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Original Article

SOCIO-DEMOGRAPHIC PROFILE OF NEONATAL INTENSIVE CARE UNIT ADMISSIONS IN TERTIARY CARE HOSPITAL

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ABSTRACT

Background: The mother and baby are always considered to be a single unit. Globally, neonatal mortality declined from 4.7 million in 990 (33 deaths per 1000 live births) to 2.8 million in 2013 (20 deaths per 1000 live births). However, there are significant variations in mortality rates among Neonatal Intensive Care Unit (NICU) admissions, which have been documented. It is an important responsibility of the health care workers involved in newborn care to provide research inputs that will strengthen and support the Government efforts.

Objectives: To study the socio-demographic profile of neonatal intensive care unit admissions in a tertiary care hospital.

Material and Methods: The study was carried out in the NICU at a Government medical college hospital, a tertiary care centre. It was a cross-sectional, hospital-based study for a study period of approximately two years (January 2022 to December 2023). The study comprised all

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742 neonates (≤ 28 days) admitted to the NICU of the Government Medical College Hospital. Out of these neonates, 211 fulfilled the inclusion and exclusion criteria

Results: The total number of admissions was 742, which was higher than the average number, and most were from rural areas. Among the total 211 neonates studied, there were 108 (51.2%) male and 103 (48.8%) female neonates. The timing of admission of the neonates showed that the majority of the neonates were admitted within 24 hours of birth. Among the neonates admitted <24 hours, the majority were admitted during the first hour of birth. Most of the neonates belonged to Hindu families and were from joint families. The majority of the mothers belonged to the age group of 21-25 years and were primigravida with formal education till the 10^{th} standard. Most of them were homemakers. The majority of fathers belonged to the age group 21-25 years and had a high level of education. The most predominant occupations among fathers of the study group were unskilled workers. There was equal distribution of neonates among all socioeconomic classes except for class 1 where there were no participants. The study hospital provides care free of cost. So the lower socio-economic class participants are seen more than higher class

Conclusion: Even though the educational and occupational status of parents was not very satisfactory majority of them are literate and there is awareness to bring the neonates to the hospital instead of taking to quacks which is a favourable finding

Keywords: neonates, NICU, socio-economic class

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Introduction

The mother and baby are always considered to be a single unit. In the neonatal period, the baby has maximum susceptibility to infection as it enters a new environment, and it is essential to provide the needed care and protection. Globally, neonatal mortality declined from 4.7 million in 990 (33 deaths per 1000 live births) to 2.8 million in 2013 (20 deaths per 1000 live births)[1]. In India, the decline was from 51 per 1000 live births in 1990 to 29 per 1000 live births in 2013[2]. In Maharashtra, currently (2015), it is 22 per 1000 live births[3]. The worldwide decline in neonatal mortality during the past decades has been attributable to improvements in the neonatal intensive care[4,5]. However, there are significant variations in mortality rates among Neonatal Intensive Care Unit (NICU) admissions, which have been documented. It is an important responsibility of the health care workers involved in newborn care to provide research inputs that will strengthen and support the Government efforts[6]. Thus, in addition to the above-mentioned factors regarding neonatal mortality rate (NMR), it is essential to know if any other factor affects local neonatal morbidity and mortality. Knowing it may be helpful for a further decrease in neonatal mortality. Hence, the present study was planned with the following purposes in mind.

Materials and Methods:

The study was carried out in the NICU at a Government medical college hospital, a tertiary care centre. It was a cross-sectional, hospital-based study for a study period of approximately

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two years (January 2022 to December 2023). The study comprised all 742 neonates (≤ 28 days) admitted to the NICU of the Government Medical College Hospital during the study period.

Out of these neonates, 211 neonates fulfilled the inclusion and exclusion criteria

Inclusion criteria:

1. Newborn babies (≤ 28 days) admitted in the NICU who may be delivered inside or outside the hospital.
2. Accompanying relative giving consent for participation in the study.

Exclusion criteria:

1. Newborn babies (≤ 28 days) admitted in the NICU, whose accompanying relatives are not willing to participate in the study.

Ethics: All research studies confirm ethical principles as laid down in the Helsinki declaration

Sample size :

n = [DEFF*N*p(1-p)] [(d2 / Z21-α/2*(N-1)+ p*(1-p)] = [1 x652*0.28(1-0.28)] . [(0.05)2/(1.96)2*651+28(1-0.28)] = 131.44	Symbols n – sample size p - prevalence DEFF – Design Effect = 1 d – allowable error N - finite population correction

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0.6252 = 210.22 ~ 211	factor Z - 1.9

Based on the records of past 3 years data the required sample size was estimated based on above formula of sample size for finite population with the highest admissions as 652, and prevalence of Neonatal Mortality in NICU as 28% and allowable error 5% with 95% confidence interval. The sample size calculator available in "Epi Info" provided the same sample size[7].

Sampling Technique: Systematic random sampling for one year was done till the sample size was reached. **Results**

The data of 211 collected throughout data collection (Jan 2022 to Dec 2023) was as follows. The total number of admissions was 742, which was higher than the average number of admissions for the NICU, i.e., 635. This rise could be due to the availability of transport facilities through various national programs like JSSK. The number of admissions increased by 76 (36.01%) during the winter season.

Socio-demographic profile of study participants

Various Socio-demographic characteristics of the study participants were as follows: Among the total 211 neonates studied, there were 108 (51.2%) male and 103 (48.8%) female neonates.

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The ratio was found to be 1.04:1. The timing of admission of the neonates, i.e, age at admission, showed that the majority of the neonates, that is, around 71% of the neonates, were admitted within 24 hours of birth, and 29% of the admissions occurred >24 hours. Among the neonates admitted <24 hours, 71.3% were admitted during the first hour of birth, and 28.7% of the more than 1 hour. Admissions during the early neonatal period, that is, less than 7 days, were 190 (90.1%)

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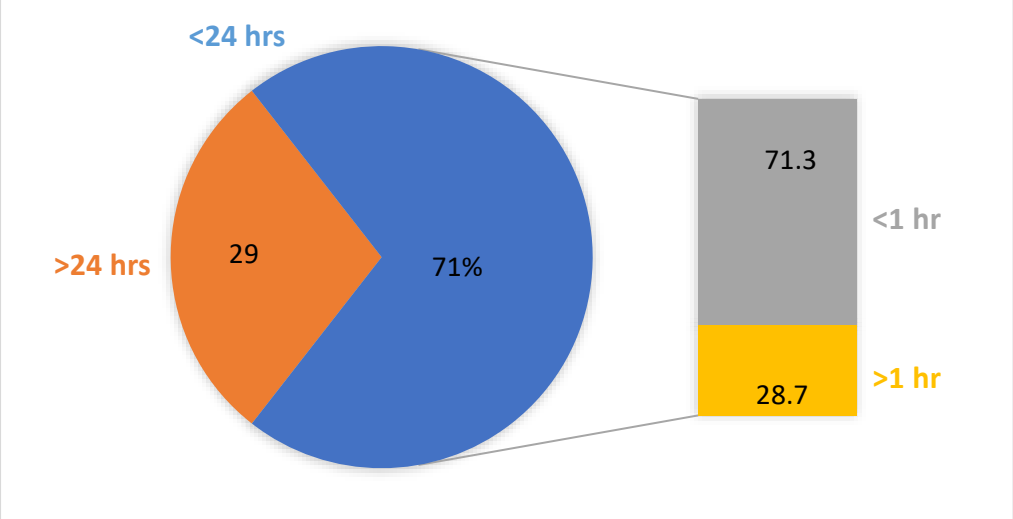
Fig 1: Distribution of neonates according to the age at NICU admissions.



In the current study majority of the neonates admitted were from rural areas. There were 145 neonates from rural areas, which constituted 68.3% of the total neonates admitted, and 67 (31.3%) were from urban areas.

Table 1: Religion-wise distribution of families of neonates.

Religion	**Number (n)**	**Percentage (%)**
Hindu	167	79.1
Muslim	38	18.1
Christian	6	2.8
Total	211	100

The above table shows the distribution of neonates by religion, most of the neonates belong to

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Hindu families,167(79.1%) followed by Muslim families who were 38(18.1%), then Christian families who are 6 (2. 8%).Most of the neonates -119 (56.4%).are a part of a joint family, followed by a nuclear family, 76(36.0%). There were 16(7.5%) from three-generation families. This could be a favourable thing for taking care of the neonate, as most of them will be part of the joint families, there may be better care, as there may already be mothers present, and it gives more people available for the care of the baby. The study observed that the mean age of mothers in the current study was 23.7 years with a standard deviation of 2.45. The majority of the mothers belong to the age group of 21-25 years. This might be because more than 2/3rd of the admissions of babies in NICU were of primigravida (69.7%) mothers. In India, the legal age for marriage is 18 years, and usually, in India, it's seen that conception occurs within 1 to 2 years after marriage. Most of the mothers had formal education till 10^{th} standard, 70 mothers were in this group and the percentage was around 33.2 % followed by secondary education who were around 65 mothers and contributed around 30.8%, followed by these higher secondary who were 36(17.1%) and then were graduates 20(9.5%) then were illiterate and finally primary school. According to NFHS 4[8], in Maharashtra, the female literacy in rural areas is 74.2% but the percentage of women who are studying post-SSC is only 32.6%, and in current study showed similar findings with all females having education of Post-SSC being 37.9%.In the current study, it was found that the majority of the mothers were homemakers 197 (93.4%), followed by skilled workers (4.7%) and unskilled labourers (1.9%).

The mean age of fathers of the study participants was 26.9 years with a standard deviation of 3.41. The majority (47.3%) of the fathers belong to the age group of 21-25 years. This is in accordance with the above finding of maternal age. Maximum proportion of paternal education was seen till HSC (33.2%) followed by SSC (32.2%). There were around 6.2% illiterates and

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more than half of fathers had an education level of HSC and above indicating a good opportunity for a job. According to NFHS 4[8], the percentage of male literacy even in rural areas is around 91.2%. Findings in the current study are similar (93.8%). The level of literacy was found to be high.

The most predominant occupations among fathers of the study group were of unskilled workers - 107(50.7%). Then it was “self-employed & professional” - 51(24.2%) and then semi-skilled workers were 39 (18.5%) and the least were skilled who was 30(14.2%).

There was equal distribution of neonates among all socioeconomic classes except for class 1 where there were no participants. Among the classes, a maximum (29.9%) belong to the class 4 socio-economic class by modified BG Prasad’s classification. It is followed by Class 5 (25.1%) followed by Class 3 (23.2%) and then Class 2 (21.8%).

The study hospital provides care free of cost. So the lower socioeconomic class participants are seen more than the higher class.

Discussion

In a study by R. Rakholia[9] in Uttarakhand, researchers found the male percentage to be higher, which was around 63.25%, while in the current study, male and female neonate admissions are comparable. Another study conducted at Cairo[10] showed a higher proportion (60.8%) of male neonates in the NICU. A study conducted by S.S.B. Saranappa[11] et al showed similar admission rates of males and females, which were around 54% among males and 46% among females. It was reported that the sex-wise proportion of NICU admissions was found to be higher in males[12]. But with changing awareness, the care of female children also seems to increase, as indicated in the present study. This could also be due to regional variation in gender inequality.

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Place wise

The study by Dalal. E et al[13], found that 78% were from rural areas and slums and the rest from urban, this finding is similar to the current finding that the percentages are comparable. In a study by Tayade Surekha et al[14] 72.2% of participants were from rural areas and 27.71% from urban areas, in the current study similar findings were there. The tertiary care centre is situated in a rural area and is a referral centre for many of the peripheral centres. So the percentage of admissions to rural places seems to be higher.

Religion

In a study in Bangladesh, they found 51.5% Muslims and 11.4% non-Muslim, while in the current study percentage of Hindus is higher (79.1%)

Type of family

A study by Gagan et al [15], had 47.6% neonates from nuclear families and 52.39% from joint families, and there were no neonates from three-generation families. The current study had a lower number of neonates from nuclear families (36%). Yet another study by Kawale et al[16], had 46.6% neonates from nuclear families and 29.2% neonates from three generations, and 24.09% from joint families. There are more number in joint families in the current study, and the number of three-generation families was lower (7.5%).

Age of mother

Yet another study conducted in Tanzania, by B.T. Mmbaga et al[17], found the Maternal mean age (SD) to be 27.6 (6.2) years, which is slightly higher than the current study.

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Education of the mother

A study conducted by Onasoga Olayinka A et al[18], found the majority of mothers with a literacy of secondary education to be 48% in the current study it was around 39%. The highest frequency was seen in the group of SSC. A.H.Diallo et al[19], found in their study that only 20% of the mothers were literate, in the current study majority of the mothers were literate i.e. 94.8% of women. This finding could be due to a higher proportion of female literacy at current time. It might be a reflection of policies like free education for females and Sarv Shiksha Abhiyan. This may also indicate that the babies of females having lower level of education are not reaching NICU and needs to be further probed by a community-level study.

Occupation of mother

In a study by Md. Jamal UDDIN et.al[20], in Bangladesh, had the majority of participants (82.9%) whose mothers did household work. The finding was similar to the current study. Next were 9.3% who were labourers in the current study there were only 1.9% of unskilled workers.

A study by Kawale et al [16] had 58.8% admissions among unemployed mothers, 17.42% among semiskilled, and 14% among unskilled mothers. In the current study, there was a higher percentage (93.4%) among unemployed mothers and 4.7% of skilled workers, whose group was absent in the study by Kawale et al[16,] and unskilled workers were less than 1.9%.

A greater proportion was homemakers and unemployed females, indicating a lower level of women's empowerment in the region. But this also indicates the availability of the mother at home for proper infant care.

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Education of father

In a study in Bangladesh by Md. Jamal UDDIN et al[20], a major group of fathers' education was illiterate, while it was of HSC in the current study. The observed difference may be due to differences in the socio-cultural background of the two countries.

Occupation of father

The study in Bangladesh showed that 33.4% of the fathers were labourers by occupation while in the current study, we had 50.7% who were unskilled, the percentage seems to be higher in the current study, this could be because most of the fathers were from rural areas and opportunity for skilled work seems to be less.

Socioeconomic class

In a study by Tayade Surekha[14] et al, had majority of participants were from class 4(72.2%), this finding is similar to the current study but the rates are lower (29.9%) in the current study.

In a study by Kawale et al[16], 40.3% belong to class 4 37.5% from class 5 and 19.3% from class 3 and 2.7% from class 2. In the present study, there were less per cent of neonates in class IV (29.9%) and class V as compared to class III. A higher percentage were found in class II (21.8%). This could be because of advanced care and quality care being provided in the study institute which is attracting patients from higher socio-economic strata.

Conclusion

In admitted neonates, there were more males, 108 (51.2%), with ratio of 1.04:1. Majority of neonates were admitted during the early neonatal period 189 (89.6%) and the majority were in

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less than 24 hrs (71%) in that majority from within 1 hour (71.3%). The mean age of admission was found to be 43.76 ± 95.91 hours; for male neonates, it was 46.03 ± 112.26 hours, and for female neonates was 43.76 ± 75.54 hours. It was found that the mean age at admission for inborn babies (27.99 hours) and the outborn babies was more (57.85 hours) difference was found to be significant. ($p>0.05$). The neonates were brought from a mean distance travelling 20.1 ± 25.4 kilometres. Mostly 53.1% of neonates were from the same district, mostly from the rural areas 145 (68.3%) and mainly belonged to Hindu families 167(79.1%), and were born to mainly, joint families, 119 (56.4%) and were from all socio-economic classes except class I. The most common maternal age group was 21-25 (71.5%) years. Mothers were educated, most had formal education till 10^{th} standard, 70 (33.2%) then till secondary education 65 (30.8%). The majority of the mothers were homemakers 197 (93.4%). The most common paternal age group was 21-25 years (47.3%). Fathers were educated up to higher secondary school 33.2%. The commonest occupation among fathers of the neonates was unskilled 107(50.7%) workers. Even though the educational and occupational status of parents was not very satisfactory majority of them are literate, and there is awareness to bring the neonates to the hospital instead of taking to quacks, which is a favourable finding.

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