Maternal Post natal Hospital Readmission-Trends and Association with Mode of Delivery

Abstract:

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Abstract
The aim of this study is to examine the trend in maternal postnatal readmission within six weeks of discharge from childbirth hospitalisation. It is a retrospective review of the maternity computer records system, patient's clinical notes and HIPE data base. All women who delivered babies weighing >500g and/e 24 weeks gestational age at Our Lady of Lourdes Hospital, Drogheda, Ireland from 1st January 2005 to 31st December 2008 who were re-hospitalised within six weeks of discharge from hospital following child birth were included in the study. A total of 15782 women were delivered over the four year study period. Of these, 236 were readmitted. A series of chi-square analysis were conducted to assess the difference in readmission rates between the year 2008-86(2.03%) and the years 2005-51(1.46%), 2006-39(1.01%) and 2007-60(1.42%). The readmission rate was found to be significantly higher in 2008 compared with the three preceding years. Complications of Caesarean section and secondary postpartum haemorrhage following spontaneous vaginal delivery constitute the major indications for readmission.

Introduction
Maternal post partum readmission represents an undesirable obstetric outcome. It signifies a deviation from the normal course of postnatal recovery [1-7]. It is therefore an indicator of maternal morbidity. Readmission to hospital following delivery disrupts mother-baby bonding and increases the cost of maternity care. It also confers a psychological burden on the woman, as she has to be separated from the family unit. Earlier studies have identified factors such as reduced length of initial postnatal hospital stay, mode of delivery, prenatal maternal morbidity as some of the factors associated with maternal postpartum readmission. This study looks at the trends in postnatal readmission within six weeks of discharge following childbirth hospitalisation over a four-year period (2005-2008) at Our Lady of Lourdes Hospital, Drogheda, Ireland.

Methods
We studied those women discharged from the postnatal ward and readmitted from the 1st of January 2005 to 31st December 2008. These patients were identified from the HIPE database, the maternity computer record system and from the discharge records kept on the postnatal ward. All women delivering babies weighing >500g and /or e24weeks gestational age were included. Information on demographic details, ethnicity, method of delivery, level of experience of personnel attending the delivery, immediate complications at the time of delivery, length of post natal stay, indication for readmission as well as the treatment received upon readmission were obtained from the case notes and the computerized hospital record system. These were displayed on a spreadsheet for analysis. Readmission rate per number of deliveries for each year was computed and we then applied the chi square test to determine whether there was a significant difference in readmission rate for successive years. We assessed the association between method of delivery and maternal readmission as well as the specific diagnosis assigned at the time of readmission for each method of delivery. The frequency of each principal diagnosis for all readmitted cases was determined. These were classified into secondary post partum haemorrhage, perineal wound infection, caesarean section wound infection, other infections (such as urinary tract infection, mastitis, and gastroenteritis).

Note: (a) chi-square reflects comparison with 2008 in readmission rates

Results
A total of 15782 women were delivered over the four- year study period [5]. Of these, 236 were readmitted. A series of chi-square analysis were conducted to assess the differences in readmission rates between the year 2008 and the years 2005, 2006 and 2007. These yearly comparisons were done separately for spontaneous vaginal delivery (SVD), instrumental delivery (ID) and caesarean section (CS). The total yearly readmission rates for spontaneous vaginal delivery, instrumental delivery and caesarean section were also compared. Within the year 2008, the difference in readmission rates per method of delivery was compared. The 0.5 alpha levels were used to determine significance. The chi-square related to each method of delivery is also presented separately. Analysis of data was done using the SPSS. We identified the various indications for readmission in 2008 and compared them with preceding years.

Note: (a) chi-square reflects comparison with 2008 in readmission rates

Caesarean Section Delivery
Table 2 represents the readmission rates for CS deliveries by year and the chi-squares that reflect each year in comparison to 2008. All of the chi-square analyses were significant (all P-values < .05). In each case, the readmission rate for 2008 was greater than the comparison year. This indicates that the readmission rate for patients who were delivered by caesarean section was greater in 2008 when compared to the three preceding years.

Note: (a) chi-square reflects comparison with 2008 in readmission rates

Spontaneous Vaginal Delivery
Table 3 represents the readmission rates for spontaneous vaginal delivery by year and the Chi-squares that reflect each year in comparison to 2008. An inspection of this table reveals that all of the chi-square analyses, with the exception of the comparison with 2007, were significant (all P-value < .05). Again, in each case the readmission rates for 2008 was greater than the comparison years. This indicates that there is evidence to conclude that the readmission rate for patients who were delivered via SVD was greater in 2008 when compared to 2005, 2006 and when 2005, 2006 and 2007 were combined.

The table indicates the number of patients diagnosed with each of the above postnatal complications.

Readmission Rates by Type of Delivery in 2008
Review of the readmission rates for each type of delivery in 2008 and the chi-squares that reflect the comparison between the rates by each type of delivery reveals that the readmission rate following caesarean sections was greater when compared to those following both spontaneous vaginal delivery and instrumental delivery ($p < .05$). However, there was no difference in the readmission rate for instrumental delivery and spontaneous vaginal delivery ($p > .05$).

Indication for Readmission
Table 4 represents the indication or diagnosis assigned to patients on readmission, which are related to caesarean section delivery. There is a clear evidence of an increase in readmissions in 2008 as a result of complications of caesarean section.

Discussion
This retrospective study examined the trend in postnatal readmission over four years at Our Lady of Lourdes Hospital, Drogheda. As far as we know, this is the biggest study of this type in the UK and Ireland. All women who were delivered by CS had intrapartum antibiotics. Our overall readmission rate is 1.5% which is relatively lower than the rate of 1.8% reported by Liu and Kramer in a Canadian population based cohort study 1997-2001 [3], but higher than rate of 1.2% reported by Lyndon-Rochelle and Holt in their study of deliveries in the State of Washington between 1987 to 1996 [4]. Critically, our readmission rate for the years 2005, 2006 and 2007(1.46%, 1.01% and 1.42%) compare favourably with both the Canadian and the American studies [3,4]. However, there was a significant increase in our yearly readmission rate for the year 2008(2.03%), which is higher than the overall rate in the aforementioned studies. This was as a result of the significant increase in the number of women readmitted following CS in 2008 and those readmitted with secondary post partum haemorrhage.

Conversely, we recorded a lower readmission rate following instrumental deliveries compared with either spontaneous vaginal delivery or caesarean section; the readmission rate of 1.3% in this group is the same as reported in the US study. Complications of caesarean section (majorly wound infection and pelvic collection) and secondary postpartum haemorrhage after vaginal

delivery are the major indications for postnatal readmission in 2008. There is a significant increase in the number of patients readmitted with a pelvic collection following caesarean section. This is 50% higher than what was recorded for the three preceding years combined. Similarly, the number of caesarean section wound infections recorded in 2008 was noted to be almost equal to the total number recorded for the 3 preceding years. Patients readmitted for secondary postpartum haemorrhage were delivered mainly via spontaneous vaginal delivery. Majority of these were however discharged home one day after re-hospitalisation. Even though caesarean sections rates during the period of study were comparable, the number of patients readmitted with postnatal morbidity particularly infectious morbidity following caesarean section is significantly higher in 2008.

Some of the suggested measures in the literature that can bring about a reduction in readmission rate include careful patient assessment before proceeding to caesarean section [8]. It is also important that high-risk cases (such as obese patient, second stage caesarian section and multiple pregnancies) are identified and such cases should be performed by the most senior obstetrician or under his or her direct supervision. Careful attention to haemostasis at the time of caesarean section and use of intra-abdominal drain when indicated will reduce the likelihood of complications such as pelvic collection. Increased level of consultant presence on the labour ward will improve intra-partum care thus preventing avoidable caesarean sections. This will consequently reduce the number of re-admissions following this procedure.

Majority of the women readmitted as result of secondary PPH could have been managed on outpatient basis. The most senior obstetrician on site should endeavour to review these patients at the time they present in the emergency room. At this stage appropriate investigations such as pelvic ultrasound scan, can be instituted, definitive diagnosis can be made and management plans can be outlined. Such women who have no need for surgical uterine evacuation or intravenous antibiotic therapy can be discharged home immediately and followâ up plans highlighted. Regular audits and introduction of obstetrician performance feedback on postnatal readmission rate particularly with respect to readmission following wound infection has been proven to be effective in bringing about a significant reduction in the rate of postoperative infectious morbidity [1].

In conclusion, there was a significant increase in readmission rate in 2008 compared with the three preceding years. Complications of caesarean section are largely responsible for most of the cases of re-hospitalisation following postnatal discharge. Attempt should be made to identify patients at risk of complication and senior obstetric staff should be involved in their care. Review of technique for caesarean section particularly among trainee obstetricians and introduction of performance feedback on readmission for all obstetricians particularly with respect to postnatal infectious morbidity1 are suggested measures to stem the rise in postnatal readmission rates in our Obstetric unit.

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Comments: