International Journal of Health Sciences and Research
[Indexed, Peer-Reviewed Journal]
Volume 15; Issue: 9; September 2025
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

A Quasi-Experimental Study Investigating Changes in After-Labour Pain, Depression and Satisfaction with Intervention After Four-Square Breathing Among Postpartum Mothers

Shanmugapriya. P[1], R. Mahesh[2], Dr. Latha Maheshwari. S[3], Aathira. S[4], Aksshaya. R[4], Karthik. K[4], Madhu Manjari. N. B[4], Shana. J[4]

[1,2]Professor, PSG College of Physiotherapy, Coimbatore.
[3]Professor & HOD of Obstetrics and Gynaecology, PSG IMS&R, Coimbatore.
[4]Physiotherapy Interns, PSG Hospitals, PSG College of Physiotherapy, Coimbatore.

Corresponding Author: Shanmugapriya. P

DOI: https://doi.org/10.52403/ijhsr.20250942

ABSTRACT

The World Health Organization (WHO) describes the postnatal period as the most critical and yet the most neglected phase in the lives of mothers and babies. Minor ailments which are physiologically rooted may cause some disruption in the normal routines of motherhood. After-labour pain is one such ailment which often goes unrecognized. After-labour pain causes discomfort to mother to perform daily routine activity of caring for herself and the baby. It also may act as a trigger in neuro-hormonal stress response which further leads to anxiety, insomnia and fatigue in post-natal women.

OBJECTIVE: To investigate the changes in after-labour pain, depression and satisfaction with intervention after four-square breathing among postpartum mothers.

METHODS: In this Quasi-Experimental study, 128 postpartum mothers were taken based on convenient sampling from the Department of Obstetrics and Gynaecology, PSG Hospitals, Coimbatore.

RESULTS: The mean values of post- test of Group A and Group B for Numerical Pain Rating Scale were 3.58 & 3.42, for Beck's Depression Inventory were 13.50 & 11.73 and for Satisfaction Likert Scale were 5.43 & 5.23 and the calculated paired 't' test values were more than the table value at $p<0.05$ and independent 't' test values for depression were more than the table value at $p<0.05$. Based on these values there was significant reduction in depression in Group B than in Group A.

CONCLUSION: This study concludes that four-square breathing technique along with the conventional protocol showed a higher positive result in reducing depression in postpartum mothers.

Keywords: after-labour pain, depression, four-square breathing, postpartum mothers

INTRODUCTION

The World Health Organization (WHO) describes the postnatal period as the most critical and yet the most neglected phase in the lives of mothers and babies. The postpartum (or postnatal) period begins immediately after childbirth as the mother's body, including hormone levels and uterus size, returns to a non-pregnant state. Minor ailments which are physiologically rooted

may cause some disruption in the normal routines of motherhood. Episiotomy is mainly done to largen the vaginal orifice and to facilitate the birth of the baby. More than half of the women having vaginal deliveries undergo episiotomy. The postnatal period is very crucial for mothers, especially if they have undergone normal vaginally delivery with episiotomy. Though episiotomy has positive effects of reducing the duration of the second stage of labour, it also has potential adverse consequence like anal sphincter dysfunction, dyspareunia., etc. After-labour pain is one such ailment which often goes unrecognized. After the delivery the mother experiences pain in several region of her body, and these pains are said to affect her quality of life. Localized pain, such as perineal pain, is one of most common physical symptoms within the first 8 weeks after vaginal birth (Cooklin et al., 2015)[2], and the incidence of acute and persistent perineal pain (8 weeks) after vaginal delivery is high (Soares et al., 2013)[3]. Perineal lacerations and depressed mood are correlated with each other (Dunn et al., 2015)[4]. After-labour pain causes discomfort to the mother in performing daily routine activities of caring for herself and the baby. It also may act as a trigger in neuro-hormonal stress response which further leads to anxiety, insomnia and fatigue in post-natal women.

Post-partum perineal pain was associated with depressive symptoms during the postpartum period (Eisenach et al., 2013[5]). Postpartum depression affects the health of mothers and the growth (Nasreen et al., 2013[6]) and development of their children (Ali et al, 2013[7]). In addition, a personal history of depression, family history of depression (Beck, 2001[11]; El-Hachem et al., 2014[9]), and prenatal depression (Heron et al., 2004[8]) have been associated with the development of postpartum depression. Few studies have found that previous postnatal depressive symptoms are associated with postpartum depressive symptoms (Beeghly et al., 2002[10]; El-Hachem et al., 2014[9]). Deep breathing exercises can be considered as an effective method to ensure pain relief during labor and several studies state the same. Breathing exercises have also been used to induce relaxation and a measure to reduce the depressive symptoms. Four-square breathing is relatively a new technique of breathing exercise. The present study is therefore undertaken to investigate changes in after-labour, depression and satisfaction with intervention after FourSquare breathing among postpartum mothers.

Usually, postpartum period is known to be accompanied by after-labour pain and depression. Increase in pain and depression affects the participation of postpartum women in activities of daily life. Hence there is a need to examine the effect of Four-Square breathing technique on pain and depression of postpartum mothers who have undergone normal vaginal delivery. The objective of the study is to investigate the changes in after-labour pain, depression and satisfaction with intervention after Four-Square breathing among postpartum mothers.

MATERIALS AND METHODS

It was a quasi-experimental study. The study was conducted in the Department of Obstetrics and Gynaecology, PSG Hospitals, Coimbatore. The study was reviewed and approved by Institutional Human Ethics Committee at PSG IMSR, Coimbatore. Proposal No.22/263 dt 27.03. 2023.The sample size was calculated by using G* Power 3.1.9.4 software. The inclusion criteria were Multiparous women with episiotomy,19 to 30 years, Delivery within 24 hours, Delivery of single foetus at term by normal vaginal delivery, medically stable, BDI Score greater than 17, Able to read and understand English. Exclusion criteria were Primiparous women, who are under sedation/ analgesics, General and Postnatal complications, Respiratory conditions, Spinal deformities, Recent abdominal surgeries, Previous LSCS.

Based on the selection criteria, a total of 128 Postpartum women were selected by convenience sampling method and were grouped into two groups with 64 Postpartum

women in each. The treatment was explained to the patients by the investigators. The postpartum mothers were allocated after obtaining the consent.

All the samples were assessed for their level of depression in the antenatal period. Based on Beck's Depression Inventory (BDI), the patients were categorized as mild, moderate and severe depression and only patients with mild to moderate depression (score > 17) were included. After the delivery, the samples were assessed for pain intensity and level of depression using Numerical Pain Rating Scale (NPRS) and (BDI) within 24 hours.

After the assessment, intervention was taught to the Four-Square breathing exercise group (Group B) patients and asked to continue intervention protocol along with routine physiotherapy exercises, as per the conventional protocol for 2 days (3 sessions/ day) and the conventional exercise group (Group A) patients were advised to follow the routine physiotherapy exercises, as per the conventional protocol. The pain intensity and level of depression was again assessed on the 3rd postpartum day with same questionnaires along with the Satisfaction Likert Scale.

STATISTICAL ANALYSIS

Data analysis is the systemic organization and synthesis of research data and testing of research hypothesis using those data. Interpretation is the process of making sense of the result of a study and examining their implication. (Polit and Beck, 2014)

Paired "t" test was used to find out whether there was any significant difference between pre-test and post-test values of the Numerical Pain Rating Scale (NPRS) & Beck's Depression Inventory (BDI) for Group A and Group B.

Independent "t" test, was used to find out whether there was any significant difference between group A & B.

RESULTS

Based on, Table 1 Paired t-test was done on a sample of 64 to determine whether there was significant mean difference between the Pre-test and Post-test values of Numerical Pain Rating Scale in Group A &B. In Group A, the mean score of Numerical Pain Rating Scale in the Pre-test (7.22) as compared to Post-test (3.58) had a significant decrease with a mean difference of 3.64. In Group B, the mean score of Numerical Pain Rating Scale in the Pre-test (7.45) as compared to Post-test (3.42) had a significant decrease with a mean difference of 4.03.

Based on, Table 2, the mean score of Beck's Depression Inventory in the Pre-test (20.30) as compared to Post-test (13.50) had a significant decrease with a mean difference of 6.80 in Group A and the mean score of Beck's Depression Inventory in the Pre-test (20.56) as compared to Post-test (11.73) had a significant decrease with a mean difference of 8.83 in Group B.

Independent t test was done on a sample size of 128 to determine whether there was significant difference between Group A and Group B. On analysis, the mean score of Group B (11.73) showed a significant difference of 3.46 in Beck's Depression Inventory score than the mean score of Group A (15.20) The mean score of Group A (3.73) showed a difference of 0.31 in Numerical Pain Rating Scale than the mean score of Group B (3.42). The mean score of Group A (5.43) showed a difference of 0.20 in Satisfaction Likert Scale than the mean score of Group B (5.23).

TABLE:1 PAIRED 't' TEST VALUES OF NUMERICAL PAIN RATING SCALE (GROUP A & B)

GROUPS	NO. OF PARTICIPANTS	MEAN	MEAN DIFFERENCE	S. D	't' VALUE	'p' VALUE
GROUP A PRE-TEST	64	7.22	3.64	1.51	27.47	<0.05
GROUP A	64	3.58		1.54		

POST-TEST						
GROUP B PRE-TEST	64	7.45	4.03	1.58	22.46	<0.05
GROUP B POST-TEST	64	3.42		1.58		

TABLE:2 PAIRED 't' TEST VALUES OF BECK'S DEPRESSION INVENTORY (GROUP A & B)

GROUPS	NO. OF PARTICIPANTS	MEAN	MEAN DIFFERENCE	S. D	't' VALUE	'p' VALUE
GROUP A PRE-TEST	64	20.30	6.8	3.52	18.97	<0.05
GROUP A POST-TEST	64	13.50		4.13		
GROUP B PRE-TEST	64	20.56	8.83	3.69	18.45	<0.05
GROUP B POST-TEST	64	11.73		3.43		

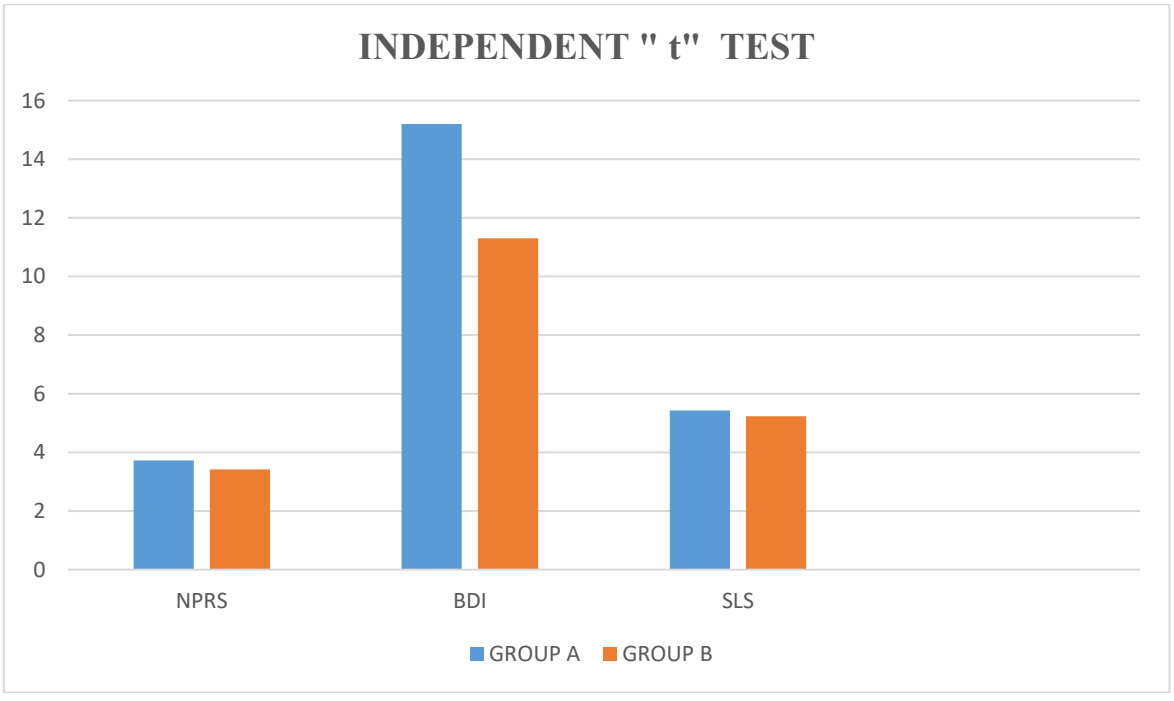
TABLE 3 NUMERICAL PAIN RATING SCALE (INDEPENDENT 't' TEST)

GROUPS	NO. OF PARTICIPANTS	MEAN ± S. D	MEAN DIFFERENCE	't' VALUE	'p' VALUE
A	64	3.73±1.49	0.312	1.149	>0.05
B	64	3.42±1.58			

TABLE 4 BECK'S DEPRESSION INVENTORY (INDEPENDENT 't' TEST)

GROUPS	NO. OF PARTICIPANTS	MEAN± S. D	MEAN DIFFERENCE	't' VALUE	'p' VALUE
A	64	15.20±4.06	3.46	5.21	<0.05
B	64	11.73±3.42			

GRAPH 1



DISCUSSION

After-labour pain has been documented as a major concern for women in the postpartum period. Majority in both Group A and Group B reported moderate level of after-labour pain. Few studies have included breathing exercise for pain management after labour (Dengsangluri & Salunkhe, 2015[13]; Yuksel et al., 2017[14]). This research was conducted to investigate changes in pain and depression after four square breathing among the postpartum multiparous mothers. 128 postpartum mothers were included in this study based on inclusion and exclusion criteria. Out of this, 64 mothers were given conventional protocol and 64 mothers were given four square breathing as an add on intervention. The result of the current study revealed that four square breathing significantly reduces the intensity of after labour pain. The findings of this study partly correlate with a study conducted in Alexandra University- Egypt where it was reported that practicing breathing exercise was effective in reducing the after-labour pain and physical stress symptoms in the body, positively affecting the mental well-being by reducing the stress, anxiety and depression among the postpartum women (Basyouni & Gohar, 2017)[1]

Four-Square breathing exercise can reduce physical stress symptoms in body by decreasing the production of stress hormone (cortisol) thereby reducing the anxiety, depression and stress; as well as increasing the mental clarity, energy and facilitating the release of endorphins (feel good hormones), a natural pain killer created by the body itself (Stinson, 2018)[15] which enhances feeling of wellness and relieves pain. The breath holding phase positively enhances the collateral ventilation thereby improving the lung capacity, blood circulation to the whole body and inducing general relaxation. Another relative recent study (Ibrahim Mohamed et al., 2023)[18] was conducted to examine the effect of Four-Square breathing exercise on post operative pain and satisfaction with intervention among patients undergoing abdominal surgery. In this study, they stated that breathing can be viewed as a interface to alter the patterns of autonomic discharge and cerebral mechanisms that are known to influence pain. The Four-Square breathing technique reduces the discomfort as well as the slow, deep breathing improves oxygenation, relaxation and body awareness. Patients become more conscious, attentive, alert and focused by focusing on breathing and relaxing. This cuts out other distractions. The postpartum women can easily learn to treat breathing as a simple problem during after pains. The gate-control theory of pain is the theoretical foundation for the researcher's assertion. The neurophysiological mechanism behind the sense of pain was explained by this pain theory, which focuses on the capacity for pain, and the capacity of nerve pathways to transmit pain is reduced or completely shut by using distraction techniques (Mike Thomas & Anne Bruton, 2014)[16]. Most research that is now available to supports the efficacy of breathing exercises in reducing pain (Mahin Kamalifard et al., 2012)[17]

The findings of the study (Ibrahim Mohamed et al., 2023) [18] showed that those who practiced Four-Square breathing exercise were satisfied with the intervention, reporting that it was easy to use and had no negative side effects. It also aids in removal of toxins from the body and enhancing women's pleasure by promoting better sleep, positive feelings of well- being and pain relief (Nestor, 2020). The result of the present study showed significant difference in pain and depression score of group B before and after the intervention, it also showed significant difference in pain score and depression score of group A before and after the intervention, but the difference in the scores of depressions were more in group B than in group A which showed, Four Square Breathing may further help to reduce the postpartum depression experiences. This finding relatively accords with a study conducted in Gujarat, India where it was concluded that after-labour pain reduces naturally overtime, Four Square Breathing can help in reducing this pain further (Vasava

et al., 2021)[12]. The difference between the findings of this study and other relative studies may be due to different sample size and culture. With reference to the statistical analysis done from the collected data of Numerical Pain Rating Scale, Beck's Depression Inventory and Satisfaction Likert Scale, it showed a significant decrease in depression and pain scores within the group where Four Square Breathing was administered as an add on to the conventional treatment protocol

Limitations of the Study

The intervention of Four-square breathing has been recently evolved and as a result the intervention is still being under research, so there were only a few evidences supporting the study.

Only multiparous mothers with normal vaginal delivery were included in the study.

External factors (feeding time, visitors time) affected the time taken for each sample.

The difference in the perception of pain by the individual would have affected the result of the study.

Only patients who knew English were included in this study.

Suggestions For Future Study

The outcome measure used in the current study is a quantitative measure for depression. It could have also included a qualitative measure for the same.

Future studies can be done by including primiparous mothers.

Future studies can focus on the effects of four-square breathing on patients who underwent caesarean section.

A baseline inclusion criterion for pain could have been set.

The long-term effects of using the four-square breathing can be studied in the future studies.

As the intervention studied is a breathing exercise, other outcome measures which focusses on the respiratory effects of the breathing exercise could have been added.

A questionnaire which had both the English and the translated version can be used

CONCLUSION

The study aimed to investigate changes in after-labor pain, depression, and satisfaction with the intervention following Four Square Breathing among postpartum mothers.

Statistical analysis of the data showed that participants who underwent conventional management experienced a moderate decrease in the Numerical Pain Rating Scale (NPRS) score for pain and the Beck's Depression Inventory (BDI) score for depression.

In contrast, participants who combined Four Square Breathing with the conventional exercise protocol demonstrated a significant and substantial decrease in the BDI score for depression.

Therefore, the study concluded that Four Square Breathing is effective in significantly reducing depression among postpartum mothers.

Declaration by authors

Ethical Approval: Approved

Source of funding: self-funded

Conflict of Interest: No conflict of interest

REFERENCES

1. 1.Basyouni NR, Gohar IE. (2017) Effect of breathing exercise on the after pains among Postpartum Women. J Nurs Health Sci; 6:88-96
2. 2. Cooklin, A. R., Amir, L. H., Jarman, J., Cullinane, M., & Donath, S. M. (2015). Maternal Physical Health Symptoms in the First 8 Weeks Postpartum Among Primiparous Australian Women. Birth, 42(3), 254–260. doi:10.1111/birt.12168
3. 3. Soares, A. D. S., Couceiro, T. C. de M., Lima, L. C., Flores, F. L. L., Alcoforado, E. M. B., & Filho, R. de O. C. (2013). Associação da Catastrofização da Dor com a Incidência e a Intensidade da Dor Perineal Aguda e Persistente após Parto Normal: Estudo Longitudinal Tipo Coorte. Brazilian Journal of Anesthesiology, 63(4), 317– 321. doi:10.1016/j.bjan.2012.12.001
4. 4. Dunn, A. B., Paul, S., Ware, L. Z., & Corwin, E. J. (2015). Perineal Injury During Childbirth Increases Risk of Postpartum Depressive Symptoms and Inflammatory

Markers. Journal of Midwifery & Women‟s Health, 60(4), 428–436. doi:10.1111/jmwh.12294

5. 5.Eisenach, J. C., Pan, P., Smiley, R. M., Lavand'homme, P., Landau, R., & Houle, T. T. (2013). Resolution of Pain after Childbirth. Anesthesiology, 118(1), 143–151. doi: 10.1097/aln.0b013e318278ccfd
6. 6. Nasreen, H.-E., Nahar Kabir, Z., Forsell, Y., & Edhborg, M. (2013). Impact of maternal depressive symptoms and infant temperament on early infant growth and motor development: Results from a population based study in Bangladesh. Journal of Affective Disorders, 146(2), 254–261. doi:10.1016/j.jad.2012.09.013
7. 7. Ali, N.S., Mahmud, S., Khan, A. et al (2013). Impact of postpartum anxiety and depression on child's mental development from two peri-urban communities of Karachi, Pakistan: a quasi-experimental study. BMC Psychiatry 13, 274 (2013).
8. 8. Heron, J., O'Connor, T. G., Evans, J., Golding, J., & Glover, V. (2004). The course of anxiety and depression through pregnancy and the postpartum in a community sample. Journal of Affective Disorders, 80(1), 65–73. doi:10.1016/j.jad.2003.08.004
9. 9.El-Hachem, C., Rohayem, J., Bou Khalil, R., Richa, S., Kesrouani, A., Gemayel, R., … Attieh, E. (2014). Early identification of women at risk of postpartum depression using the Edinburgh Postnatal Depression Scale (EPDS) in a sample of Lebanese women. BMC Psychiatry, 14(1). doi:10.1186/s12888-014-0242-7
10. 10.Beeghly, M., Weinberg, M. K., Olson, K. L., Kernan, H., Riley, J., & Tronick, E. Z. (2002). Stability and change in level of maternal depressive symptomatology during the first postpartum year. Journal of Affective Disorders, 71(1-3), 169–180. doi:10.1016/s0165- 0327(01)00409-8
11. 11.Beck, C.T., (2001). Predictors of postpartum depression: an update. Nurs. Res. 50 (5), 275– 285
12. 12. Vasava et al., Effectiveness of four-square breathing exercise on after –labour pain among post-natal mothers indian journal of continuing Nursing education
13. 13.Dengsangluri, J.A. (2015). Effect of Breathing Exercise in Reduction of Pain during First Stage of Labour among Primigravidas. International Journal of Health Sciences and Research, 5, 390-398.
14. 14.Yuksel H, Cayir Y, Kosan Z, Tastan K (2017). Effectiveness of breathing exercises during the second stage of labor on labor pain and duration: a randomized controlled trial. J Integr Med.;15(6):456-461. doi:10.1016/S2095-4964(17)60368-6
15. 15.Stinson, A. (2018): What is box breathing? Available at URL: https:// www. medicalnewstoday.com/articles/321805. Retrieved on: 22 Jan 2022
16. 16.Thomas, M.; Bruton, A. (2014). Breathing exercises for asthma. Breathe, 10(4), 312– 322. doi:10.1183/20734735.008414
17. 17. Kamalifard, M., Shahnazi, M., Melli, M. S., Allahverdizadeh, S., Toraby, S., & Ghahvechi, A. (2012). The efficacy of massage therapy and breathing techniques on pain intensity and physiological responses to labor pain. Journal of caring sciences, 1(2), 73.
18. 18. Amany Gamal El gharieb El berdan, Ishranga A. Ibrahim Mohamed, Donald Lotfi Afifi Alqersh, Marwa A. Shahin, Alaa M Hassanein (2023). Four Square breathing exercises effectiveness on post-operative pain and satisfaction among patients undergoing abdominal surgery ". Annals of forest research, January. ISSN: 18448135, 20652445

How to cite this article: Shanmugapriya. P, R. Mahesh, Latha Maheshwari. S, Aathira.S, Aksshaya. R, Karthik. K et.al. A quasi-experimental study investigating changes in after-labour pain, depression and satisfaction with intervention after four-square breathing among postpartum mothers. *Int J Health Sci Res.* 2025; 15(9):381-387. DOI: *https://doi.org/10.52403/ijhsr.20250942*

******