimental and control group.

S. no.	Level of back pain (VAS score)	Experimental f (%) (n-30)	Control f (%) n-30)	X^2	df	P value
1	No pain	5 (16.6)	-	44	4	$\leq 0.000^{S}$
2	Mild (1-3)	17 (56.6)	-			
3	Moderate (4-6)	8 (26.6)	8 (26.6)			
4	Severe (7-9)	-	16 (53.3)			
5	Worst (10)	-	6 (20)			

Table 7: Mean score and standard deviation of pain score among participants in post-test in experimental and control group.

S. no.	Groups	Mean	SD	t value	P value
1	Experimental (n-30)	2.4	1.653	-12.592	≤0.000[s]
2	Control (n-30)	7.8	1.669		

S- Significant at level of significance p≤0.05.

Table 8: Mean and standard deviation of pre and post-test in experimental and control groups.

S. no.	Groups	Mean ±SD		t value	P value
		Pre-test	Post-test		
1	Experimental group	5.13±1.776	2.4±1.653	-10.42	≤0.000S
2	Control group	4.93±1.837	7.8±1.669	10.145	≤0.000S

S- Significant at level of significance p≤0.05.

Table 9: Assessment of activity of daily living among participants of the experimental and control group in pre-test and post-test.

S. no.	The activity of daily living	Experimental f (%)	Control f (%)	X^2	df	P value
		n-30	n-30			
1	Complete independent	25 (83.3)	23 (76.6)	0.417	1	0.519[NS]
2	Moderate impairment	5 (16.6)	7 (23.3)			

*No participants had complete dependent ADL, NS- Non-significant at level of significance p≤0.05.

Table 10: Mean and standard deviation of activity of daily living among participants of the experimental and control group in pre-test and post-test.

S. no.	Groups	Mean	SD	t value	P value
1	Experimental	19.76	0.626	0.739	0.463[NS]
2	Control	19.63	0.764		

NS- Non-significant at level of significance p≤0.05.

DISCUSSION

The present study was aimed to assess the effectiveness of a nurse-led educational intervention package on the back pain and activity of daily living in pregnant women. Discussion is presented based on the objectives and hypothesis of the study comparing and contrasting the findings of the present study with findings of similar studies.

Discussion of findings of sample characteristics

The majority of the participants of inclusion criteria belonged to the age group of 24-27 years and the mean age (in the year) in the experimental group was 26.07 and 26.97 in the control group. In similarity, a randomized controlled trial completed by Haugland et al found 28.9 years mean age.[11] Morino et al mentioned the mean age of 31 years of the inclusive participants in their cohort study.[12] In similar to this cohort study, the mean age of the pregnant women about 31.0 was found in a study according to Robinson et al.[13]

In this study, primigravidae women who took part in this study had the educational qualification of graduation and above (86.7% in experimental and 66.7% in the control group). In parallelism, research finding according to Robinson et al described that plurality of pregnant women of inclusion criteria had the university-level qualification and some have above.[14]

The mean height (in cm) of primigravidae women in this study was 156.36 in the experimental and 152.79 in the control group. Similar to these findings, author Lene et al carried out a randomized control trial and they found the mean height of the participants was 169 cm.[10] In the clinical control trial carried out by Beyaz et al, the mean height of 161.93 cm was found for the participants.[13]

In the present study mean weight (in kg) of the participants in the experimental group was 69.09 and in the control group was 72.24. A similar finding was reported by Beyaz et al and they found mean weight (in kg) of the experimental group was 61.02 and 59.42 in the control group.[13]

The results of this study show, the mean and SD of body mass index (in kg/m^2) in the experimental group was 28.39±4.674 and in the control group was 28.99±3.788. Similar to the present study results, Kluge et al found the mean BMI in the experimental group was 26.3 and 30.4 in the control group in their study.[15]

The majority of participants in the experimental (37.5%) and control group (43.9%) stated that they perceived more pain in their back during prolonged sitting. The result of this study is identical to another study which was conducted by Morino et al. They found that sitting, walking, standing from a chair caused back pain in pregnant women.[12]

Gutke et al in their study identified that some activities which were unsuitable for pregnant women were lifting a heavy object, running, and doing heavy work.[16]

Discussion of findings of the level of back pain

In the current study, a plurality of primigravidae of experimental (70%) and control group (60%) had reported moderate pain in pre-test and post-test 56.6% primigravidae women in the experimental group reported mild pain whereas 53.3% primigravidae in the control group reported severe pain.

A significant difference ($p<0.05$) was found between the experimental and control group which shows that the nurse-led educational intervention package was effective in reducing pain levels among primigravidae women in the experimental group. With similar to this study, the author found a significant difference between groups after the implementation of the intervention ($p<0.01$). In the study of Kluge et al participants of the experimental group, the pain was decreased after the intervention. They mentioned that pain did not worsen in control group participants.[15] In contrary to this finding, in the present study, the pain was enhanced and reported as severe by the participants of the control group.

Unlike to present study results, Haakstad et al didn't find any significant difference in pain level amid exercise and control group ($p=0.51$). The study also described that there was no negative outcome was observed on participants of the study.[10]

Similar to this study results, Garshasbi et al found a significant association ($p<0.0001$) in the level of pain amid exercise and control group after the exercise schedule.[17]

Discussion of findings of activities of daily living

The present study outcome described that about 83.3% in experimental and 76.6% in control group participants were completely independent and 16.6% in experimental and 23.3% in control group participants were moderate impairment. No significant difference ($p=0.519$) was observed in ADL in pre and post-test among primigravidae women in the experimental and control group. Unlike this study, Kluge et al in their study described that there was an improvement ($p=0.06$) in the functional ability of pregnant women in the study group. They found that there was no significant difference in control group participants in terms of pain intensity and functional ability (0.70).[15]

Limitations

The limitation of this study was: post-test was taken through telephone; and self-report regarding compliance to exercise was used as the compliance to exercise schedule could not be checked in person.

CONCLUSION

This study concludes that the majority of primigravidae women had back pain during pregnancy and participants identified prolonged sitting as the most common aggravating factor. The nurse-led educational intervention package was effective in reducing the level of back pain among primigravidae women in the experimental group.

There was no significant difference in activity of daily living among participants in the experimental and control group. No personal variable was found to be significantly associated with the level of back pain in the experimental and control group.

ACKNOWLEDGEMENTS

We would like to thank the participants for their continuous support with interest for the study. They would like to thank all the faculty of college of nursing and department of Obstetrics and Gynaecology, and department of Physical Medicine and Rehabilitation of AIIMS, Jodhpur for their support in all the stages of this study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Rakhecha G, Vyas H, Shekhar S, Gonnade NM. Effectiveness of nurse-led educational intervention package on back pain and activity of daily living in primigravidae women with back pain. Int J Community Med Public Health 2022;9:2596-603.