

A Study to Assess the Level of Maternal Stress Regarding the Adequacy of Breast Milk Among Postpartum Mothers at a Selected Tertiary Care Hospital in Western Maharashtra

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Abstract—Background: Postpartum mothers are particularly susceptible to stress due to childbirth-related recovery, sleep deprivation, altered family dynamics, cultural expectations, and concerns regarding infant health, often resulting in anxiety about perceived milk insufficiency and early supplementation.

Methods: A quantitative descriptive cross-sectional study was conducted using consecutive sampling technique on 114 postnatal mothers. Self-structured questionnaire and interview method was utilised for demographic and clinical data; postpartum stress was assessed with Likert scale.

Results: Among 114 postnatal mothers, majority were within the age group of 26–30 years (54%), Hindu (76.32%), urban residents (97.37%), and housewives (99.21%), from nuclear families (53.51%), had higher secondary or better education (73.68%) with good antenatal care utilization (≥ 8 visits), multiparous, had vaginal delivery, and no pregnancy or delivery complications. More than half experienced either high (7%) or moderate stress (47%), while 89% demonstrated adequate breast milk. The study revealed a highly significant association between maternal stress and adequacy of breast milk, with higher stress levels linked to poorer milk adequacy.

Conclusion: Mothers with low stress predominantly had adequate breast milk, whereas mothers with high stress showed a higher proportion of fair and inadequate milk adequacy. Prenatal support played a more critical role in influencing stress and milk adequacy than obstetric or delivery-related factors.

Index Terms—maternal stress, postpartum mothers, breast milk adequacy, breastfeeding, lactation, postnatal period.

I. INTRODUCTION

Breastfeeding is widely recognised as the optimal method of infant nutrition, providing essential nutrients along with critical immunological protection for early growth and development. Colostrum, rich in immunoglobulins, acts as the infant's first natural vaccine, while continued breastfeeding protects against infections and long-term non-communicable diseases, underscoring its role in reducing child morbidity and mortality^{1,4,5}. In addition to its biological benefits, breastfeeding supports maternal–infant bonding and maternal psychological well-being through hormonal mechanisms involving oxytocin and prolactin³.

However, lactation is highly sensitive to maternal psychological status. Evidence indicates that stress can impair milk ejection by reducing oxytocin release and may lower prolactin levels, leading to decreased milk production and altered breastfeeding patterns^{7,8}. Stress during childbirth and the postpartum period may also delay lactogenesis³³. Postpartum stress - arising from physical recovery, sleep deprivation, and socio-cultural pressures - often manifests as perceived insufficient milk supply, a leading cause of early supplementation and reduced exclusive breastfeeding^{18,28}.

In India, particularly in Maharashtra, breastfeeding practices are influenced by socio-economic and cultural factors, yet limited research has examined the relationship between maternal stress and breast milk adequacy in tertiary care settings. Current hospital-

based support focuses largely on technical aspects, with less emphasis on maternal emotional well-being. Understanding this relationship is essential to develop holistic, mother-centred interventions that integrate psychological support with breastfeeding guidance, thereby improving maternal and infant health outcomes.

II. OBJECTIVES

1. To assess the level of maternal stress among postpartum mothers.
2. To assess the adequacy of breast milk among postpartum mothers.
3. To find the association between level of maternal stress with adequacy of breast milk and selected variables.

III. CONCEPTUAL FRAMEWORK

This study is based on Transactional Model of Stress and Coping, which explains how postpartum mothers perceive and respond to stress related to breast milk adequacy. Primary appraisal involves viewing the situation as a threat or challenge, while secondary appraisal assesses the coping resources such as knowledge, experience, support and health status. Mothers then adopt problem-focused or emotion-focused coping strategies, which ultimately determine the level of maternal stress as low, moderate, or high.

IV. METHOD

A. Research Design

A quantitative descriptive cross-sectional study was conducted among 114 postnatal mothers using a consecutive sampling technique. Data were collected after ethical approval through a structured interview schedule covering socio-demographic, obstetric, and clinical variables, along with a Likert scale to assess postpartum stress. Statistical analysis was performed using R software, applying descriptive statistics and inferential tests (Chi-square and Fisher's exact test) to determine associations between stress levels and selected variables, with $p < 0.05$ considered significant.

B. Setting

The study was carried out in the obstetric wards of a selected tertiary care multispecialty hospital in Pune, Western Maharashtra, catering to both urban and rural populations. Postpartum mothers breastfeeding healthy infants and able to communicate in Hindi, English, or Marathi were included, while those with medical contraindications to breastfeeding, severe psychiatric conditions, or infants with significant illness were excluded.

C. Population and Sample

The target population comprised postpartum mothers experiencing or at risk of maternal stress related to breast milk adequacy in tertiary care hospitals of Western Maharashtra. The accessible population included postpartum mothers admitted to the maternity wards of the selected tertiary care hospital who met the inclusion and exclusion criteria during the data collection period. The study sample consisted of postpartum mothers admitted to the postnatal wards of the same hospital. Participants were selected as a representative subset to assess the study variables.

The formula used for calculating the sample size is:

$$n = \frac{z^2 \times p \times (1 - p)}{d^2}$$

$$n = \frac{(1.96)^2(0.75)(0.25)}{(0.08)^2} = 112.5 \sim 113 \text{ mothers}$$

where z represents the standard normal value at 95% confidence (1.96), p is the estimated prevalence from the reference study, and d is the margin of error (8%).

D. Data Collection Tools

Socio-demographic data and baseline variables:

I – Socio-demographic data: The sociodemographic variables used in the study are age, religion, residence, type of family, mother's education (primary, secondary, diploma, graduation and above) and occupation.

II – Obstetric history & clinical data: Obstetric score, Number of living children, antenatal visits, mode of delivery, pregnancy and delivery complications and any antenatal breast milk counselling.

III – Neonatal history: Gender, birth weight and gestational age.

IV – Breastfeeding practices & adequacy indicators: feeding pattern, time of first breast feed and frequency of breastfeeds in 24 hours, pre-lacteal feeds, nipple

problems and perceived adequacy indicators of breastmilk (urinary frequency, stool colour & frequency, baby's satisfaction after feed, suckling pattern, breast changes during feed, satiety behaviour and activity level).

LIKERT scale(standardized) to assess maternal postpartum stress.

The scale used is a standardized scale comprising a total of 22 items, organized on a five-point Likert scale. The total score of the scale ranged from 0 to 88, with higher scores indicating a higher level of postpartum stress. The scale is divided into four domains: Physical & emotional stress – consisting of 7 items with a possible score range of 0 to 28; Infant related stress – consisting of 7 items with a possible score range of 0 to 28; Social & Family Stress - consisting of 4 items with a possible score range of 0 to 16 & Role & Responsibility Stress – consisting of 4 items with a score range of 0 to 16. All questions were positive statements, scoring was assigned as follows: *Always = 4, Very Often =3, Sometimes = 2, Rarely = 1, and Never = 0.*

Post-partum Stress:

POST-PARTUM STRESS	CATEGORY
0-22	Minimal Stress
23-44	Mild Stress
45-66	Moderate Stress
67-88	Severe Stress

E. Validity and Reliability

Content validity of the structured questionnaire was established by a panel of experts in Obstetrics, Neonatology, Obstetric nursing, Research and Biostatistics. Reliability of the tool was established by Cronbach's alpha of 0.73, establishing the tool as

reliable for the main study. Expert suggestions were incorporated before finalizing the tool.

F. Ethical considerations and Pilot study

Institutional ethical approval was obtained from the Institutional Ethical Committee, AFMC, prior to data collection. Written informed consent was obtained from all participants. Confidentiality of data was maintained throughout the study. Pilot study was conducted among 12 postpartum mothers to assess the feasibility and clarity of tools. No major difficulties were reported by the researcher and the participants. Minor modifications were made based on their feedback. The tool was found to be feasible and appropriate for conducting the main study.

G. Data analysis

Data were analysed using descriptive and inferential statistical methods. Frequency, percentage, mean, and standard deviation were used to summarise socio-demographic and clinical variables, as well as levels of maternal stress and breast milk adequacy. The Chi-square test and Fisher's Exact Test were applied to assess the association between maternal stress levels and selected demographic, obstetric, and clinical variables. A p-value of < 0.05 was considered statistically significant. Statistical analysis was performed using R software.

H. Results:

The data gathered from postpartum mothers were systematically organized, tabulated, and analysed in accordance with the objectives of the study. Appropriate statistical methods were employed to ensure meaningful interpretation of the findings. A total of 114 mothers were analysed in the study.

Table 1: Distribution of postpartum mothers as per socio demographic variables.

		Frequency	Percentage
Age	<20	4	3.5%
	21-25	41	36%
	26-30	62	54%
	31-35	4	3.5%
	>36	3	3%
Religion	Christian	2	1.75%
	Hindu	87	76.32%
	Muslim	25	21.93%

Residence	Rural	3	2.63%
	Urban	111	97.37%
Type of Family	Joint	53	46.49%
	Nuclear	61	53.51%
Education	Post Graduate	7	6.14%
	Graduate	32	28.07%
	Higher Secondary	52	45.61%
	High School	22	19.30%
	Middle	1	0.88%
Occupation	House wife	125	99.21%
	HR	1	0.79%

Table 2: Distribution of postpartum mothers as per Obstetric Characteristics.

	Items	Frequency	Percentage
Gravida	1	40	35.09%
	2	54	47.37%
	>=3	20	17.54%
Parity	1	53	46.49%
	>=2	61	53.51%
No of Living Children	1	51	44.74%
	>=2	63	55.26%
Antenatal Visits	<8	1	0.88%
	>10	54	47.37%
	8 to 10	59	51.75%
Mode of Delivery	Caesarean	47	41.23%
	Instrumental	3	2.63%
	Vaginal with episiotomy	64	56.14%
Pregnancy Complication	No	110	96.49%
	Yes	4	3.51%
Delivery Complication	No	110	96.49%
	Yes	4	3.51%
Breast Milk Counselling	No	66	57.89%
	Yes	48	42.11%

Assessment of maternal postpartum stress:

Table 3 : Distribution of postpartum mothers as per maternal stress

n=114

	Item	Frequency	Percentage
Stress Level	High	8	7%
	Low	52	46%
	Moderate	54	47%

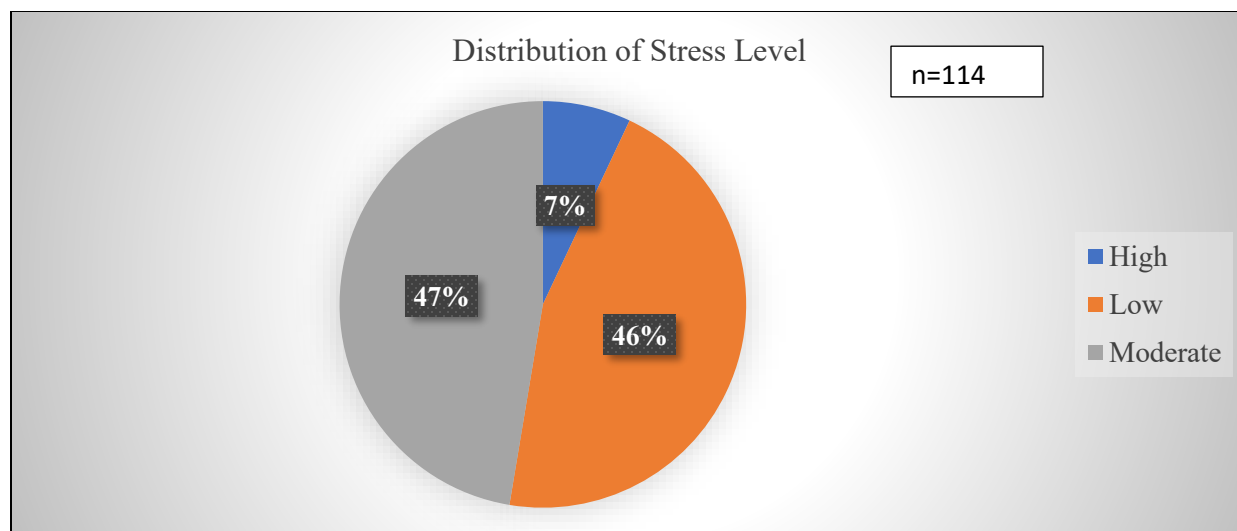


Figure 1: Distribution of level of stress among postpartum mothers.

Table 3 and figure 1 Represents the distribution of postpartum mothers as per stress level. It showed that nearly half of the participants (47%) experienced moderate stress, followed closely by those with low stress (46%). A smaller proportion of participants (7%) reported high stress levels.

These findings indicate that moderate stress was the most commonly observed stress level among the study population, while a relatively small percentage of participants experienced high stress. Assessment of the adequacy of breast milk among postpartum mothers:

Table 4 : Distribution of postpartum mothers as per breast milk adequacy

n = 114

Adequacy		Frequency	Percentage
	Adequate	102	89%
	Fair	8	7%
	Inadequate	4	4%

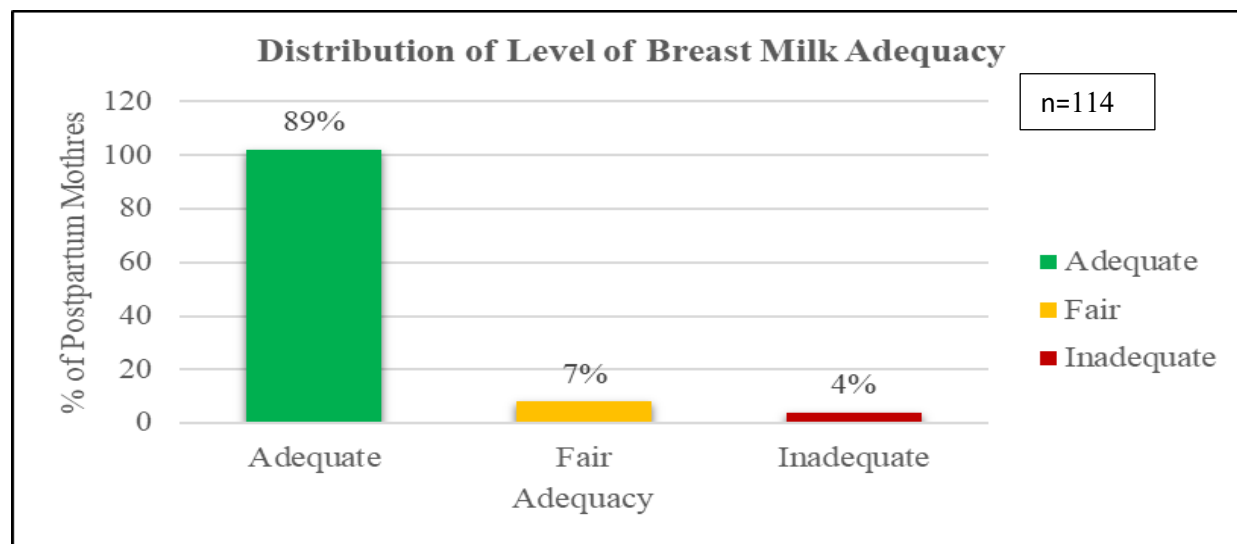


Figure 2: Distribution of postpartum mothers as per breast milk adequacy

Table 4 and figure 2 Represents the distribution of postpartum mothers as per breast milk adequacy. It shows that the majority of participants (89%) had adequate breast milk. A smaller proportion of mothers (7%) demonstrated fair adequacy, while only a few participants (4%) had inadequate breast milk.

These findings suggest that most postpartum mothers in the study population exhibited adequate breast milk production, with a minimal proportion experiencing inadequacy.

Association between level of maternal stress and adequacy of breast milk.

Table 5 : Distribution of postpartum mothers as per Stress and Breast Milk Adequacy.

n=114

	Level of adequacy of breast milk						Fisher Exact p- value
Stress	Adequate		Fair		Inadequate		
	Freq	%	Freq	%	Freq	%	<0.001*
Low Stress	51	44.74%	1	0.88%	0	0.00%	
Moderate Stress	49	42.98%	4	3.51%	1	0.88%	
High Stress	2	1.75%	3	2.63%	3	2.63%	

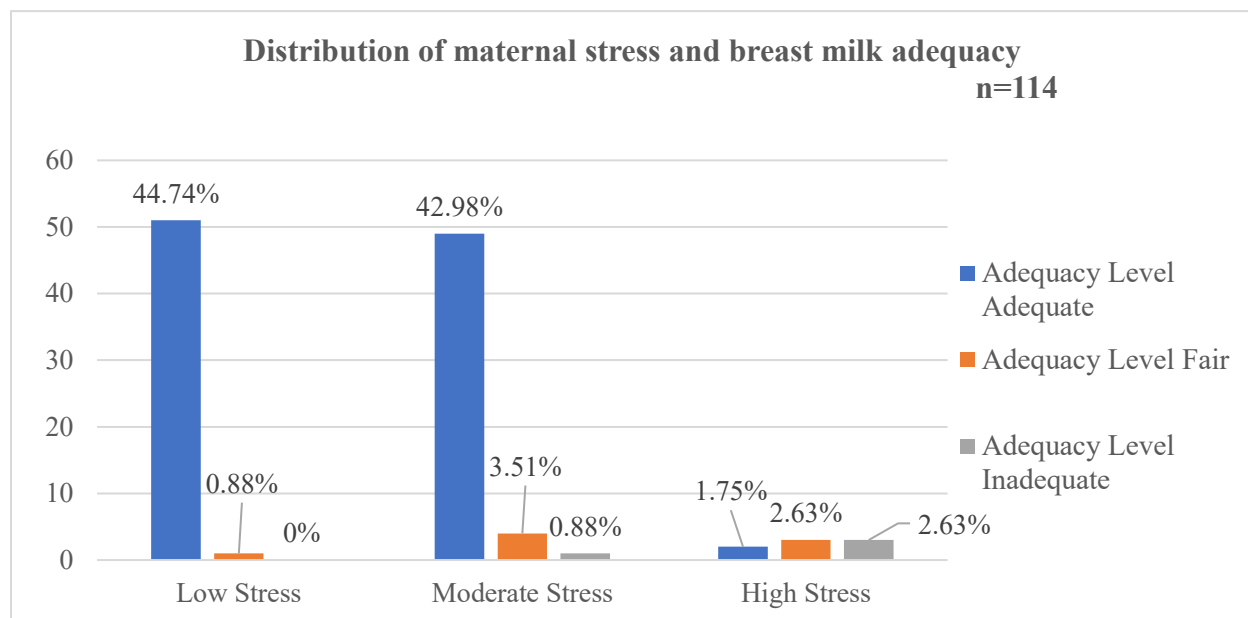


Figure 3 : Distribution of mothers as per Stress and Breast Milk Adequacy.

Table 5 and figure 3 depicts a high statistically significant association between stress level and adequacy of breast milk (Fisher's Exact $p = 3.45 \times 10^{-6}$, $p < 0.001$). Mothers with low stress predominantly demonstrated adequate breast milk, whereas mothers experiencing high stress showed a greater proportion of fair and inadequate breast milk. This finding indicates that increasing stress levels are associated with poorer breast milk adequacy.

Table 11: Overall Conclusion for association between stress and selected variables.

n=114

Variables	p-value	Significance
Age	0.5509	Not Significant
Religion	0.06437	Not Significant
Type of Family	0.6427	Not Significant
Education	7.03E-06	Significant
Gravida	0.003064	Significant
Parity	0.005051	Significant
No of Living Children	1.31E-03	Significant

Antenatal Visits	5.39E-06	Significant
Mode of Delivery	0.4475	Not Significant
Delivery Complication	0.3435	Not Significant
Pregnancy Complication	0.1684	Not Significant
Breast Milk Counselling	0.01903	Significant

The analysis revealed variables such as education ($p = 0.00000703$), gravida ($p = 0.003$), parity ($p = 0.005$), number of living children ($p = 0.0013$), antenatal visits ($p = 0.00000539$), and breast milk counselling ($p = 0.019$) were found to be significantly associated with stress, indicating that lower parity, fewer living children, fewer antenatal visits, and lack of counselling were linked to higher stress levels among women. In contrast, mode of delivery ($p = 0.4475$), delivery complications ($p = 0.3435$), and pregnancy complications ($p = 0.1684$) showed no statistically significant association with stress, suggesting that these factors did not influence stress levels in this study population. Overall, the findings highlight that maternal experience, support, and prenatal care play a more critical role in influencing stress levels than the mode or complications of delivery.

V. DISCUSSION

The study found that most (54%) postpartum mothers were aged 26–30 years, urban residents, Hindu, housewives, and educated up to higher secondary level, with adequate antenatal care (≥ 8 visits). Most (53.51%) were multiparous with vaginal delivery and no obstetric complications. Nearly half (47%) experienced moderate stress, while 89% reported adequate breast milk. A highly significant association was observed between maternal stress and breast milk adequacy ($p < 0.001$), with higher stress linked to poorer milk adequacy. Among demographic variables, only educational status was significantly associated with stress, while age, religion, and family type were not significant. Obstetric factors such as gravida, parity, number of living children, antenatal visits, and breastfeeding counselling were significantly associated with stress, whereas mode of delivery and complications showed no significant relationship, indicating a stronger influence of prenatal care and counselling than delivery-related factors. These findings are supported by evidence that maternal education and awareness positively influence

breastfeeding confidence and perceived milk adequacy, while lack of knowledge contributes to perceived insufficient milk supply.^{6,7} Although obstetric stressors such as caesarean section and labour complications have been linked to delayed lactogenesis, their impact appears less consistent than psychosocial factors.^{8,9} In the present study, moderate stress was common, which is clinically relevant as psychological distress can impair oxytocin release and reduce effective milk ejection.^{9,10} While physiological insufficiency of breast milk is uncommon, perceived inadequacy is frequently driven by maternal stress and confidence levels.^{11,12} Overall, the findings align with existing evidence that maternal psychological state plays a critical role in lactation outcomes.²⁵

A highly significant association between stress and breast milk adequacy further reinforces the role of stress in disrupting lactation physiology, including prolactin and oxytocin-mediated pathways.^{9,10} Previous studies also suggest that psychological distress can alter milk volume and composition, extending beyond perception to physiological effects.⁷ Additionally, evidence indicates that interventions improving breastfeeding self-efficacy and reducing stress can enhance breastfeeding outcomes.¹³ Therefore, integrating psychological assessment, counselling, and breastfeeding support into routine postpartum care is essential to improve maternal well-being and lactation success.

VI. CONCLUSION

The findings highlight that the majority of postpartum mothers had adequate breast milk and low-to-moderate stress levels. Education, antenatal care utilization, and breastfeeding counselling emerged as key determinants of milk adequacy. Maternal experience and prenatal support were stronger predictors of stress levels than obstetric complications or mode of delivery.

VII. LIMITATIONS

The study is limited by its cross-sectional design, which prevents causal inference, and its conduct in a single tertiary care hospital, restricting generalisability to other settings. The relatively small sample size in some subgroups may affect statistical power. Self-

reported measures of stress and breast milk adequacy may introduce recall and response bias, and the short postpartum assessment period limits understanding of long-term outcomes. Additionally, the absence of objective measures such as breast milk volume or hormonal markers, limited control of confounders (e.g., family support, nutrition, socio-economic factors), and a predominantly urban sample further constrain interpretation and applicability of the findings.

VIII. RECOMMENDATIONS

1. Nursing education should integrate breastfeeding management, maternal stress, and lactation counselling, supported by practical training methods such as workshops, simulations, and community exposure.
2. Nurses and community health workers should provide regular antenatal and postnatal education on breastfeeding techniques, milk adequacy, and stress management, along with strengthening counselling, support groups, and home visits.
3. Hospitals should implement structured breastfeeding counselling services with emphasis on early initiation, correct positioning and attachment, and psychological support to reduce maternal stress.
4. Lactation consultants and trained nurses should be readily available to assist mothers experiencing breastfeeding difficulties.
5. Continuous in-service education and CNE programmes should be conducted for healthcare professionals to enhance breastfeeding support and maternal mental health care.
6. Further research with larger and diverse samples is needed to explore determinants of maternal stress and breastfeeding adequacy and to evaluate effective interventions.

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