

Parental Perceived Stress and Its Influencing Factors among Parents with Newborns in Newborn Unit in Kericho and Bomet Counties, Kenya

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Abstract: A mental health problem, such as acute stress disorder and post-traumatic stress is projected to affect 20-30 percent of parents of hospitalized newborns during the first year after birth globally. In Sub Sahara Africa where a large number of premature birth occur there is limited information concerning parental stress on newborn care unit. This study determined parental perceived stress and its influencing factors among parents with newborns admitted in Kericho and Bomet county referral hospitals, Kenya. This study used hospital based descriptive cross sectional analytical design to determine parental perceived stress from newborn care unit among parents of neonates using Parental Stress Scale : neonatal intensive care unit (PSS:NICU). Quantitative approach was employed to gather information among 135 parents who were sampled through simple random sampling method. Quantitative data was collected using pre-tested semi-structured questionnaire through exit interview. Stress was quantified using 5 point Likert scale from 1 to 5. The findings showed that most stressful item for both parents was their experience of having their babies hospitalised in the NBU ($\bar{X}=4.7$; 95%CI: 4.4-5.0; $P=0.01$) with the mean score hitting a maximum on 5.0. Male parents experienced higher stress levels compare to females parents with respect to baby's unusual or abnormal breathing patterns and small body size of the baby. The current study shows that parents regardless of gender generally experience high stress during their admission to NBU.

Conclusion: There is need for appropriate counselling and NBU education support to reduce stress among NBU parents with respect to all the subscales of PSS: NICU.

Key words: parental stress, nicu, infant.

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I. Introduction

A mental health problem, such as acute stress disorder and post-traumatic stress is projected to affect 20-30 percent of parents of hospitalized newborns during the first year after birth globally. Prematurity is the major cause of neonatal admissions. To the family hospitalization of a newborn (NB) in a neonatal care unit is usually an unexpected and traumatic event. The joy of having a healthy child is shattered by the trauma of being away from him or her and unable to care for their child as they had hoped (Palma, Wusso, Morales, Cifuentes and Ambiado, 2017). According to the World Health Organization (WHO), about 15 million children are born prematurely each year, making it the second leading cause of death among children under the age of five. These deaths are more common in Sub-Saharan Africa and South Asia (Aagaard *et al.*, 2015). Parents and infants are separated when they are admitted to a neonatal care unit. As the neonate is taken away from the mother's bedside, possibly during birth, and cared for in a neonatal care unit away from the parents, the parent-infant bond is strained (Palma, *et al.*, 2017). The delivery of a baby that requires neonatal care brings parents a great deal of stress and anxiety. Although studies on the stress experienced by parents of infants in neonatal care units have been conducted, no studies on the parental perceived stress and its related factors in parents of infants hospitalized in a NICU have been conducted in Kenya. It is critical to have a good understanding of the factors that influence parental perceived stress in NBU in order to provide effective supportive interventions to these parents. The goal of this study was to investigate parental perceived stress and its affecting factors among parents of newborns admitted to the NBU referral hospitals in Kericho and Bomet counties.

II. Materials and Methods

Study design: This study used hospital based descriptive and analytical cross-sectional design to determine parental perceived stress from newborn care unit and its influencing factors among parents of neonates in Kericho and Bomet counties.

Study Area: The study was carried out at newborn care unit Longisa and Kericho County Referral Hospitals. The hospitals serves clients both as outpatients and inpatients. The hospitals serve as clinical placement sites for health care providers including nursing and clinical medicine students. The two hospitals acts as an internship centre for nurses, clinical officers and medical officers. Bomet County and Kericho County is an agricultural area and mainly inhabited by Kipsigis community.

Sampling Procedures

Simple random sampling was used which is a probability sampling technique where by every client had an equal chance of being selected to participate in the study. Neonates/infant in NBU were identified and their parents both the mother and the father were contacted through nurse in charges. Sample Size Determination was calculated based on Fischer's formula (Fisher *et al.*, 1998). A total of 137 parents were randomly selected and took part in the study.

Data Collection Procedure

A structured questionnaire was used in data collection. This was adapted from Miles and Funk 1987. The PSS: NICU is widely used tool to evaluate parental perception of stress experienced during new born unit admission. These are experiences that cause the parents to feel anxious, upset, or tense (Miles&Funk, 1987). The researcher used three (3) research assistants who were trained on the data collection tools and the sample size from which the data was collected.

Data Analysis

Data from the completed questionnaires was coded, cleaned and, analysed using. Statistical Package for Social Science (SPSS) version 22.. Descriptive statistics like means, frequency, and standard deviation was used to summarize the independent variables. An independent samples t-test was used to compare the means of the Likert Scale scores that ranged between 1 = Not stressful to 5 = extremely stressful. Higher mean stress score means parental stress was high for that corresponding item or domain. The Kruskal Wallis test used with socio-demographic dichotomous (two levels) variables as independent variables where domain scores were treated as ordinal dependent variable. A p value of ≤ 0.05 was considered statistically significant.

III. Results

Respondents' background information

Respondents of both gender took part in the study. Out of 135 parents 73.7% were mothers and 23.3% fathers (Table 1). Most males (52.8%) and females (47.5%) were aged 25 – 34 years with statistically significant differences in age ($p < 0.0001$), particularly among younger males (5.6%) and females (39.6%) aged 15 – 24 years. Female parents were generally younger with a mean age of 23.9 ± 6.9 compared to male parents with an average age of 26.4 ± 7.0 years, the difference being statistically different ($p < 0.0001$). Whereas most of the males had attained tertiary education (44.4%), most the female counterparts (45.5%) had reached secondary level with significant differences being reported among males (19.4%) and females (32.7%) as well as in tertiary education ($p = 0.03$). Unlike females (67.3%) majority of males (94.4%) were married, the difference being significant statistically ($p = 0.005$). There were no significant differences in terms of the proportion of males or females who had either term or premature infant at birth ($p = 0.5$). There were significant differences among employment categories of both gender ($p = 0.008$) with more males (33.3%) than females (10.9%) in permanent employment. There was no significant disparity in terms religious affiliation by gender with reported proportions being comparable ($p = 0.3$).

Table 1: Socio-demographic characteristics of parents

Variable	Categories	Gender		p value
		Male n = 36 (%)	Female n = 101 (%)	
Age groups in years	15 – 24	2 (5.6)	40 (39.6)	< 0.0001
	25 – 34	19 (52.8)	48 (47.5)	
	≥ 35	15 (41.7)	13 (12.9)	
Mean age ±SD (Range) in years (Males)		32.9 ± 6.9 (20.0 – 45.0)	26.4 ± 7.0 (16.0 – 40.0)	< 0.0001 π
Level of education	Primary	7 (19.4)	33 (32.7)	0.03
	Secondary	13 (36.1)	46 (45.5)	
	Tertiary	16 (44.4)	22 (21.8)	
Marital status	Married	34 (94.4)	68 (67.3)	0.005*
	Single	2 (5.6)	29 (28.7)	
	Divorced	0 (0.0)	1 (1.0)	
	Widowed	0 (0.0)	3 (3.0)	
Age of the infant at birth	Term	15 (41.7)	48 (47.5)	0.5
	Premature	21 (58.3)	53 (52.5)	
Employment status	Permanent	12 (33.3)	11 (10.9)	0.008
	Contract	6 (16.7)	17 (16.8)	
	Casual	6 (16.7)	14 (13.9)	
	Self employed	10 (27.8)	32 (31.7)	
	Other	2 (5.6)	27 (26.7)	
Religion	Christian	34 (94.4)	99 (98.0)	0.3*
	Muslim	2 (5.6)	2 (2.0)	

* Fisher’s Exact Test

π ANOVA

Neonatal characteristic that influence perceived stress among parents with newborns in NBU

Neonatal characteristics that contribute to stress experienced by the parents was examined by assessing parental perception on baby’s looks and behaviour in NBU and comparing the perceptions of male and female parents in Table 4.2 above, there were significant differences in socio-demographic characteristics by gender. An independent samples t-test was used to compare the means of the Likert Scale scores that ranged between 1 = Not stressful to 5 = extremely stressful. Higher mean scores meant parental stress was high for that corresponding item regarding baby’s look and behaviour (Table 2). The results indicate that there is a statistically significant difference between the mean stress score for males and females. ($p = 0.04$). In other words, male parents ($\bar{x} = 4.3$; 95% CI: 4.0 – 4.6) experienced higher stress level compared to females ($\bar{x} = 3.9$; 95% CI: 3.7 – 4.1) with respect to baby’s unusual or abnormal breathing patterns. In the same way, the small size of the baby was more stressful to fathers ($\bar{x} = 4.4$; 95% CI: 4.1 – 4.6) than mothers ($\bar{x} = 3.7$; 95% CI: 3.5 – 4.0) with resultant significant mean differences ($p = 0.006$). There was a marginal significant difference in mean stress score with higher mean for male parents ($\bar{x} = 4.4$; 95% CI: 4.0 – 4.7) than mothers who had a lower score of 4.0 (95% CI: 3.7 – 4.2) as they perceived the limp and weak appearance of their baby ($p = 0.07$). No significant differences were reported between male and female parents in the mean stress scores of tubes and equipment on or near the baby, bruises, cuts or incision on the baby, among other items examined.

Table 2 Baby’s looks and behaviour in NBU and its influence on parental perceived stress

Perceptions on the neonates appearance and behaviour	Male parents stress score (n = 36)		Female parents Stress score (n = 101)		p value
	Mean	95% CI	Mean	95% CI	
	Tubes and equipment on or near the baby	3.3	3.0 – 3.6	3.2	
Bruises, cuts or incision on the baby	3.6	3.3 – 4.0	3.5	3.3 – 3.8	0.57
The baby’s unusual or abnormal breathing patterns	4.3	4.0 – 4.6	3.9	3.7 – 4.1	0.04
Seeing my baby stop breathing	4.6	4.4 – 4.8	4.3	4.1 – 4.5	0.16
The small size of my baby	4.4	4.1 – 4.6	3.7	3.5 – 4.0	0.006

My baby crying in long periods	4.4	3.8 – 4.4	3.8	3.6 – 4.1	0.19
When my baby looked afraid	3.8	3.5 – 4.2	3.6	3.3 – 3.8	0.28
When my baby looked sad	3.8	3.4 – 4.1	3.5	3.3 – 3.8	0.37
The limp and weak appearance of my baby	4.4	4.0 – 4.7	4.0	3.7 – 4.2	0.07
Jerky or restless movement of my baby	4.3	4.0 – 4.6	4.2	4.0 – 4.4	0.57
My baby being not able to cry like other babies	4.2	3.9 – 4.5	4.0	3.7 – 4.2	0.35
Clapping on baby's chest for chest drainage	4.4	4.2 – 4.7	4.2	4.0 – 4.4	0.15

Parental characteristics that influence parental perceived stress among parents with newborns in the Newborn unit

In order to examine parental characteristics that influence stress when babies are admitted in NBU, parents socio-demographic factors and their relationship with the stressful items in the following five domains: parental role adjustment, restrictions of visiting hours in NBU, experience during previous pregnancy (excluded for male parents on item asking about their experience during previous deliveries as this targeted mothers). Total score for the items in each domain was worked out and mean score calculated by dividing the total domain score by the number of items. The minimum score was 1 and maximum was 5 signifying higher stress level for that particular domain.

The Kruskal Wallis test was then used with socio-demographic dichotomous (two levels) variables as independent variables and domains scores being treated as ordinal dependent variable. Kruskal Wallis is the non-parametric form of ANOVA.

Table 3 Presents results on parental socio-demographic characteristics that elicited stress as a result of baby's look and behaviour in NBU. The results indicate that there are statistically significant differences among age groups, gender, marital status and occupation and mean stress scores. Higher mean scores were reported among parents older than 30 years ($\chi^2 = 8.9$; $df = 1$; $p = 0.003$), males ($\chi^2 = 4.2$; $df = 1$; $p = 0.04$), married ($\chi^2 = 3.8$; $df = 1$; $p = 0.05$) and those holding permanent jobs ($\chi^2 = 5.5$; $df = 1$; $p = 0.02$) presented higher mean stress score among male parents (chi-square with two degrees of freedom = 34.0452, $p = 0.0001$). On the other hand, level of education or age of the baby had no influence on stress experienced by the parents.

Table 3 Kruskal-Wallis test on parental socio-demographic factors and baby looks and behaviour and its influence on parental perceived stress

Independent variable	Categories	N	Mean score	χ^2	p value
Age group in years	≤ 30	90	3.8	8.9	0.003
	> 30	47	4.0		
Gender	Male	36	4.1	4.2	0.04
	Female	101	3.8		
Level of education	Primary	40	3.8	0.05	0.82
	Secondary / Tertiary	97	3.9		
Marital status	Married	102	4.0	3.8	0.05
	Single, Widow, Divorced	35	3.6		
Age of baby	Term	63	3.9	0.002	0.96
	Premature	74	3.9		
Occupation	Permanent	23	4.2	5.5	0.02
	Others	114	3.8		

Parental socio-demographic factors and parental role adjustment and its influence on parental perceived stress

Table 4 shows findings on parental socio-demographic factors and stress due to parental role adjustment when baby is admitted in NBU. Only one factor was significantly associated with the reported parental perceived stress. Females were more likely to experience stress related to changes in parental role adjustment with higher mean of 3.5 against male parent mean of 3.2 ($\chi^2 = 6.7$; $df = 1$; $p = 0.009$). The relationship between the remaining parents' socio-demographic variables and stress associated with parental role adjustments was not statistically significant.

Table 4 Kruskal-Wallis test on parental socio-demographic factors and parental role adjustment and its influence on parental perceived stress

Independent variable	Categories	N	Mean score	χ^2	p value
Age group in years	≤ 30	90	3.4	0.4	0.52
	> 30	47	3.4		
Gender	Male	36	3.2	6.7	0.009
	Female	101	3.5		
Level of education	Primary	40	3.5	1.4	0.23
	Secondary / Tertiary	97	3.4		
Marital status	Married	102	3.5	1.3	0.25
	Single, Widow, Divorced	35	3.3		
Age of baby	Term	63	3.4	1.1	0.30
	Premature	74	3.5		
Occupation	Permanent	23	3.4	0.005	0.94
	Others	114	3.4		

Parental socio-demographic factors and restrictions of visiting hours to NBU and its influence on parental perceived stress

Table 5 shows findings on parental socio-demographic factors and parental perceived stress on restrictions of visiting hours to NBU. Again, there was significant gender differences on stress level experienced by male compared with female parents. However, on the contrary, male parents, this time registered a higher mean stress score of 4.1 versus 3.2 among female parents ($\chi^2 = 16.5$; $df = 1$; $p < 0.0001$) the difference being highly statistically significant. None of the other parents' socio-demographic characteristics were significantly associated with stress related to restrictions of visiting hours to NBU.

Table 6 Kruskal-Wallis test on parental socio-demographic factors and restrictions of visiting hours to NBU and its influence on parental perceived stress

Independent variable	Categories	N	Mean score	χ^2	p value
Age group in years	≤ 30	90	3.4	1.1	0.29
	> 30	47	3.6		
Gender	Male	36	4.1	16.5	< 0.0001
	Female	101	3.2		
Level of education	Primary	40	3.7	2.5	0.11
	Secondary / Tertiary	97	3.4		
Marital status	Married	102	3.5	0.19	0.66
	Single, Widow, Divorced	35	3.3		
Age of baby	Term	63	3.3	1.01	0.32
	Premature	74	3.5		
Occupation	Permanent	23	3.8	3.1	0.08
	Others	114	3.4		

Parental socio-demographic factors and previous pregnancy experience and its influence on the parental perceived stress

Table 7 illustrates relationship between parents' socio-demographic factors and previous pregnancy experience and its influence on the parental perceived stress relating the current baby's status in NBU. Married parents ($\bar{x} = 2.2$; $\chi^2 = 23.1$; $df = 1$; $p < 0.0001$) and those who had term babies ($\bar{x} = 2.2$; $\chi^2 = 5.1$; $df = 1$; $p = 0.02$) were significantly less likely to have had high level stress attributed to previous pregnancy experience with corresponding p values of < 0.0001 and 0.02, respectively. The rest of the variables tested yielded non-statistically significant outcomes.

Table 7: Kruskal-Wallis test on parental socio-demographic factors and experience during previous pregnancy and its influence on parental perceived stress

Independent variable	Categories	N	Mean score	χ^2	p value
Age group in years	≤ 30	90	2.5	0.1	0.77
	> 30	47	2.4		
Gender	Male	36	2.3	0.6	0.45
	Female	101	2.5		
Level of education	Primary	40	2.5	0.05	0.82
	Secondary / Tertiary	97	2.5		
Marital status	Married	102	2.2	23.1	< 0.0001
	Single, Widow, Divorced	35	3.3		

Age of baby	Term	63	2.2	5.1	0.02
	Premature	74	2.7		
Occupation	Permanent	23	2.3	0.4	0.51
	Others	114	2.5		

4.3.4 Parental socio-demographic factors and sight and sounds in NBU and its influence on parental perceived stress

Table 8 illustrates parents' socio-demographic factors influencing stress related to sights and sounds in NBU parents. None of the six socio-demographic variables of parents was significantly associated with stress that could be linked to sights and sounds in NBU. Mean scores for this particular domain was generally comparable between the two categories in each independent variable assessed.

Table 8 Kruskal-Wallis test on parental socio-demographic factors and sight and sounds in NBU and its influence on parental perceived stress

Independent variable	Categories	n	Mean score	χ^2	p value
Age group in years	≤ 30	90	3.1	1.7	0.18
	> 30	47	3.4		
Gender	Male	36	3.4	1.7	0.19
	Female	101	3.1		
Level of education	Primary	40	3.0	1.0	0.31
	Secondary / Tertiary	97	3.3		
Marital status	Married	102	3.3	2.2	0.14
	Single, Widow, Divorced	35	3.0		
Age of baby	Term	63	3.1	0.18	0.67
	Premature	74	3.2		
Occupation	Permanent	23	3.2	0.03	0.86
	Others	114	3.2		

Parental socio-demographic factors and staff behaviour in NBU

Table 9 shows results on parental socio-demographic factors and stress associated with staff behaviour in NBU. Higher mean stress scores were registered among male parents ($\bar{x} = 4.1$; $\chi^2 = 17.4$; $df = 1$; $p < 0.0001$), those who were married ($\bar{x} = 3.8$; $\chi^2 = 4.7$; $df = 1$; $p = 0.03$) and respondents employed on permanent basis ($\bar{x} = 4.0$; $\chi^2 = 6.0$; $df = 1$; $p = 0.01$). Males, married parents and those on permanent employment experienced statistically significantly higher levels of stress than their counterparts. Parents who were 30 years and below ($\bar{x} = 3.6$; $\chi^2 = 7.1$; $df = 1$; $p = 0.008$) and those who had attained primary education ($\bar{x} = 3.5$; $\chi^2 = 5.2$; $df = 1$; $p = 0.02$) had lower mean stress scores related to staff behaviour, results being statistically significant. Some of the staff behaviours included staff explaining things too fast, staff using words that parents do not understand, among other items assessed. There was significant association between parents with term babies and those whose babies were premature with respect to stress related to staff behaviour.

Table 9 Kruskal-Wallis test on parental socio-demographic factors and staff behaviour in NBU and its influence on parental perceived stress

Independent variable	Categories	n	Mean score	χ^2	p value
Age group in years	≤ 30	90	3.6	7.1	0.008
	> 30	47	3.9		
Gender	Male	36	4.1	17.4	< 0.0001
	Female	101	3.5		
Level of education	Primary	40	3.5	5.2	0.02
	Secondary / Tertiary	97	3.7		
Marital status	Married	102	3.8	4.7	0.03
	Single, Widow, Divorced	35	3.4		
Age of baby	Term	63	3.6	1.2	0.27
	Premature	74	3.7		
Occupation	Permanent	23	4.0	6.0	0.01
	Others	114	3.6		

4.3.6 Parental role adjustment and its influence on parental perceived stress

Relationship between parental perceived stress on parental role adjustment in NBU was tested using independent samples t-test. Mean stress scores for each item for the parental role construct was compared between male and female parents. The means of the Likert Scale scores ranged between 1 = Not stressful to 5 = extremely stressful. Higher mean scores means parental stress was high for that corresponding item regarding parental role adjustment. The mean stress level on role adjustment was higher among female parents where they

perceived that they were being separated from their babies ($\bar{x} = 3.7$; 95% CI: 3.5 – 4.0; $p = 0.03$), not feeding their baby by themselves ($\bar{x} = 3.4$; 95% CI: 3.2 – 3.7; $p < 0.0001$), not being able to care for their babies themselves e.g. changing nappies and bathing ($\bar{x} = 3.3$; 95% CI: 3.0 – 3.6; $p < 0.0001$), not being able to hold their babies whenever they want ($\bar{x} = 3.5$; 95% CI: 3.2 – 3.7; $p = 0.03$), sometimes forgetting how their babies look like ($\bar{x} = 3.6$; 95% CI: 3.4 – 3.9; $p = 0.01$), and not being able to share their babies with other family members ($\bar{x} = 3.4$; 95% CI: 3.1 – 3.6; $p = 0.04$). In each of these items, male counterparts' scores significantly lower mean stress scores (Table 4.10). The converse was the case where male parents presented with significantly higher mean stress scores as they felt helpless and unable to protect their babies from pain and painful procedures ($\bar{x} = 4.6$; 95% CI: 4.3 – 4.8; $p = 0.0003$) or felt helpless about how to help their babies during that time ($\bar{x} = 4.5$; 95% CI: 4.2 – 4.8; $p = 0.0004$). Such significant differences were not evident among male or female parents with regard to being afraid of touching or holding their babies or the feeling that the NBU staff was closer to their babies than the parents themselves.

Table 10 Parental role adjustment in NBU and its influence on parental perceived stress

Perceptions	Male parents stress score (n = 36)		Female parents Stress score (n = 101)		p value
	Mean	95% CI	Mean	95% CI	
Being separated from my baby	3.3	3.0 – 3.6	3.7	3.5 – 4.0	0.03
Not feeding my baby by myself	2.2	1.7 – 2.6	3.4	3.2 – 3.7	< 0.0001
Not being able to care for my baby myself e.g. changing nappies and bathing	2.1	1.7 – 2.6	3.3	3.0 – 3.6	< 0.0001
Not being able to hold my baby when I want	2.9	2.5 – 3.4	3.5	3.2 – 3.7	0.03
Sometimes forgetting how my baby looks like	3.0	2.5 – 3.4	3.6	3.4 – 3.9	0.01
Being afraid of touching or holding my baby	3.6	3.3 – 4.0	3.6	3.4 – 3.9	0.95
Not being able to share my baby with other family members	2.9	2.5 – 3.3	3.4	3.1 – 3.6	0.04
Feeling helpless and unable to protect my baby from pain and painful procedures	4.6	4.3 – 4.8	3.8	3.5 – 4.0	0.0003
Feeling staff are closer to my baby than I am	2.8	2.4 – 3.2	3.1	2.9 – 3.4	0.17
Feeling helpless about how to help my baby during this time	4.5	4.2 – 4.8	3.7	3.4 – 3.9	0.0004

Restrictions of visiting hours in NBU and its influence on parental perceived stress

Table 11 shows results of relationship between parental perceived stress on restrictions of visiting hours in NBU and mean stress scores. Male parents reported statistically higher mean stress scores with regard to NBU visiting schedules ($\bar{x} = 4.4$; 95% CI: 4.1 – 4.7; $p < 0.0001$) and restriction of visiting hours which they perceived to reduce their ability to assume parental role ($\bar{x} = 4.2$; 95% CI: 3.9 – 4.6; $p < 0.0001$). There was evidence of gender differences in level of mean stress scores among male or female parents with respect to the feeling that family members were unable to visit the baby frequently as they could have wanted ($p = 0.16$).

Table 11 Restrictions of visiting hours in NICU and its influence on parental perceived stress

Perceptions	Male parents stress score (n = 36)		Female parents Stress score (n = 101)		p value
	Mean	95% CI	Mean	95% CI	
Stress with NBU visiting schedules	4.4	4.1 – 4.7	3.1	2.9 – 3.4	< 0.0001
Stressed that family members were unable to visit the baby frequently as they want	3.6	3.2 – 4.0	3.2	3.0 – 3.5	0.16
Restriction of visiting hours reduces ability to assume parental role	4.2	3.9 – 4.6	3.3	3.0 – 3.5	< 0.0001

Previous pregnancies and relationships with family and others and its influence on parental perceived

Table 12 shows results of relationship between parental perceived stress on previous pregnancies and relationships with family and others and mean stress scores. Female parents experienced statistically significantly higher mean stress scores than male parents when they considered any stress with support their spouses ($\bar{x} = 2.6$; 95% CI: 2.3 – 2.9; $p = 0.009$) although this was relatively at a lower level. It was not evident that adjustment to new role as a male or female parent was associated with higher mean stress scores ($p = 0.23$) nor relationship with family members ($p = 0.24$).

Table 12 Previous pregnancies and relationships with family and others and its influence on parental perceived stress

Perceptions	Male parents stress score (n = 36)		Female parents Stress score (n = 101)		p value
	Mean	95% CI	Mean	95% CI	
Did you experience any stress with support from your spouse if yes how stressful was it?	1.8	1.4 – 2.3	2.6	2.3 – 2.9	0.009
Adjusting to your new role of parenting	3.3	2.7 – 3.7	2.9	2.7 – 3.2	0.23
How was your experience during your previous deliveries			2.5	2.2 – 2.7	-
How is your Relationship with family members	1.8	1.3 – 2.2	2.1	1.8 – 2.4	0.24

Environmental factors associated with parental stress in NBU

To assess environmental factors influencing parental perceived stress in NBU, responses of respondents on items that defined the sights and sounds constructs was used and comparison made between mean stress scores of male and female parents. Table 13 presents the results. Apparently, male parents were highly stressed by seeing other sick babies in the room ($\bar{x} = 4.2$; 95% CI: 3.9 – 4.6; $p = 0.0006$). Presence of monitors and equipment, or constant noises of monitors and equipment or sudden noises of monitor alarms or there being a large number of people working in the unit, all were not significantly associated with differences in male or female parent mean stress scores.

Table 13 Sights and sounds in NBU and its influence on perceived stress

Perceptions	Male parents stress score (n = 36)		Female parents Stress score (n = 101)		p value
	Mean	95% CI	Mean	95% CI	
Presence of monitors and equipment	3.1	2.8 – 3.3	3.0	2.7 – 3.2	0.56
Presence of constant noises of monitors and equipment	3.3	3.1 – 3.6	3.3	3.0 – 3.5	0.74
Sudden noises of monitor alarms	3.3	3.1 – 3.6	3.3	3.1 – 3.6	0.95
Other sick babies in the room	4.2	3.9 – 4.6	3.3	2.5 – 3.6	0.0006
Large number of people working in the unit	3.0	2.5 – 3.5	2.8	2.5 – 3.1	0.43

Staff behaviour in NBU and its influence on parental perceived stress

Table 14 shows Staff behaviour in NBU and its influence on parental perceived stress and compares mean stress scores for male and female parents. Interestingly all of the nine factors examined with statistically significant results show male parents having experienced higher mean stress scores than their spouses. The means were higher where they perceived that staff explained things too fast ($\bar{x} = 3.6$; 95% CI: 3.2 – 3.9; $p = 0.04$), staff using words that they do not understand ($\bar{x} = 4.1$; 95% CI: 3.8 – 4.4; $p = 0.0007$), staff telling them conflicting things about the condition of the baby ($\bar{x} = 3.9$; 95% CI: 3.5 – 4.2; $p = 0.05$) and staff not telling them enough about tests and treatments being done on the baby ($\bar{x} = 4.1$; 95% CI: 3.8 – 4.4; $p = 0.02$). Similar findings were revealed where male parents registered higher mean stress scores concerning difficulty getting information or help when they visit or call the unit ($\bar{x} = 4.3$; 95% CI: 4.0 – 4.6; $p = 0.003$), not being sure if they would be called when the baby’s condition changes ($\bar{x} = 4.4$; 95% CI: 4.1 – 4.6; $p = 0.009$), staff looking worried about the baby ($\bar{x} = 4.6$; 95% CI: 4.6 – 4.8; $p = 0.0003$), staff acting as if they do not want parents around ($\bar{x} = 4.3$; 95% CI: 4.0 – 4.6; $p = 0.002$) and generally expressing how stressful the experience of having their babies hospitalised has been to them ($\bar{x} = 4.7$; 95% CI: 4.4 – 5.0; $p = 0.01$) with the latter mean stress score at a maximum of 5.0. There were significant differences in mean stress scores between male and female parents with regard to staff not talking to them enough ($p = 0.24$), too many health care providers talking to them ($p = 0.08$) or staff acting as if they do not understand the baby’s behaviour or special needs ($p = 0.09$).

Table 14 Staff behaviour in NBU and its influence on parental perceived stress

Perceptions	Male parents stress score (n = 36)		Female parents Stress score (n = 101)		p value
	Mean	95% CI	Mean	95% CI	
Staff explaining things too fast	3.6	3.2 – 3.9	3.0	2.8 – 3.3	0.04
Staff using words that I don’t understand	4.1	3.8 – 4.4	3.3	3.0 – 3.5	0.0007
Telling me different (conflicting) things about the condition of my baby	3.9	3.5 – 4.2	3.4	3.2 – 3.6	0.05
Not telling me enough about tests and treatments being done to my baby	4.1	3.8 – 4.4	3.5	3.3 – 3.8	0.02
Not talking to me enough	3.6	3.2 – 3.9	3.3	3.0 – 3.5	0.24

Too many different people (doctors, nurses, others) talking to me	3.6	3.2 – 4.0	3.2	2.9 – 3.4	0.08
Difficulty getting information or help when I visit or call the unit	4.3	4.0 – 4.6	3.6	3.4 – 3.9	0.003
Not being sure if I will be called when my baby's condition changes	4.4	4.1 – 4.6	3.8	3.5 – 4.0	0.009
Staff looking worried about the baby	4.6	4.6 – 4.8	3.9	3.7 – 4.1	0.0003
Staff acting as if they do not want parents around	4.3	4.0 – 4.6	3.6	3.3 – 3.8	0.002
Staff acting as if they do not understand my baby's behavior or special needs	4.0	3.7 – 4.3	3.6	3.3 – 3.8	0.09
How stressful has the experience of having your baby hospitalized been for you?	4.7	4.4 – 5.0	4.1	3.9 – 4.4	0.01

IV. Discussion

According to the results of the current study parents of both genders express high levels of perceived stress when they were expressing how their stay have been while having their infant admitted the NBU. Generally expressing how stressful the experience of having their babies hospitalised has been to them the results were ($\bar{x} = 4.7$; 95% CI: 4.4 – 5.0; $p = 0.01$) with the latter mean stress score at a maximum of 5.0. The results shows that this was the highest level of stress when compared with other PSS:NICU domains which was assessed in this study. The results shows that NBU admission was extremely stressful to both parents. This was contrary to a study done by Palma *et al.*, 2017 where the study sought to quantify the stress levels presented by parents whose infants are admitted in NICU, the study found that the most stressful item was alteration in the mother-father-child relationship due to hospitalization.

The neonatal characteristic that was assessed in this study were: Parental perceived stress on baby's looks and behaviour in NBU and comparing the perceived stress of male and female parents .In this study results indicates that male parents experienced higher stress level compare to females parents with respect to baby's unusual or abnormal breathing patterns and small size of the baby .This was contrary to a study done in India, where the study sought to quantify stress levels of parents whose babies were admitted in NICU and compare the source of stress for mothers and fathers. The study was done in a tertiary care centre 400 parents were interviewed .Most mothers were home makers (49.2%) and 27% were not formally educated, The study found that mothers experience higher stress than fathers (Agrwal&Gaur,2017).This results was consistent with study done by Jurczak *et al.*,(2015) where by cases of men stress increased with the question concerning infant behaviour and appearance, seeing their baby stop breathing and seeing him/her in pain which was described by the parents extremely stressful events.Ashwani et al 2017 found that stress and anxiety experienced by fathers appears to be significant than mothers which was in line with the current study. The reason could be most males parents spend less time in NBU and they may not have been given orientation in the unit making them more stressed because they might not be understanding the condition of their infant and management.

To examine parental characteristic that influence stress when babies are admitted to NBU, parents sociodemographic factors and their relationship with stressful items in the following domains were assessed: Parental role adjustment, Restriction of visits ,experience during previous pregnancies (which was excluded for male parents) was examined. The results indicate that there are statistically significant difference among age groups, gender, marital status and occupation and mean score parents older than 30years, males, married and those holding permanent jobs presented higher mean stress. This was in line with results found by Ashwani *et al.*, (2017) where parent's gender and education were associated with higher level of stress which was also reflected in study done Musabirema *et al.*,(2015) where they found that parents who completed high school and higher education have high stress frequency levels than parents who have not completed high school. This could have been attributed to the fact that parents who were more educated they tend to understand well whatever the health care workers were explaining to them concerning their infant's condition and treatment than those who are illiterate. The environmental factors that was assessed in this study were: Sights and sounds in NBU and staff behaviour.

To assess environmental factor influencing parental stress in NBU response on item that defined the sights and sounds construct was used and comparison between mean stress score of male and female parents were considered. According to the current study male parents were highly stressed by seeing other sick babies in the room .Presence of monitors and equipment or constant noises of monitors, alarms or there being large number of people working in the unit, all were not significantly associated with difference for male and female mean stress score. This was consistent with Ashwani *et al.*, (2017) the researchers found that the stress level of fathers was found to be significantly higher than mothers in the sights and sound domains. Ganguly *et al.*, (2020) also found that the most stressful to parents was the sight and sound which is not in line with the current study where only the sight of sick babies was significantly stressful to NBU parents. The reason for inconsistency could be the difference with the study sites .For the current study it was conducted in a NBU while the later was conducting in a NICU which could be more stressing with the presence of more complicated environment.

Recommendations

According to the results and conclusion of this study the following recommendations are made -:

- The highest mean stress score for both parents was generally their experience of having their babies hospitalised in NBU. Therefore the study recommends the hospital policy makers should ensure that parents are given appropriate counselling and education support by training nurses and doctors on psychological counselling or employing counsellors in order to reduce stress among NBU parents.
- The hospital management should develop a visiting schedule which promotes attachment with infant while ensuring rest for parents. The hospital management also should implement family centered care by ensuring that both parents are allowed access to their infant does reducing parental stress in NBU. Doctors and midwives find less time to focus on parental perceived stressors in NBU environment and give appropriate counselling to alleviate their anxiety. Therefore the hospital should employ separate counsellors designated for the same. Orientation also should be given to all parents on NBU environment and staffs should use a language that parents can understand.

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