

“Outcome of Early Transferred Preterm VLBW Neonates from NICU”

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Abstract

Background: Traditional policy is to discharge preterm infants from NICU when a predetermined weight has been achieved which makes their stay in NICU prolonged. Prolonged NICU stay is associated with many adverse effects. So, there must be ways out to discharge these infants early though there are many controversies and concern among health care professionals and parents. **Objectives:** This study was designed to evaluate the outcome of early transfer of preterm babies from NICU. **Materials and Methods:** This prospective observational study included stable preterm babies of <34 weeks, tolerating tube feeding, with 1-2 L/min oxygen by nasal canula and whose parents wanted early transfer from NICU. Mothers of the included babies were being trained to provide care to their preterm babies with little or no professional help. Then these babies were transferred to cabin or ward with their mother and care given by mothers with assistance of a nurses designated for this purpose. Outcome was assessed based on feed tolerance, need for oxygen, respiratory distress, occurrence of apnea, mortality and duration of hospital stay. **Results:** Among 78 neonates, 52 (66.7%) neonates were transferred early to cabin or general ward and remaining 26 (33.3%) neonates stayed in NICU until discharge. The occurrence of feed intolerance was significantly less in the early transferred group than that of NICU stayed group (13.5% vs. 46.1%, $p=.002$). Also, development of respiratory distress was significantly less in early discharged group (15.4% vs. 38.5%, $p=.023$). No statistical differences were found (>0.05) between two groups in case of apneic attacks (15.4% vs. 30.8%) and requirement of oxygen (34.6% vs. 53.8%). It was found that duration of hospital stays (9.4 ± 1.01 days vs. 15.9 ± 4.24 days) was significantly less ($p<0.05$) in early transferred group. Overall, it was found that the mortality was significantly less ($P<0.05$) in early transferred group. **Conclusion:** This study confirmed the feasibility of early transfer of preterm VLBW infants from NICU with reduction of hospital stay and mortality.

Key words: Early transfer, NICU, Outcome, Preterm, VLBW.

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I. Introduction

Preterm very low birth weight (VLBW) babies are one of the highest risk neonates with high morbidity and mortality [1,2]. These infants need special care and treatment in early days of life for their survival and for that they need admission in Neonatal Intensive Care Unit (NICU) and Special Care Nurseries.

In NICU for premature and VLBW neonates, one of the main goals is to provide an appropriate nutritional support for growth, development and weight gain similar to those provided during in-utero growth of fetus. Premature neonates, specially those born before 34 weeks of gestation, have lack of coordination between sucking, swallowing and breathing reflexes. Therefore, cannot take oral feeding and need to take feeding by oro/nasogastric tube [3]. Until they can take entire feeding orally, they need to be hospitalized and this often leads to longer hospitalization [4]. Prolonged hospitalization is associated with many adverse effects, including an increased risk of nosocomial infections, reduced staff time for sick neonates, delayed mother-child bonding, emotional problems for parents, high costs and shortage of hospital beds.

Duration of hospital stay and post-menstrual age at discharge is inversely proportional to birth weight and gestation [5,6]. It is difficult and labour-intensive to give clinical care of preterm VLBW neonates in developing countries with limited resources for intensive care. Prolonged NICU stay to achieve the standard weight for discharging these neonates is not feasible in such condition. It is also important to ensure a smooth transition from the protected environment of NICU to home.

Some premature babies, during their NICU stay, may be physiologically stable but still need special care for feeding by gavage, may require low flow oxygen but can maintain temperature in an open cot care. For these preterm neonates after appropriate training of their parents can be transferred out from NICU to ward with their mother and stay at hospital until establishment of full sucking feeds, adequate weight gain, respiratory stability with no apnea and the maintenance of temperature in an open care cot [7]. In Bangladesh, intensive care service is very limited and costly; to find out the ways to reduce the treatment cost and better survival this study was designed to evaluate the outcome of early transfer of preterm babies from NICU.

II. Materials & Methods

This prospective observational study was conducted from March 2014 to August 2015 in the Neonatal Intensive Care Unit (NICU) of Aysha Memorial Specialized Hospital, which is a specialized private hospital in Dhaka, Bangladesh. Neonatal Intensive Care Unit (NICU) of Aysha Memorial Specialized Hospital has a capacity of 17 beds and a team of 2 Consultant Neonatologists, 6 Registrars, 18 Medical Officers and 28 Nurses. Preterm babies of <34 weeks of gestation and <1500gm, with stable hemodynamic condition, tolerating feed, with 1-2 L/min oxygen by nasal canula and whose parents wanted early transfer from NICU were included in this study. Those preterm VLBW babies who required mechanical ventilation, had sepsis and hemodynamic instability were excluded from the study.

Mothers of the included babies were being trained during NICU stay to provide care to their preterm babies. All the mothers received information and training regarding personal cleanliness, hand washing, early establishment of breast feeding, proper positioning and attachment during breast feeding, feeding with cup and spoon practice, feeding with oxygen support, management of apnea by tactile stimulation, and cleaning mouth and nostrils. Then babies were transferred to cabin or ward with their mothers and care was given by the mothers with assistance of a nurse designated to take care of babies. Outcome of this group was assessed based on feed tolerance, need for oxygen, respiratory distress, occurrence of apnea, mortality and duration of hospital stay and compared with the group of preterm babies of similar characteristics who stayed in NICU until discharged. All information of both groups was recorded in a questionnaire. Informed written consent was taken from parents.

Statistical analyses were done by using SPSS version 20. All categorical variables were expressed as percent (%) and continuous variables were expressed as mean ± sd. Chi-square (χ^2) test or fisher exact test and independent sample “t” test were used to compare the outcome variables. P value of <0.05 was considered significant.

III. Results

During the study period of 18 months, total 234 preterm neonates were admitted, among them 94 neonates fulfill the criteria and enrolled, out of them 16 neonates were leave against medical advice (LAMA). So, finally data of 78 neonates were analyzed. Among 78 neonates, 52 (66.7%) neonates were transferred early to cabin or general ward with their mother and remaining 26 (33.3%) neonates stayed in NICU until discharge.

Mean gestational age and weight of the neonates were 30.9±2.5 weeks and 1262.1±172.2 gm of early transferred group and 31.4±2.5 weeks and 1286.9±194.7 gm of NICU stayed group. Mean age at the time of admission of both the groups were 3.4±2.4 days and 3.5±2.2 days respectively. All the baseline characteristics were similar in two groups (p>0.05) (Table 1).

Table 1: Baseline characteristics of the study participants (n=78)

Baseline characteristics	Early discharged Group (n=52)	NICU Stayed Group (n=26)	P value
Age (days) on admission	3.4±2.4	3.5±2.2	.913
Admission weight (gm)	1262.1±172.2	1286.9±194.7	.568
Gestational age (week)	30.9±2.5	31.4±2.5	.496

* Independent “t” test

Among the early discharged group occurrence of feed intolerance was significantly less than that of NICU stayed group (13.5% vs. 46.1%, p=.002). Also, development of respiratory distress was significantly less in early discharged group (15.4% vs. 38.5%, p=.023). No statistical differences were found (>0.05) between two groups in case of apneic attacks (15.4% vs. 30.8%) and requirement of oxygen (34.6% vs. 53.8%) (TABLE 2).

Table 2: Comparison of outcome of the study participants (n=78)

Outcome variable	Early transferred group (n=52) n(%)	NICU stayed group (n=26) n(%)	P value
Feed intolerance	7(13.5)	12(46.1)	.002*
Apnea	8(15.4)	8(30.8)	.113*
Oxygen requirement	18(34.6)	14(53.8)	.104*
Respiratory distress	8 (15.4)	10(38.5)	.023*
Mortality	1(1.9)	5(19.2)	.014 [†]
Duration of hospital Stay (day)	9.4±1.01	15.9±4.24	.000 [#]

*Chai square (χ^2) test; [†]Fisher’s exact test; [#]Independent “t” test

Two (3.8%) neonates of early transferred group were readmitted in NICU, one due to prolonged apnea and the other due to feed intolerance. Out of 2 readmitted neonates, one who developed prolonged apnea was expired.

Duration of hospital stay was 9.4±1.01 days in early transferred group and was 15.9±4.24 days in NICU stayed group; it was found that hospital stay was significantly less (p<0.05) in early transferred group. Overall, 1.92% (1/52) neonates of early transferred group died and 19.23% (5/26) neonates of NICU stayed group died. It was found that the mortality was significantly less (P<0.05) in early transferred group (Table 2).

IV. Discussion

One out of four VLBW infants dies in the first year of life; nearly all deaths (87%) occur in the neonatal period [2]. There has been gradual improvement in the survival of VLBW infants globally [8,9]. The survival rate of VLBW infants worldwide ranges between 43% in developing countries [10] to more than 90% in developed countries [11]. Outcome of VLBW infants also improving in Bangladesh due to increased survival of VLBW neonates mainly in tertiary level hospitals and in specialized hospitals. Hasan et al reported that 6.75% of admitted neonates were VLBW in a tertiary care Medical college hospital and among them 71.05% of VLBW neonate survived [12]. This study done in NICU of a private hospital and 78 VLBW preterm neonates were enrolled. We found that mortality rate was less in early transfer group than NICU stay group. Similar findings of overall improvement of survival rate was reported by Bhutta et al [7].

Efficient and high-tech neonatal care services in the form of either NICU or SCANU are needed to take care of preterm VLBW babies, which consume a significant proportion of health resources. Bangladesh is a developing country with limited health resources and high patient burden; it is not possible to provide full tertiary support to every VLBW infant. This study was conducted to find out the feasibility of taking care of VLBW babies outside the NICU before discharged to home. We found that taking care of physiologically stable preterm VLBW neonate is possible with the help of appropriately trained mothers.

Regarding discharge of preterm babies, a recent report from Canada revealed that about 50% of infants born at <34 weeks gestation usually transferred to the community hospitals before discharge to home. Bhutta et al reported that a stepdown unit was established in Aga Khan University Medical Center in Karachi, Pakistan, in September 1994, with mothers providing supervised all basic nursing care for their infants before being discharged [7]. In this study we trained the mother to provide nursing care outside the NICU in similar way.

Premature neonates are incapable of taking feed orally until a certain age to attain neuromuscular maturity to take full feeding by mouth, and this often leads to increasing the hospitalization period. Some of them, during their NICU stay, may have physiological stability but they still need special care for feeding by tube, which can be provided by the mother after an appropriate training [13] and outside of NICU in a cabin or ward staying with his/her mother. In this study, feeding intolerance was significantly less in the early transferred group. Similarly, Asadollahi et al found that feed intolerance occurred significantly less in stable preterm neonates who were discharged early with home gavage feeding after an appropriate training of parents [14].

This study found that the among the morbidities, respiratory distress was significantly less in early transferred preterm VLBW babies but apneic attack and requirement of oxygen was similar in two groups. Bansal A compared outcome of VLBW babies with data of developed country and found that morbidity among survivors were significantly less than that of developed countries [15].

We found only 3.8% neonates of early transferred group were readmitted in NICU. Similar rate of readmission to NICU was reported by Bhutta et al [7]. In this study, mortality was significantly less (P<0.05) in early transferred group. Soni A et al reported that early discharge of preterm <34week babies is possible without any increased mortality and readmission within the first month of life [16]. Regarding duration of hospital stay this study revealed that preterm VLBW neonates of early transferred group stayed in hospital 9.4±1.01 days, which was significantly less than that of NICU stayed group. This finding is similar to the finding observed by Bhutta et al [7].

V. Conclusion

This study found care of stable preterm VLBW neonates within hospital outside the NICU was associated with less feed intolerance and significant reduction of mortality and length of hospital stay. Such an approach may provide a cost-effective strategy for good outcome of preterm VLBW babies who need NICU care with limited resources.

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