**Ergonomic Analysis of Breastfeeding Position & Related Musculoskeletal Pain & Discomfort in Mothers**

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**INTRODUCTION**

Breast feeding is a beneficial procedure for both physical and mental health of mothers and children. Mothers adapt a supportive position while nursing babies so that they latch on easily in addition provide better control of breasts to allow free flow of milk.

Common BF positions are side-lying hold, cradle hold (same arm), cross cradle hold (opposite arm), football hold, twins hold, laid-back breastfeed in g (biologic al nurturing), laid back breastfeeding after caesarean and babysitting breastfeeding.

Mechanical neck pain, brachial plexus pain, carpel tunnel syndrome, kyphosis, lordosis, scoliosis, sciatica and mechanical low back pain are few of the problems most commonly encountered in breast feeding mothers. These musculoskeletal postural problems have a higher dependency on different positions of breastfeeding, which can either aggravate or relieve it. Pain originating due to these postural issues can involve any site of the body and can be felt any time during or after breastfeeding.

Successful breastfeeding requires education, support, and an environment that values and understands breastfeeding. This need for support may derive from the fact that our modern culture has evolved a series of messages that inhibit automatic and natural behaviours related to breastfeeding. Because breastfeeding is rarely observed in our society, health care professionals must supply the appropriate education, support, and encouragement for breastfeeding to occur and to help mothers meet their breastfeeding goals.

**MATERIALS AND METHODS**

**Study Design**

A cross-sectional survey was used

**Subjects : a sample size of 65 breastfeeding mothers was used.**

**Inclusion criteria:** Breastfeeding mothers (in the age group 22-40)

**Exclusion criteria:**

• Women who are mentally and physically challenged.

• Women who are not willing to participate.

• Women who are unable to respond to the questions (due to hearing problems or any other reason).

**Procedure**

This study was be done in the Community.The purpose of the study was explained to all the eligible participants in their local language.Verbal consent and written consent were obtained from all who elected to participate in the survey. Data was collected by face-to-face interview as well as through video conferencing method using different questionnaires. Questionnaires was filled by the participants in front of the investigator at the time of interview. Following that all the participants were explained about different problems related to musculoskeletal discomfort due to incorrect positioning At last they were given a patient education booklet explaining Occupational Therapy program for safe, healthy and efficient lifestyle, emphasizing the correct ergonomics and different positions of breastfeeding. The booklet given was self-explanatory and consisted of information related to correct ergonomics, different positions and adaptive equipment to help reduce pain and discomfort while breastfeeding and then data was analysed.

**Outcome Measures / Scales**

• **Musculoskeletal Discomfort Form** Well accepted questionnaire for the analysis of musculoskeletal symptoms in an ergonomic and occupational health context. The questions are choice variants and may be either self-administered or used in the interviews. These questions concentrate on symptoms most often encountered in occupational settings. The reliability of the questionnaire has been shown to be acceptable.

**• Visual Analog Scale (VAS**) The vas is a measure of the intensity of pain (Huskission, 1982). It is usually a 10cm line with anchors of “no pain” and ‘worst pain possible’ with a score of zero to ten. The person rates the intensity of their pain on the VAS by marking the line at the point that best describes the intensity of their pain. The VAS is simple, widely used self-report measures that has excellent reliability and validity.

**• Researcher’s Assisted Questionnaire** The questionnaire was a set of 17 questions each for the general challenges to determine the factors responsible in Indian population which had to be answered simply. The questions comprised of the factors affecting mental stress, sleep disturbances and musculoskeletal pain in young mothers.

**DATA ANALYSIS**

1. Complete data was gathered in the form of a master chart on Microsoft excel 2010.

2. Descriptive analysis included percentages, Graphs and Pie Charts.

**PERCENTAGE ANALYSIS**

* **Factors related to breastfeeding positioning and related musculoskeletal pain and discomfort in young mothers (According to researcher’s assisted questionnaire)**

1. Pain aggravating and relieving factors
2. Awareness of breastfeeding techniques
3. Awareness of breastfeeding positions
4. Mode of delivery
5. Type of Breastfeeding Pattern
6. Frequency of Breastfeeding
7. Preference of Breastfeeding position
8. **Pain aggravating and relieving factors**

* **Relieving Factors**

|  |  |
| --- | --- |
| **Factor** | **No. of women** |
| **Resting** | 32 |
| **Lying** | 6 |
| **Sitting** | 1 |
| **Standing** | 2 |
| **Medication** | 3 |

**Figure 4: Relieving Factors**

* **Aggravating Factors**

|  |  |
| --- | --- |
| **Factors** | **No. of women** |
| **Sitting** | 18 |
| **Standing** | 11 |
| **Lying** | 1 |
| **With activity** | 14 |

**Figure 5: Aggrevating Factors**

1. **Awareness of breastfeeding techniques**

|  |  |
| --- | --- |
| **Presence of awareness** | **No. of women** |
| **Yes** | 48 |
| **No** | 17 |

**Figure 6: Breastfeeding Technique Awareness**

1. **Awareness of breastfeeding positions**

|  |  |
| --- | --- |
| **Awareness of various positions** | **No. of women** |
| **Few of them (2-3)** | 39 |
| **All of them** | 14 |
| **None of them** | 12 |

**Figure 7: Awareness of various breastfeeding positions**

* **Relation between Awareness of Breastfeeding positions and presence of related discomfort and pain**

|  |  |  |
| --- | --- | --- |
| **Presence of discomfort or pain** | **Yes** | **No** |
| **Few of them (2-3)** | 25 | 14 |
| **All of them** | 7 | 7 |
| **None of them** | 7 | 5 |

**Figure 8: Relation of awareness of breastfeeding position and pain**

1. **Mode of delivery**

|  |  |
| --- | --- |
| **Mode of delivery** | **No. of women** |
| **Normal** | 22 |
| **Caesarian** | 43 |

**Figure 9: Mode of Delivery**

* **Relation between Mode of delivery and presence of related discomfort and pain**

|  |  |  |
| --- | --- | --- |
| **Presence of pain /discomfort** | **Yes** | **No** |
| **Normal** | 14 | 8 |
| **Caesarian** | 25 | 18 |

**Figure 10:Relation Between Pain with mode of delivery**

1. **Type of Breastfeeding Pattern**

|  |  |
| --- | --- |
| **Breastfeeding pattern** | **No. of women** |
| **Complete breastfeeding** | 34 |
| **Partial use of formula milk** | 31 |

**Figure 11: Types of breast-feeding pattern**

* **Relation between Type of Breastfeeding Pattern and presence of related discomfort and pain**

|  |  |  |
| --- | --- | --- |
| **Presence of pain /discomfort** | **Yes** | **No** |
| **Complete breastfeeding** | 20 | 14 |
| **Partial use of formula milk** | 19 | 12 |

**Figure 12: Relation of pattern of breastfeeding with pain/discomfort**

1. **Frequency of Breastfeeding**

|  |  |
| --- | --- |
| **No. of feeds** | **No. of women** |
| **ATLEAST 6-8 FEEDS** | 35 |
| **FEWER THAN 6 FEEDS** | 28 |

**Figure 13: Frequency of breastfeeding**

* **Relation between Frequency of Breastfeeding and presence of related discomfort and pain**

|  |  |  |
| --- | --- | --- |
| **Presence of pain /discomfort** | **Yes** | **No** |
| **ATLEAST 6-8 FEEDS** | 22 | 13 |
| **FEWER THAN 6 FEEDS** | 16 | 12 |

**Figure 14: Relation of number of times of breastfeeding with pain**

1. **Preference of Breastfeeding position**

|  |  |
| --- | --- |
| **Positions** | **No. of women** |
| **The cradle** | 39 |
| **Side-lying** | 8 |
| **Cross cradle** | 16 |
| **The football** | 4 |
| **Laid-back** | 3 |

**Figure 15: Preference of breastfeeding positions**

* **Relation between Preference of Breastfeeding position and presence of related discomfort and pain**

|  |  |  |
| --- | --- | --- |
| **Presence of pain /discomfort** | **Yes** | **No** |
| The cradle | 18 | 16 |
| Side-lying | 6 | 2 |
| Cross cradle | 11 | 5 |
| The football | 1 | 3 |
| Laid-back | 3 | 0 |

**Figure 16: Relation between Preference of Breastfeeding position and presence of related discomfort and pain**

* **DISTRIBUTION OF AREAS OF PAIN AND DISCOMFORT**

Musculoskeletal discomfort was assessed in women using “Musculoskeletal Discomfort Form”

|  |  |
| --- | --- |
| **Area of discomfort** | **No. of women** |
| **Neck** | 12 |
| **Shoulder** | 14 |
| **Arms/Hands** | 3 |
| **Upper Back** | 15 |
| **Lower Back** | 32 |
| **Thighs** | 4 |
| **Knees** | 2 |
| **Ankle/Feet** | 5 |

**Graph 1: Areas of discomfort**

* **INTENSITY OF PAIN**

|  |  |
| --- | --- |
| **Intensity of pain** | **No. of women** |
| **No pain** | 22 |
| **Mild, annoying pain** | 20 |
| **Nagging pain** | 16 |
| **Intense pain** | 4 |
| **Unbearable pain** | 3 |

**DISCUSSION**

This study was set out to investigate about Ergonomic Analysis of Breastfeeding Position & Related Musculoskeletal Pain & Discomfort in Mothers. The sample of 65 Indian women were taken. Keeping the account of covid 19 pandemic, the data were collected in online as well as in person while collecting the data all necessary precautionary measures (N-95 mask and gloves, sanitiser and proper social distance Singh were used throughout the assessment).

All the participants were assessed on the basis of economic analysis using VAS, MSD, and researchers assisted questionnaire. Among physical stress the women were assessed on the basis on musculoskeletal discomfort and pain.

Musculoskeletal discomfort was analysed using MSD and VAS scale, where areas of distribution of discomfort were marked by participating women. It was investigated that most of the participants reported discomfort in some areas of their body. On analysing the discomfort in mothers lower back was found to be most discomforting area specifically. Shoulder, neck and upper back were also found as areas of discomfort in young mothers.

Similar result was found by W.W.K Wong –et –al (AOGS, 2003) who conducted a study on Factors associated with back pain symptoms in pregnancy and the persistence of pain 2 years after pregnancy and concluded that the main factors associated with development of back pain were previous episodes of back pain while non‐pregnant or pregnant. The occurrence of back pain during pregnancy did not affect the pregnancy outcome. The main risk factors associated with persistent back pain at 24 months appeared to be the onset of severe pain at an early gestation in the index pregnancy, as well as the inability to reduce weight to their pre‐pregnant level.10

The intensity of pain was measured by VAS scale. Most of the participants were having moderate and nagging pain however intensity of pain varied from mild to severe in participants. In this study we tried to figure out factors responsible for musculoskeletal discomfort and pain due to breastfeeding postures among Indian mothers. this study has also focused on various positions of bf from ergonomically point of view. The women sample (all 65) were analysed by percentage analysis on the basis of answers given by them through Researcher’s Assisted Questionnaire (a set of 17 questions related to factors).

Out of 65 women, 29 (45%) Women were working and 36 (55%) were housewives. When the factors were analysed, it was found that 22 women (34%) had normal mode of delivery while 43 women (66%) had Caesarean mode of delivery. Also, 14 women (36%) having normal mode of delivery and 25 women (64%) having Caesarean mode of delivery suffered from pain/discomfort.

In the study, 52% of women preferred complete breastfeeding while 48% breastfed partially using formula milk. 20 (51%) complete breastfeeding women and 19 (49%) partially breastfeeding women suffered from pain/discomfort. 56% women fed at least 6 to 8 times while 44% women paid fewer than 6 feeds. While 58% of women who fed at least 6 to 8 times and 42% of women who fed fewer than 6 feeds experienced pain/discomfort.

60% women were aware about few (2 to 3), 22% about all of them and 18% about none of the shown breast-feeding positions. Out of which 64% (few of them), 18% (all of them) and 18% (none of them) experienced pain/discomfort.

73% women reported resting and 14% women found lying as the two most pain-relieving factors while, 41% women found sitting and 32% women found further increase in pain with activity as their pain aggravating factors.

On analysing the distribution of areas of pain and discomfort, lower back (32 women), shoulder (14), neck (12), upper back (15), thighs (4), arms/hands (3) & knee (2).

Sadia Rani – et – al (Journal of Pakistan Medical Association,2019)conducted similar study on Association of breast-feeding positioning with musculoskeletal pain in post-partum mothers of Rawalpindi and Islamabad. The purpose of this study was to determine common breastfeeding positions and musculoskeletal problems in our population and the association between them. A descriptive cross-sectional survey was conducted on 400 breast feeding mothers from hospitals, universities and community of Rawalpindi and Islamabad using a self-structured questionnaire. It was found that 283(70.8%) reported cross cradle hold (opposite arm) breastfeeding position, while 86(21.5%) reported breastfeeding in side lying position. 1

On assessing their breastfeeding positioning, 56% preferred the cradle, 23% cross cradle, 11% side lying, 6% football and 4% laid-back as breastfeeding positions. Out of all breast-feeding positions, 46% of the cradle, 28% of cross cradle, 15% side lying, 8% laid-back and 3% of the football position experienced pain/discomfort.

# Ezeukwu Obinna Antoninus – et – al (Work, vol. 66, no.1, pp. 183-191, 2020) conducted a similar study on Biomechanical analysis of the three recommended breastfeeding positions.This study evaluated the trunk lean angles and electromyographic (EMG) activities of the trunk muscles during these BF positions.Cross-cradle position resulted in significantly higher anterior trunk lean and right ES and EO muscle activities. Conversely, cradle position significantly elicited highest activities in the left ES and EO muscles. Left trunk lean angles were highest during the football position. Football BF position may pose less risk of BF-related musculoskeletal disorders in nursing mothers, as compared to the cradle and cross-cradle BF positions.12

**CONCLUSION**

In my survey-based study on Ergonomic Analysis of Breastfeeding Position & Related Musculoskeletal Pain & Discomfort in Mothers, the musculoskeletal discomfort and pain were found in almost all the participants. Area around the lower back was the most affected area of discomfort.

The cradle breastfeeding position, Caesarean mode of delivery, long duration of breastfeeding at one time, latching on single breast by the baby were some contributory factors to musculoskeletal discomfort and pain in mothers.

It was found that physical activity and longer sitting position were aggravating pain while resting and lying on bed were the relieving factor from the pain found in most of the participants.

Among all the participants and lack of awareness regarding different breastfeeding position were found.

Most of the women were aware about cradle position only as a breastfeeding position whereas football position is the most recommended and least contributed position to the pain due to breastfeeding.

Eradicating the contributory factors to pain and discomfort the mother can enjoy her special moment with the baby. Therefore, it is important to identify the factors to take care and solve the breastfeeding related musculoskeletal discomfort and problems in mothers.

**Conflicts of interest:** The authors report no conflicts of interest in this work.

**Findings sources:** Self

**Ethical clearance:** Necessary permission was obtained from the head of superintendent to conduct the study. Verbal consent and written consent were obtained from all the women who elected to participate in the survey.

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