

Neonatal Visits to the Pediatric Emergency Center and its Implications on Postnatal Discharge Practices in Qatar

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ABSTRACT

Background: An early discharge from postnatal policy has been practiced at Women's Hospital, Hamad Medical Corporation. **Aim:** This observational cohort study was conducted to evaluate the effect of early postnatal discharge practice on neonatal morbidity in the State of Qatar. **Setting and Design:** This is a data-based cohort study. All neonates ≤ 28 days visiting the Pediatric Emergency Centers (PEC) were evaluated for the need for re-hospitalization, referral for clinic appointments, or observation at the PEC setting. **Materials and Methods:** Differences in outcome rates were compared in neonates who visited in the first 24 hours postnatal discharge (2-3 days of life) and those who visited after the third day of life. **Statistical Analysis:** Crude differences in incidence rate assessed by χ^2 or Fisher exact test were applicable. **Results:** Of 3528 PEC visits for 1915 neonates, 1.7% required admission (3.1% of neonates), 8.4% were observed, 1.1% were referred to a clinic, and the remaining were discharged home. There was no significant difference in re-hospitalization rates of neonates visiting PEC in the first 3 days and those visiting at a later age (OR 0.78, 95% CL 0.19-3.23, $P=1$). However, early presentations to PEC was more likely to result in periods of observation (OR 1.88, 95% CL 1.17-3.04, $P=0.01$), or clinic referral (OR 4.96, 95% CL 2.16-11.38, $P=0.001$) when compared to older neonates. Moreover, those who presented early were significantly more likely to revisit any of the PECs with in the 28 days period (OR 3.20, 95% CL 2.17-4.97, $P<0.0001$). **Conclusion:** These results clearly demonstrate the need for a structured early post-discharge follow-up service that addresses the needs of all neonates and their families. The results, however, do not provide sufficient evidence that delaying postnatal discharges for apparently healthy neonates will provide significant health benefits to these neonates and their families.

Key words:

Neonatal morbidity, postnatal discharge, re-hospitalization

INTRODUCTION

The early discharge of a neonate from the postnatal unit continues to draw considerable controversy worldwide.^[1,2] With global financial constraints, the healthcare system is obligated to ensure the best utilization of the available resources and to review and cut down on expenses including prolonged unnecessary hospitalizations.^[3] However, discharging apparently health term neonates before 48 hours of age is associated with an increased morbidity.^[4-6] This includes a risk of jaundice, neonatal congenital cardiac, and gastrointestinal anomalies that may be expressed on the third day of life onwards. Further, as breast milk letdown may not be established until the third day of life, early postnatal discharge may negatively impact on proper and exclusive breast feeding practices. On the other hand, some studies have failed to find an association between early postnatal discharge and neonatal morbidity,^[7-9] and others view early postnatal discharge to be of some benefit particularly in improving maternal-infant bonding and paternal involvement.^[10]

The American Academy of Pediatrics (AAP) and American College of Obstetricians and Gynecologists (ACOG) defines early postnatal discharge as less than 48 hours of neonatal

age for a normal delivery and less than 96 hours for a cesarean section.^[11] If a less than 48 hour discharge policy is in place, the AAP further endorses proper evaluation before discharge and the scheduling of a follow-up appointment within 2 to 3 days after discharge.^[12] This post-discharge follow up may be conducted through a home visit system, clinic visit, or possibly by telephone. This strategy has been shown to be both safe and economically attractive. The Women's Hospital of Hamad Medical Corporation (HMC) has adopted the early postnatal discharge policy. In Qatar, parents may seek medical advice at 24 primary health care (PHC) centers distributed inside and outside

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Doha city. The centers, among other services, provide for both maternal and infant's periodic prenatal and postnatal visits. However, the first "well-baby" appointment to which parents are expected to attend coincides with the vaccination appointment scheduled at 2 month of the infant's age. Aside from the PHC centers, six Pediatric Emergency Centers (PEC) are utilized by many parents to reflect on any acute health-related concerns. Although both options are available, parents are more likely to present directly to PECs for urgent concerns. Moreover, those visiting the PHC centers and judged to have a significant concern are referred to PECs for further care. Neonates presenting to PECs with significant concerns are either observed in the center's observation wards for various length of time (may exceed 24 hours) or transferred to the pediatric department medical or surgical wards, or intensive care setting, or given further out-patient clinic appointment to a main hospital pediatric specialty clinic. As the Women's Hospital of HMC has adopted the early postnatal discharge policy, it was not clear if this policy has any impact on post-discharge neonatal morbidity.

This study was conducted in collaboration with the PEC administration to assess qualitatively and quantitatively the visits of newborns to the PEC during the first 28 days of life. The aim of the study is to understand if early discharge of healthy infants from the postnatal floor at less than 48 hours results in any significant infant re-hospitalization.

MATERIALS AND METHODS

The Women's Hospital of HMC in Doha (Qatar) is the main tertiary center for obstetrical and neonatal care. The facility offers a total of 334 beds to women and an 80-bed Neonatal Intensive Care Unit. The obstetrical department provides services to >15000 gravid women of all nationalities annually, constituting >95% of the national birth for the state of Qatar. Newborns delivered vaginally are assessed by the medical team at 24 hours of age and discharged to home before 48 hours if no concerns are noted.

This survey utilized information retrieved from all six PEC database which highlights the various medical conditions that result in PEC visits in the first 28 days as well as the management actions taken. The PEC visit data for November 1, 2009 to January 28, 2010 were analyzed. The crude data from the PEC was converted from Microsoft excel format to SPSS 18.0 (SPSS Inc). The data was further stratified into various organ/system(s)-specific diseases as designated by the PEC physicians. Neonates assigned more than one diagnosis per visit will be aggregated to a specific system on the basis of what was considered the most serious. Neonatal visits not assigned any diagnosis will be further analyzed by identifying other visits conducted

by the same infant. If a second visit is identified the same day for the same neonate, with a diagnosis provided, the diagnosis is considered to be the same for both visits. If the same neonate has made other visits in a different day the diagnosis will remain undetermined.

Demographics including neonatal sex, nationality, and age on presentation to PEC will be captured. Furthermore, the number of visits per neonate and the geographical distribution of patients among the different PECs in Qatar were also analyzed.

The main outcome for this study is the re-admission rate to the general pediatric medical/surgical ward or PICU and observation at the PEC. As all of our term healthy neonatal population are discharged home at <48 hours of age, high PEC visit rates within 24-48 hours of discharge (2nd to 3rd day of life) may be considered as a strong argument to extending the postnatal pre-discharge observation to 72 hours. With that in mind and as a secondary outcome, we analyzed the rate of PEC visits on the first 24-48 hours after discharge (2nd to 3rd day of life), with subsequent rates of referral to a pediatric specialty clinic, rates of PEC observation, and rates of multiple visits per individual infant.

The occurrence rates of the various outcomes were calculated as a percent of the total cohort. In addition, descriptive statistics were used for some of the collected variables. Crude differences in incidence rate were assessed by the Chi-square test or Fisher exact test. Comparisons with other international centres were made whenever possible.

RESULTS

Over the period of 3 months, 3528 PEC visits were recorded for 1915 neonates in less than 28 days of life (an average of 1176 neonatal visits/month). Thirty-two percent of all neonates visiting the six PECs were Qatari nationals and are considered the majority of the 46 various nationalities registered during the study period. A higher proportion of males (56.8%) were also noted as compared to females and the largest share of patients was seen at Al Saad PEC (67%).

The majority of visits seen at the various PECs were discharged home immediately (88.7%), observed in PEC (8.4%), admitted to pediatric floor (medical/surgical) or Pediatric Intensive Care (PICU) (1.7%), or referred to outpatient clinics (1.1%). Sixty neonates were admitted after their PEC visit; 1 of the 60 required hospitalization on two different visits to PEC during the 28 days of life. From the 61 admissions, 7 (11%) were to PICU and 5 (8%) to a surgical a surgical ward. The most common reason for

admission was bronchiolitis (31%) followed by suspected neonatal septicemia 23% and apnea/seizures 11% [Table 1].

A total of 146 visits were recorded for neonate in the first 3 days of life [Figure 1]. Only 2 of the 146 visits (1.4%) resulted in an admission to PICU or pediatric medical or surgical wards, whereas 59 of the remaining 3382 visits (1.7%) for neonates beyond 3 days of age required admission (OR 0.78, 95% CL 0.19-3.23, $P=1$) [Table 2]. However, 14% of neonates who visited the PECs in the first 3 days of life were placed under observation whereas only 8% of older neonates were observed (OR 1.88, 95% CL 1.17-3.04, $P=0.01$). Similarly, 5% of younger neonates were referred to an outpatient clinic compared to 1% of older neonates (OR 4.96, 95% CL 2.16-11.38, $P=0.001$). Furthermore, combining admission, PEC observation, and OPD referral, a significantly higher percentage of infants visiting the PEC in the first 3 days of life were recorded compared with those presenting beyond 3 days (20.5% vs. 10.9% (OR 2.02, 95% CL 1.37-2.98, $P=0.001$)).

Table 3 describes the differences in incidence rates of the various outcomes of the PEC visit (observed, admitted, or referred to outpatient clinics) in relation to the number of visits per individual infant. While no difference in admission rate was noted, it was clear that infants who have visited the PEC more than twice were significantly more likely to be observed in PEC or referred to outpatient clinic when compared to those who required less than three visits to PEC. Similarly, it was also noted that neonates presenting in the first 3 days of life to PEC are more likely to revisit the PEC within the neonatal period (70% vs. 42% (OR 3.20, 95% CL 2.17-4.97, $P<0.0001$)).

Jaundice accounted for the single most likely reason to visit the PEC (29%) followed by respiratory tract concerns (20.7%), and gastrointestinal and feeding concerns (12%). Eleven percent of PEC visits were considered healthy neonates [Figure 2]. In neonates visits recorded in the first 3 days of life, jaundice (52%) continued to be the number one reason to be seen [Figure 3].

DISCUSSION

Over the study period of 3 months, 3528 visits were registered in the PEC for neonates less than 28 days of life (an average of 1176 infant visits/month). Given an average monthly delivery of 1305 at Women's Hospital, the PEC visits seem to constitute 90% of the monthly deliveries. However, only 30.4% of the visits are single patient visits, 26.7% of the visits were attributed to infants visiting the PEC twice over the first 28 days of life, 15.4% were three visits/infant, 10% were four visits/infant, and 17.5% were five or more visits by the same respective infant. It is worth

Table 1: Admission diagnosis for neonates re-hospitalized after postnatal discharge

Reason for admission	Number 61 (100%)
Bronchiolitis	19 (31)
Neonatal sepsis	14 (23)
Apnea/seizures	7 (11)
Jaundice	5 (8)
Suspected congenital heart disease	3 (5)
Dermatological condition/skin infection	3 (5)
Urinary tract infection	3 (5)
Vomiting	2 (3)
Others	5 (8)

Table 2: Difference in decisions taken for neonates visiting the pediatric emergency center ≤ 3 days and >3 days

Outcome	Patients visited the PEC at ≤ 3 days of age N=146 (100%)	Patients visited the PEC at 4-28 days of age N=3382 (100%)	OR (95% CL)
Admission	2 (1.4)	59 (1.7)	0.78 (0.19-3.23)
Observed in PEC	21 (14.4)	277 (8.2)	1.88* (1.17-3.04)
Referred to OPD	7 (4.8)	34 (1.0)	4.96* (2.16-11.38)
Discharged to Home	116 (79.4)	3012 (89.1)	0.48* (0.31-0.72)
Had >2 subsequent PEC revisits	102 (70)	1420 (42)	3.20* (2.17-4.97)

* $P<0.05$; PEC – Pediatrics emergency centers

Table 3: Difference in decisions taken for neonates with ≤ 2 visits to the pediatric emergency center and those with ≥ 3

Outcome in respect to frequent PEC visits	Infants with 1-2 visits (%)	Infants with ≥ 3 visits (%)	OR (95% CL)
Admitted	19.7	16.9	0.83 (0.42-1.66)
Observed in PEC	14.7	50.4	5.89* (4.46-7.78)
Referred to outpatient clinic	18.6	67.5	9.11* (4.66-17.84)

* $P<0.05$; PEC – Pediatrics emergency centers

noting that there was one infant who has visited the PEC 12 times during the study period. A good proportion (89%) of these visits was seen and send home immediately; however, the remainder were either admitted to a general pediatric medical or surgical word, pediatric intensive care unit, observed in PEC, or referred to a pediatrics outpatient clinic service.

According to a WHO report 1998, it is not necessary that women and newborns be cared for in the hospital. This was in keeping with worldwide trends to deliver healthy women at home.^[13] As postnatal care developed many mid to high income countries shifted to hospital deliveries with variable postnatal length of stay reaching as high as 6-10 days after

birth.^[14,15] Over the past three decades, the postnatal length of hospital stay has been gradually reduced to 2 days or less.^[16] With declining length of postnatal hospital stay concerns with increasing re-admission rates, increased severity of jaundice and risk of missing heart defects emerged.^[17-19] The Women’s Hospital of HMC has adopted a short postnatal length of stay of 24-48 hours for normal vaginal deliveries and 72-96 hours for cesarean sections. This is similar to the mean length of stay for healthy, vaginally delivered, and routinely discharged infants in California which was 1.1 days.^[5]

In this study, a 3.1% of 1915 infants visiting the PEC were re-hospitalized in the first 28 days of life (1.7% of all visits). In UK, the re-hospitalization rate was estimated at 2.8% of newborns and was due to infections, “colic” feeding problems, and jaundice. However, these rates were not significantly different from those for babies who received longer postnatal hospital care. Although the longer postnatal care was more likely to be provided to newborns with some risk (low birth weight, borderline preterm, etc), in the author’s opinion, re-hospitalization rates after postnatal discharge were less likely to be solved with extending the postnatal hospital stay.^[15] Sweden was similar with a re-hospitalization risk estimated to be 1.7% when discharged early.^[16] In the USA, the odds risk of re-hospitalization was estimated to be 1.3.^[20,21] In a RCT of two different follow-up strategies, Escobar *et al.*^[22] identified 25 infants (1.4%) who were re-hospitalized in the first 10 days of life out of 1748 healthy low-risk vaginally delivered mothers in a hospital in California. Although the study was not formulated to address the reasons for re-admission, the authors noted that infections could not have been prevented by extending postnatal hospital stay. Another study of 926 low-risk vaginally delivered infants discharged at less than 48 hours identified 27 re-hospitalizations (2.9%) within the first 2 weeks of life.^[23] This rate was is in keeping with our rates of re-admission to a pediatric hospital ward or PICU and was within the range of several studies.^[24-26] Moreover, Liu *et al.* found a 22% increase in re-hospitalization rate in the 28 days of life if infants are discharged at less than 30 hours of age.^[21] However, if our PEC observation is included with in the definition of hospitalization in this cohort, nearly 10% of all PEC visits were re-hospitalized. This is approximately three times the rate noted in different countries [Table 4].

In this study, we assessed the relative difference of re-hospitalization if the neonate presented in the first 3 days of life and after. We hypothesized that longer hospitalization >48 hours may potentially reduce the rates of re-admissions. Neonates seen in the PEC in the first 3 days of life were more likely to be observed or referred

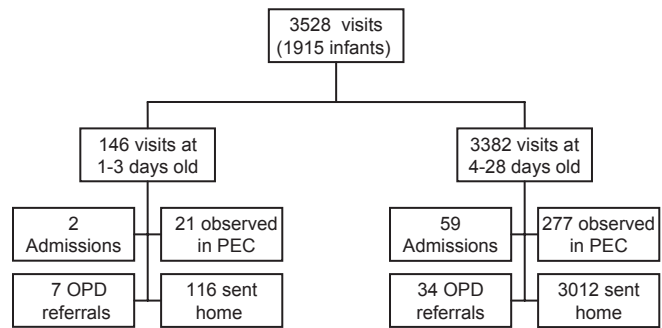


Figure 1: Outcomes for neonatal visits to pediatric emergency centers in Qatar over a 3 month period

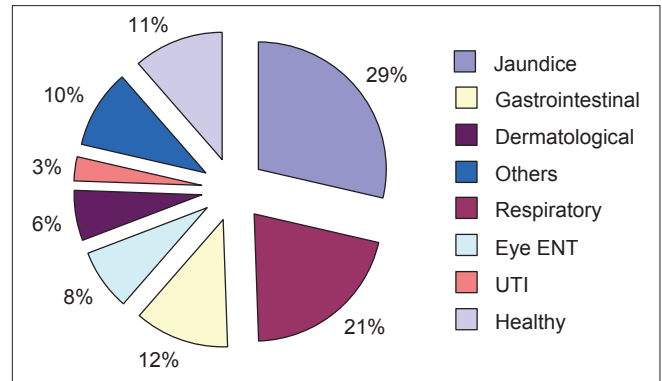


Figure 2: Diagnosis on discharge from pediatric emergency centers for total cohort

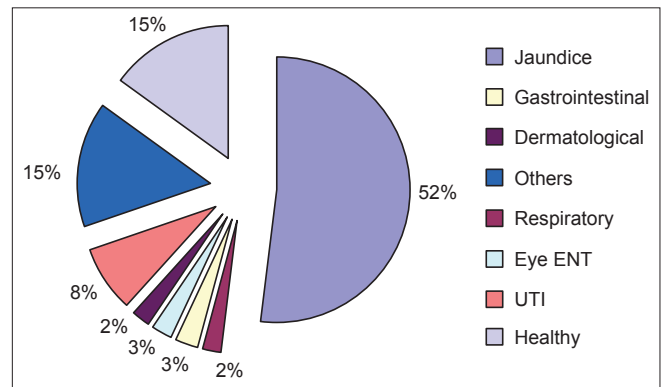


Figure 3: Diagnosis on discharge from pediatric emergency centers for neonates presenting in the first 3 days of life

Table 4: Re-hospitalization rates different studies

Author	Country	Postnatal stay	Re-hospitalization (%)
Oddie <i>et al.</i> ^[15]	UK	<2 days	2.8 up to 1 month of age
Johansson <i>et al.</i> ^[16]	Sweden	<24 hours	1.3
Escobar <i>et al.</i> ^[22]	USA	<2 days	1.4 up to 10 days
Lieu <i>et al.</i> ^[23]	USA	<2 days	2.9 up to 2 weeks
Danielsen <i>et al.</i> ^[5]	USA	<24 hours	3.6
		<2 days	3 up to 28 days of age
		≥2 days	3
HMC	Qatar	<2 days	3.1 (1.7 of visits) up to 28 days of life (10 including PEC observations)

HMC – Hamad Medical Corporation; PEC – Pediatrics Emergency Centers

to an outpatient clinic in comparison to those presenting after 3 days of life. However, in this study the rate of admission to a hospital pediatric ward or PICU was not significantly different between those who presented before or after 3 days of life. Again if the observation is considered as a form of re-hospitalization, then a 5.5% risk is added to early discharges (OR 1.69, 95% CL 1.07-2.68, $P=0.02$).

Is the re-hospitalization rate dependent on the early discharge from hospital? This is clearly a difficult question to answer. Looking closer into the reasons for admission we find more than half of the total cohort is admitted due to bronchiolitis or neonatal septicemia. For those who presented to PEC early (less than 3 days), sepsis was the reason for admission and jaundice was the main reason for PEC observation. Danielsen *et al.*^[5] noted that jaundice was the condition most often diagnosed as a cause contributing to re-admission (12.2%).

Based on our data, a total of 23 infant visits were either observed or admitted. If we consider those to be avoidable, by extended postnatal stay to 72 hours, 83 babies will be unnecessarily hospitalized to identify 1 baby with a potential concern. Studies have shown early discharge to be cost-effective but the safety component pivots on the availability of post-discharge follow-up plans.^[3,27] Moreover, these post-discharge strategies in combination with early discharge are welcomed by families of newborns.^[16] Although the AAP has recommended that all infants discharged early should be followed up within 48 hours, this was not appropriately practiced in the USA.^[28] Despite the availability of published studies on early discharge of infants, reviews of this literature demonstrated methodological concerns with patient selection, sample size, comparisons with controls, and limited outcomes to death and re-admission, and paucity in information pertaining to care offered on post-discharge follow up.^[29,30] Similarly, this database study is limited by the paucity of important clinical information which could better clarify the reasons for admission or observation.

In conclusion, this study has demonstrated a clear need for a well-structured setup for periodic health supervision of all newborns in the immediate post-discharge period. These visits will be important to providing the necessary support for neonates and their families and in promoting optimal physical, emotional, and intellectual growth and development. Such health care measures include routine immunizations to prevent disease, screening procedures for early detection and treatment of illness, and parental guidance and instruction in proper nutrition, accident prevention, and specific care and rearing of the child at various stages of development.

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