The birth of a baby always brings a bundle of joy for the parents. Anticipating the arrival of baby, the parents often start preparing themselves, along with joy of child-rearing. However, not all parents remain fortunate enough to realize their dreams immediately. Few babies often fail to make the smooth perinatal transition, with neonatal intensive care unit (NICU) admissions. The mother–infant bonding which is often believed to lay the foundation for long-term child–parent relationship fails to develop as the neonate remains separated.[1] Mothers whose babies remain admitted to NICU experience many stressors due to prematurity, medical or surgical condition of neonate, stressful NICU environment, and anticipated vulnerability apart from the psychological morbidity perceived during pregnancy and perinatal transition.[2,3] Bright lights, noisy life support and monitoring devices, tubings, wire connections, intravenous cannulations, and continuous presence of health-care professionals are thought to be the main disturbing elements for the parents. Inability on the part of the mother to perform the desired maternal role is also perceived by many as the contributing factor.[2,4,5]

Maternal stress is very often neglected, as attention is focused mainly on the care of sick neonates. Although maternal stress in NICU is very well documented in

**ABSTRACT**

**Context:** Admission of a neonate in a neonatal intensive care unit (NICU) can be very stressful for the mother, which often remains unattended by health-care professionals. Early identification of maternal stress, environmental stressors, and providing remediation will prove instrumental in providing a holistic family-based patient care. **Aims:** The aim of the study was to analyze the stress levels among mothers whose babies were admitted to NICU. **Settings and Design:** This was a cross-sectional question-based observational study conducted in the pediatric department of a peripheral hospital in Pune, Maharashtra. **Subjects and Methods:** This was a cross-sectional, observational, hospital-based study. Maternal stress level was assessed using the Parental Stressor Scale: NICU (PSS: NICU) questionnaire among 73 mothers. Stress score was quantified using Likert scale as low (1–2.9), moderate (3–3.9), and high (4–5), respectively. **Statistical Analysis Used:** Simple descriptive statistics method with frequency, percentage, mean, and standard deviation was used as applicable. **Results:** NICU environment is moderate to highly stressful for mothers. The mean score for each domain of PSS: NICU was as follows: sights and sounds, 2.60 (±0.43); looks and behavior, 3.47 (± 0.31); and parental role alteration, 3.94 (± 0.24), respectively. Maternal stress level remained high irrespective of age at delivery, educational level, occupation, mode of delivery, and number of living children. **Conclusions:** Mothers of NICU-admitted babies are under significant stress, which needs to be identified early along with care of the sick neonate, so as to give a holistic care to the family. **Keywords:** Maternal stress, neonatal intensive care unit, neonate, PSS: neonatal intensive care unit, stressor

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How to cite this article: Kumar N, Mallick AK. Maternal stress in neonatal intensive care unit very often overlooked by health professionals. Ind Psychiatry J 2020;29:130-3.
Western countries,[2-4] very few studies in India have addressed this issue.[5-9] Early identification and remediation will prove instrumental in improving the quality of patient care.

Based on this knowledge, we conducted this study in order to analyze the stress level using the Parental Stressor Scale: NICU (PSS: NICU) among mothers whose babies were admitted to NICU at a peripheral hospital in urban Maharashtra.

SUBJECTS AND METHODS

This cross-sectional question-based survey was conducted in the pediatric department of a peripheral hospital in Pune, Maharashtra, from March 2018 to September 2019. All mothers whose babies were admitted to NICU during the study period were included in the study. Prior informed consent was taken from all mothers before inclusion in the study. Mothers refusing consent and those having baby with shorter duration of NICU stay (<24 h) were excluded from the study. The study was approved by the institutional ethical committee.

Antenatal history and other demographic details of the mother such as age, educational qualification, occupation, parity, number of living children, type of delivery, baby gestational age, weight, length of stay, and other relevant details were meticulously entered in a predefined pro forma by the treating physician. Maternal stress level was assessed by a trained psychological counselor nurse, using the PSS: NICU, a validated questionnaire-based survey.[4]

The questionnaire had three domains of stress assessment, namely sights and sounds, looks and behavior, and parental role alteration with baby. The mothers answered a total of 19 questions, with response being recorded on a five-point Likert scale from 0 to 5, where 0 meant no experience at all with the situation, 1 (not at all stressful) to 5 (extremely stressful). Maternal stress levels were classified according to the score on Likert scale as low (1–1.9), moderate (2–3.9), and high (4–5). The baseline demographic data and maternal perceived stress score were entered in an Excel sheet and analyzed statistically by simple descriptive statistics method with frequency, percentage, mean, and standard deviation as applicable. Post questionnaire, all the mothers were given psychological counseling, to relieve their stress. Psychological counseling was also given to mothers not participating in the study.

RESULTS

There were a total of 104 mothers with baby admitted to NICU during the study period. However, 27 mothers were excluded as their baby stayed in NICU for duration < 24 h. Four mothers refused consent. Hence, 73 eligible mothers were finally enrolled in the study. The baseline demographic details are illustrated in Table 1.

The mean age of the mothers was 28.69 (±5.01) years. The education level of the mother was good, with 11 (15.1%) mothers studied till secondary level, 19 (26%) higher secondary, 32 (43.8%) graduates, and 11 (15.1%) postgraduates. Sixty-five (89.1%) mothers were homemaker, whereas 8 (10.9%) were working. Twenty-seven (37%) mothers were primigravida and 46 (63%) were multigravida. Thirty-nine (53.4%) mothers had one living child and 34 (46.6%) mothers had two or more living children. Thirty-three (45.2%) deliveries were normal deliveries and 40 (54.8%) were through cesarean. Thirty-eight (52.1%) babies were born preterm (gestation <37 completed weeks) and 35 (47.9%) babies were born term. Forty-nine (67.1%) babies had NICU stay ≤7 days and 24 (32.9%) had more than 7 days NICU stay. Causes of neonatal admissions

| Baseline characteristics* | n (%) |
|---------------------------|-------|
| Mean age of mother in years±SD | 28.69±5.01 |
| Education level | |
| Up to secondary level | 11 (15.1) |
| Higher secondary | 19 (26.0) |
| Graduation | 32 (43.8) |
| Postgraduation | 11 (15.1) |
| Occupation | |
| Homemaker | 65 (89.1) |
| Working | 8 (10.9) |
| Gravida | |
| Primi | 27 (37.0) |
| Multi | 46 (63.0) |
| Number of living children | |
| 1 child | 39 (53.4) |
| >1 child | 34 (46.6) |
| Term baby (>37 weeks' gestation) | 35 (47.9) |
| Preterm baby (<37 weeks' gestation) | 38 (52.1) |
| Mode of delivery | |
| Normal delivery | 33 (45.2) |
| Cesarean delivery | 40 (54.8) |
| Days of NICU stay (days) | |
| ≤7 | 49 (67.1) |
| >7 | 24 (32.9) |
| Diagnosis on NICU admission | |
| Prematurity | 38 (52.1) |
| Poor feeding | 11 (15.4) |
| Perinatal asphyxia | 9 (12.3) |
| Neonatal sepsis | 7 (9.5) |
| Hypoglycemia | 6 (8.3) |
| Congenital malformations | 2 (2.7) |

*All indicate numbers unless specified. SD – Standard deviation; NICU – Neonatal intensive care unit
in NICU were, prematurity 38 (52.1%), poor feeding 11 (15.1%), perinatal asphyxia 9 (12.3%), neonatal sepsis 7 (9.5%), hypoglycemia 6 (8.3%) and congenital malformations 2 (2.7%) respectively.

The various questionnaire of PSS: NICU and their corresponding mean maternal stress score are illustrated in Table 2. NICU environment was found to be highly stressful for mothers in domain of parental role alteration (mean score, 4.14 ± 0.36) and moderately stressful in domain of sights and sounds (mean score, 2.60 ± 0.43) and looks and behavior (mean score, 3.47 ± 0.31).

| Questions                                      | Stress score, mean±SD |
|------------------------------------------------|------------------------|
| **Sights and sounds**                          |                        |
| Presence of monitors and equipment             | 2.37±0.94              |
| Constant noise of monitors and equipment       | 2.55±1.83              |
| Sudden loud noises of monitor alarms           | 2.56±0.88              |
| Other sick babies in the room                  | 2.85±0.97              |
| Presence of nurses and doctors in NICU         | 2.82±0.81              |
| Having a respiratory support for baby          | 2.47±1.85              |
| Mean score                                     | 2.60±0.43              |
| **Looks and behavior**                         |                        |
| Needles and tubes being put on baby            | 3.39±1.05              |
| Unusual color and appearance of baby           | 3.49±1.21              |
| Baby being fed by tube or intravenous line     | 3.59±0.89              |
| Baby activity and cry not like other babies in nursery | 3.47±0.85 |
| Seeing baby in pain                            | 4.26±0.69              |
| Baby looking sick                              | 4.43±0.61              |
| Mean score                                     | 3.47±0.31              |
| **Parental role alteration**                   |                        |
| Being separated from baby                      | 4.18±0.69              |
| Not being able to feed baby myself             | 4.37±0.59              |
| Not being able to care for baby myself         | 4.42±0.62              |
| Not being able to hold baby                    | 4.47±0.56              |
| Unable to protect baby from painful procedures | 4.63±0.49              |
| Feeling helpless about how to help or comfort baby | 4.62±0.49 |
| Not being able to spend time with baby alone on own | 3.69±0.61 |
| Mean score                                     | 3.94±0.24              |

Table 2: Mothers response as assessed by the Parental Stressor Scale: Neonatal Intensive Care Unit questionnaire (total respondents=73)

DISCUSSION

We conducted this study in order to analyze the stress level using PSS: NICU among mothers whose babies were admitted to NICU. Maternal stress in NICU is very often neglected by health-care professionals. Although this morbidity on the part of mothers is very well documented in Western countries,[2,4-6] very few studies in India have tried to highlight this issue.[7-9] The findings of moderate-to-high level of stress among these mothers once again emphasize that it is important that health-care providers in NICU address and identify their stressors early and give remedial counseling and psychotherapy so as to provide a holistic family-centered approach to patient care.

The findings of our study are similar to the findings of Dudek-Shriber et al.[8] According to them, the mean subscale stress score was highest for parental role alteration (4.14), followed by looks and behavior (3.47) and sights and sounds (2.60). Although improvement in perinatal care has increased the survival of neonates in NICU, parental morbidity remains high, which needs to be addressed.[10] Similar findings were noted by other authors also,[7,9] who found that among the three domains of PSS: NICU, parental role alteration with their baby and looks and behavior were the most stressful scores. Hence, we feel that early counseling and intervention should focus specifically in these two domains. Early involvement of mothers in neonatal care, feeding the baby, skin-to-skin contact, and allowing visit by close family members may play a pivotal role in reducing her stress level. Among the individual subscale scores, feeling helpless about how to help or comfort baby at this time, unable to protect baby from painful procedures, not being able to hold baby, not being able to care for baby, not being able to feed baby, and baby looking sick had maximum stressor scores. Hence, it is felt that addressing these issues early will play a crucial role in decreasing the stress level among mothers. As seen in previous studies, higher stress scores were strongly related to younger maternal age, lower formal educational level, primigravida mothers, and increased length of NICU stay. We found more mothers in higher age group, higher educational level, and multigravida and more neonates had NICU stay <7 days. Hence, it implies that maternal stress level remains high irrespective of these baseline characteristics, and all mothers require special attention, counseling, and support. A study by Carvalho et al. emphasized the need for psychological support for mothers of NICU-admitted babies for reduction of the situational anxiety.[11] We also felt the same and gave psychological counseling and support to all the mothers irrespective of their inclusion criteria.

Our study has few limitations. We took into account only the mother’s stress. The stress level of fathers could not be studied. This is owing to the service exigency, as ours is a service hospital. Most of the fathers were away on duty, and hence, they could not be interviewed. The sample size is also small compared to other studies due to our limited clientele. The strength of our study is that our team had a dedicated psychological counselor, who alone interviewed all the mothers and focused on appropriate counseling to alleviate her anxiety.
CONCLUSION

To conclude, mothers of NICU-admitted babies are under significant stress, which needs to be identified early along with care of the sick neonate, so as to give a holistic care to the family.

Acknowledgment

We acknowledge the support of the patients and their parents for making this study successful. We also acknowledge all the nursing staff and paramedical staffs in the pediatric department of our hospital for helping in patient care and giving the inputs, Mrs. Sulekha J (psychological counselor) for counseling of the mothers, and our family for their unconditional support.

Financial support and sponsorship
Nil.

Conflicts of interest

There are no conflicts of interest.

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