INTRODUCTION

The optimal duration of hospital stay after a normal delivery remains unknown despite extensive research. A consensus in this matter is lacking, and the practice of variable policies is a ground reality. The “Newborns' and Mothers' Health Protection Act” mandating insurance cover for 48-hour hospital stay for the infant and mother following a normal delivery was passed in the USA in 1996. Since then, numerous studies have been published in the USA both favouring the utility of a 48-hour hospital stay after birth and advising against it. Similar variability is evident in a study conducted in the UK. One of the primary points of contention in these studies has been the effect of hospital stay on subsequent readmission of the neonate within 28 days of birth. With global economies in recession, every possible effort is being made to decrease hospital readmissions to the minimum; in recent times, the authorities in the West are penalizing hospitals where readmission rates are higher than expected, though with various repercussions.

No study has assessed the impact of the length of post-delivery hospital stay on the rate and etiology of neonatal readmissions in Saudi Arabia; moreover, no uniform policy is practiced in this regard. Normal newborns delivered vaginally are discharged early (within 48 hours), while those delivered via caesarean section had longer hospital stays (mean length of stay: 1.1 and 2.8 days, respectively). There were 166 readmissions, wherein the leading cause was neonatal sepsis (37.3%) followed by neonatal jaundice (26.5%). The readmission rate in early discharged (142 out of 9927) was significantly higher (p = 0.017) as compared to newborns who were discharged late after birth (24 out of 2801). Etiology of readmissions was not affected by discharge timings.

Conclusion: Hospital discharge of neonates within 48 hours after delivery is counterproductive and significantly increases the risk for hospital readmission during the neonatal period. The pre-dominance of sepsis-related cases observed here indicates the need to explore its causes and determine an optimal prevention and management strategy.

Key Words: Readmissions. Normal newborns. Early discharge. KSA.
on the rate and etiology of hospital readmissions during the neonatal period.

**METHODOLOGY**

This cross-sectional study included all the normal newborns delivered in King Abdulaziz University Hospital (KAUH), Jeddah, Saudi Arabia, from October 2008 to September 2011. Normal newborns were defined as neonates born at full-term, with normal weight and no antenatal or perinatal problems. Mothers with a history of preterm or multiple births and infants with Intrauterine Growth Retardation (IUGR), congenital malformation(s), birth asphyxia, and respiratory distress were excluded from the analysis.

Data were collected from the Discharge Abstract Database of KAUH. Data collected for initial hospitalization at birth included the mode of delivery, parity, gender, gestational age, weight, singleton status or otherwise, any maternal or infant factors influencing the risk for readmission, and length of hospital stay. Data collected related to readmission included diagnoses, age at admission, gender, parity, mode of delivery, and length of stay. Patient diagnosed were coded according to the ninth revision of the International Classification of Disease (ICD-9). Neonates with ICD-9 V codes were also excluded from the analysis as these represent planned admissions for specific treatments.

Early discharge (ED) was defined as discharge from the hospital before completion of 48 hours of birth, and late discharge (LD) was defined as discharge after 48 hours of birth.

The data was analyzed on Minitab 16. The quantitative variables like age and hospital stay are expressed as mean ± SD and qualitative variables like etiology, types of discharge, and number of readmissions, are represented by frequencies and percentages. The Chi-square test was applied to calculate significance and p ≤ 0.05 was considered statistically significant.

**RESULTS**

Overall, 12,728 normal newborns delivered in the hospital during the study period fulfilled the inclusion criteria. Out of these, 78% (9,927) were delivered via vaginal deliveries and 22% (2,801) were delivered via caesarean section. The infants included 6,431 males (50.5%) and 6,297 females (49.5%). As per hospital policy, the normal newborns delivered vaginally were discharged along with the mothers once they had urinated, passed meconium, achieved stable vital signs, showed no problems in feeding had undergone routine metabolic screening, and administered vitamin K and Hepatitis B vaccine. The mean length of stay (LOS) in these newborns was 1.1 days. All normal neonates born via caesarean section were discharged within 48 hours of birth, fulfilling the definition of ED.

Infants born via caesarean section were discharged mostly on the third day, along with the mothers; the mean LOS was 2.8 days in this group. All infants in this group were discharged after 48 hours of birth, thus fulfilling the definition of LD.

Out of these normal newborns, there were 166 readmissions within 28 days of birth, with a readmission rate of 1.3%. Figure 1 shows the characteristics of the neonates who required readmissions. The leading cause of hospital readmission was neonatal sepsis. A detailed analysis is shown in Table I.

Relationship of discharge timings with the etiology of readmission is shown in Table II. Discharge timings had no significant effect on the etiology of readmission.

Overall, 65 (39.2%) neonates were admitted during the first week after birth, i.e., age ≤ 7 days. In this group, 27 (41.5%) had neonatal jaundice and 21 (32.3%) had neonatal sepsis. Further, 101 (60.8%) patients were admitted after the first week of life. In this group, 41 (40.6%) had neonatal sepsis and 17 (16.8%) had neonatal jaundice.

Out of the 9,927 newborns who received ED, 142 (1.45%) were readmitted, while out of the 2,801 neonates who received LD, 24 (0.81%) required readmissions. The readmission rate in early discharged was significantly higher (p = 0.017) as compared to newborns who were discharged late after birth (Table III).
observed in other related studies. In contrast to the results, an American study showed a readmission rate of only 0.8%. The relatively low rate of neonatal readmissions observed in the present study was partially attributed to the fact that only full-term normal neonates with normal weights were included and all neonates with any abnormalities were excluded as such patients were already at an increased risk of readmission. Another reason for the low rate of readmission in the present study could be that some newborns may have been readmitted to hospitals other than KAUH. Despite the relatively low readmission trend, such readmissions place an overall burden on the health system due to the acute shortage of hospital beds in KSA, as mentioned earlier. Further, the disturbance experienced by each individual family due to neonatal readmission is also an important factor.

Sepsis was noted to be the leading cause underlying readmission in the present study. In several studies, neonatal jaundice has been observed to be the most frequent reason for readmission. In fact, many strategies have been adopted for reducing neonatal hyperbilirubinemia so that readmissions related to this etiology can be curtailed and the concept of home phototherapy was a part of this strategy. The reason for the predominance of sepsis-related cases in the present study could be the un-preparedness or poor handling of the newborns at home by mothers and the family. Simple basic hygienic measures such as frequent hand washing can save scores of newborns from exposure to potentially dangerous infections. Although the role of prenatal and antenatal education cannot be undermined in this context, in researcher’s experience, mothers and families are most receptive to advice after the arrival of the newborn, particularly on day 2 after delivery. Exhaustion, excitement, visitors, phone calls, etc., on day 1 after delivery hampers any meaningful educational interaction between the mother and health providers, including doctors and nurses. Researchers have documented a marked reduction in cognitive function in mothers on the first day after birth using standardized tests. Such mothers cannot reliably integrate the information given to them by doctors/nurses, which can influence the infant’s well-being. The researcher believes that it is on day 2 that mothers and families are fully primed and eager to learn.

Rather than a casual conversation that typically forms the basis of such interactions, this study recommend the initiation of a structured, well-prepared and practiced, standardized effort comprising verbal as well as printed instructions for infant care. The pediatrician should be the first point of contact for this interaction, aided by the nursing staff, with contributions from the obstetric side. All aspects of neonatal care should be covered and all queries answered during the session. This is only possible if the infant and mother remain in the hospital on day 2 after delivery, thereby necessitating hospital discharge on completion of 48 hours rather than as soon as the baby/mother are stable. This second-day education of the mother and family is extremely important in the absence of any mandatory follow-up visit. Compliance is usually poor for such follow-up; moreover, proper effective teaching in the out-patient environment is typically difficult. In many countries such as UK, a home visit by lady health-workers at 48 hours after discharge is a good alternative and is extremely productive both for providing education and support to the mother as well as for examining the infant for general well-being, especially to rule out pathological jaundice. Due to multiple reasons, such a program of home visits by trained lady health-workers in the immediate postpartum period is not possible in KSA and in many other countries, at least in the near future. Therefore, the importance of a full second-day stay of both the mother and the baby in the hospital is essential.

The negative effect of ED on the establishment of breastfeeding has been documented in many studies. In a recent study, mothers with ED but who received 2 – 3 home visits by healthworkers were compared with mothers who received education regarding neonatal care in the hospital by delaying discharge to after 48 hours of birth. At 3 months after delivery, 74% of the newborns in the first group were receiving exclusive breastfeeding whereas 93% of babies in the second group were on exclusive breastfeeding. In setups where no home visit services are available, the negative impact of ED on the establishment of breastfeeding is thus compounded and enormous.

Researchers have recommended the use of a comprehensive discharge-readiness checklist that can help the hospital team to decide the fitness of the newborn and mother for discharge. Such a team is headed by a pediatrician, with inputs from obstetricians.
and the mother. Feedback from mothers is included as they have their own perception of readiness for discharge.\textsuperscript{23} One of the main factors included in this checklist is related to breastfeeding. It covers the mothers’ physical and mental readiness to feed and the infants’ ability to co-ordinate sucking, swallowing, and breathing while feeding. It also evaluates the mother's knowledge, ability, and confidence to provide adequate care for her infant. Based on these factors, the researchers have recommended hospital discharge of vaginally delivered normal neonates after 48 hours of birth but not later than 72 hours.\textsuperscript{22}

Studies have shown that pregnant women have a high incidence of Group-B Streptococci (GBS) colonization in the birth canal, which can predispose the newborn to infections leading to sepsis.\textsuperscript{24} Screening for GBS in mothers can be helpful in reducing the risk of neonatal sepsis. Mothers are tested between 35 – 37 weeks of pregnancy for GBS and if positive, they are administered intravenous antibiotics at the start of labor.\textsuperscript{25}

Considering the predominance of sepsis as the leading cause of readmission in neonates, implementation of a GBS screening program is expected to be very beneficial.

**CONCLUSION**

The “Early Discharge” policy applied in KAUH and similar hospitals does not provide adequate time for health providers to effectively teach and for mothers to adequately learn the processes involved in optimal care of their newborns. A mandatory hospital revisit at 48 hours after discharge is not being practiced in KSA, and a program of home visits by trained health visitors is not possible in the near future. Considering these factors, it is recommended that all normal neonates born vaginally should be discharged after completion of 48 hours after birth. A structured, well-practiced effort should be initiated during this period to teach and guide the mother regarding all the aspects of care of the infant as well as the mother herself. A discharge-readiness checklist should also be used. In view of the high incidence of sepsis in the current study in readmission group, it is also recommended that there should be a mandatory screening of all mothers for GBS in KSA.

**REFERENCES**


