Improving quality of clinical coding of post-partum haemorrhage: the process and its effects on reported incidence rates in a New Zealand hospital maternity service

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ABSTRACT

**AIM:** The Waitemata District Health Board (DHB) aimed to investigate and improve the accuracy of its reporting of post-partum haemorrhage (PPH), to understand its true incidence.

**METHOD:** The quality improvement project included multidisciplinary collaboration between maternity clinicians and clinical coders, substantive redesign of the Waitemata DHB’s birth documentation form, systematic auditing and follow-up of clinical documentation by a dedicated quality midwife, linking of maternity clinicians to a key designated senior coder and ongoing PPH incidence monitoring and staff education.

**RESULTS:** The coded rate of PPH has risen dramatically and is now in line with expected Australasian incidence levels. A corresponding increase in the value of cost-weighted discharges (estimated at $544,000 for the 2015/16 financial year) was realised as a result of the more accurate reported incidence.

**CONCLUSION:** This case illustrates the value of coding to a clinical service and the importance of clinical leadership and engagement in achieving successful and sustainable service redesign initiatives. It provides an example of how to evaluate and update coding and a process for changing the way clinicians and coders work that could benefit other services in Waitemata DHB as well as in other New Zealand district health boards.

Postpartum haemorrhage (PPH) is considered the leading cause of maternal mortality worldwide and remains one of the major causes of pregnancy-related death and morbidity in the Western world. Definitions of PPH around the world vary, as do methods of calculating blood loss. In Australia and New Zealand, PPH is commonly defined as blood loss of 500 millilitres (mL) or more following vaginal delivery, or 750mL or more following caesarean section. ‘Primary PPH’ occurs within the first 24 hours after delivery, while ‘secondary PPH’ describes blood loss occurring between 24 hours and six weeks post-partum. Although the majority of PPH is caused by uterine atony and is often unpredictable, a past history of PPH is a risk factor. An Australian study of 125,295 women found that women who have had one PPH have a three-fold increased risk of PPH in their next pregnancy. After two consecutive PPHs, the risk...
climbs to four-fold for a third consecutive PPH. Even women who have PPH in a first pregnancy followed by a second pregnancy without PPH, have approximately double the risk of PPH for their third pregnancy. Thus, it is important to document and code PPH accurately, so that staff can put into place preventive measures for those at risk and manage patients accordingly. At a national level, accurate coding ensures quality information is available for casemix, research, health service planning, evaluation and funding.

Every inpatient and day stay patient discharged from a New Zealand public hospital has their clinical notes coded and recorded in the hospital's patient management system. Coding is performed by the district health board’s (DHB) clinical coding team, who read the patient's hospital record from admission through to discharge and translate the diagnoses, injuries, procedures and treatments received into health classification codes. Whether the coded summary is an accurate reflection of the patient's hospital admission depends on the accuracy of documentation in the hospital notes by the patient's clinicians. Clinical coders cannot infer diagnoses from the clinical notes. Certain conditions, including PPH, require particular terminology to have been documented by the clinician in order for the condition to be coded. For example, a coder cannot independently assign a code for PPH unless a clinician has documented the term “PPH” in the notes. This principle applies regardless of whether the coder can see documentation of an estimated blood loss at delivery of more than the cut-off levels for PPH.

At a workshop run by the Health Roundtable (HRT), Waitemata DHB presented their rate of PPH as 4–6%. This was significantly lower than the average rate of 12% for other services represented at the HRT (including the HRT data for WDHB). An investigation of the discrepancy between PPH rates in the clinical documentation and coded data indicated under-coding. A process of operational research and quality improvement was launched. It aimed to investigate and improve the accuracy of documentation and coding of PPH in the maternity service at Waitemata DHB. Specific objectives were to: a) audit the standard coding practice; b) audit clinical documentation; c) develop and implement a new process for documenting and coding PPH; d) determine whether the intervention had an effect on reported rates and on funding received; and e) describe the process and record the lessons learned.

Methods

Setting

The majority of deliveries at Waitemata DHB are performed by independent Lead Maternity Carers (LMCs) rather than WDHB staff midwives or doctors. Prior to August 2014, the clinical documentation of a woman's labour and delivery was completed by hand by the clinician using Waitemata DHB standard Labour and Birth Summary form. Information contained on the form was then entered into Waitemata DHB’s Healthcare programme, an electronic patient record platform, by an administrative staff member. The Healthware records are then used by clinical coders to assign the relevant clinical codes.

Audit design and analysis

The audit was conducted in early 2014 by a public health physician and quality improvement midwife. They compared the two sources of data (clinical information collected in Healthware a clinical management system and the coded data captured in the patient management system (iPM)) related to PPH for the period July to December 2013. From Healthware's clinical information, the following variables were audited: estimated blood loss; postpartum haemorrhage; PPH prophylaxis; timing of blood loss; and risk factors. From the coded data in iPM, we ascertained the percentage...
of women who were coded as having had a PPH out of those who gave birth in this six-month period.

The change process and measure of effects

The process for changing the way of working on PPH documentation and coding was initiated in February 2014. The process was led by the public health physician and involved the quality improvement midwives, senior medical officers, clinical midwives and coding staff.

The group identified deficiencies in the existing Labour and Birth Summary form and clinical documentation. The group redesigned the form to incorporate a separate section for PPH in line with the coding requirements for the condition. This new section definitively identifies PPH, preventive interventions and treatments (Figure 1). The new form was implemented in August 2014.

A list of changes achieved and the innovations developed and successfully implemented are presented in Table 1.
In conjunction with the review of the data capture processes and form redesign, an initial analysis of cost weights was also undertaken to determine whether there had been an increase in the funding that is based on the percentage of PPH per total births. The percentage of PPH events, stratified by type of delivery, was calculated for the financial years 2013/14 (pre-intervention) and 2015/2016 (post-intervention). The proportion of birth events in higher cost-weight DRGs was calculated. The value of the increase in costweight was estimated by applying the 2015/2016 national price (dollar value) to the increase between the two periods.

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<th>Change achieved</th>
<th>Innovations in the new PPH process</th>
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| Redesign of the Labour and Birth Summary form | • A six-month collaborative process between clinicians and coders produced a new form which requires the clinician to tick a Yes or No as to whether a primary “postpartum haemorrhage” occurred, and to record “PPH Treatment” and “PPH management” in a separate section on the form, distinct from “PPH prophylaxis” (refer to Figure 1 above).   
  • The change in documentation was accompanied by extensive education of LMCs, staff midwives and clerks by the Waitemata Quality Midwives. |
| Strengthened clinical accountability for documentation | • Labour & Birth Summary forms are audited by a dedicated quality midwife and senior doctors.  
  • Any incorrect or incomplete forms are sent back to the clinician responsible for completion and educative feedback is given.                                                                                     |
| Improved accuracy of PPH diagnosis by clinicians | • Delivery suite recommendations are made to LMCs to bag and weigh all sheets and liners in order to estimate blood loss more objectively.  
  • Scales are now available in every delivery room along with information on the dry weights of linen and disposable sheets to facilitate weighing blood loss.                                      |
| Improved identification of women at future risk of PPH | • Diagnostic coding of PPH creates an alert on the patient’s electronic medical record should she re-present to maternity services for subsequent pregnancies.                                                            |
| Ongoing education and communication established | • A one page information newsletter is sent out electronically to all clinicians and LMCs at WDHB. It reaches people who may not learn of new procedures otherwise. For example, resident medical officers, and private LMCs. |
| Ongoing monitoring by a maternity public health physician | • HRT Australasian Healthcare Evaluation Data is used as a benchmark for monthly monitoring of WDHB PPH rates. Monthly feedback is provided to clinicians and coders.                                                                                      |
| Two-way communication established between coders and clinicians | • One advanced coder is assigned as the key link for maternity clinicians. Regular feedback is provided.                                                                                                            |
Results

2013 audit of PPH rates and standard birth form design

The audit identified PPH rates of 16% in Healthware and 4–6% in iPM. Analysis of the Labour and Birth Summary forms revealed major issues with the way the forms were being completed by the LMCs.

Key diagnostic terminology was often missing from many women's clinical records, making it impossible for clinical coders to code for PPH. Specifically, many Labour and Birth Summary forms recorded large amounts of estimated blood loss but did not document the term ‘PPH’.

Rates of PPH before and after new process implemented

The new Labour and Birth Summary form was launched in August 2014 and new ways of working between coders and the maternity service were implemented from then on. From August 2014 to March 2017, the coded rates of PPH ranged from 5.5% to 13.7%, with a mean of 12%. The rates rose sharply in the months following the form change and plateaued at rates in line with the expected Health Round Table rates as illustrated in Figure 2.

Comparison of cost weights before and after implementation of the new process

The analysis of birth events by DRG showed a substantial increase in the ‘A’ (highest weighted) DRGs between the pre-intervention (2013/14) and the post-intervention (2015/16) financial years; 17% (10%–11.7%) for vaginal deliveries, 65% (13.8%–22.8%) for vaginal deliveries with operating room procedures and 24% (3.3%–4.1%) for caesarean births. There was also an increase in the B DRGs, to a lesser extent: 5% (64.2%–67.3%) for vaginal deliveries and 22% (17.8%–21.7%) for caesarean births. The annual value increase in the financial year 2015/16 was estimated at $543,933—the additional nominal revenue earned as a result of the higher weighting of cases (Table 2).

Discussion

This paper has described the process of investigating the problem of unusually low coded rates of PPH at the Waitemata DHB, and the process of developing and implementing a quality improvement process in a busy maternity service that relies on independent LMCs. Important changes were identified following the implementation of
a new form to capture and communicate procedures and outcomes. In particular, the reported rate of incidence of PPH rose dramatically. This means that funding will be allocated appropriately to the service, according to the casemix of events as calculated by DRG costweights.

The solution involved improving data validity at its source; that is, ensuring the right data is collected from the clinicians, and documented in the right place for the clinical coders. The adage applied “if it’s not written down you never assume that it happened.”

Implications of improved discharge data for PPH

There are many reasons why accurate documentation and coding of PPH is important. The changes achieved in the WDHB maternity service mean that it is contributing improved quality of data for national level processes as well as at its own DHB level.

In New Zealand, hospital discharge data is forwarded to the Ministry of Health where it is stored in the national collection National Minimum Data Set. The accuracy and quality are important attributes as these data contribute to an array of significant outputs, such as:

- Improving patient care;
- National and regional morbidity and mortality analysis;
- Contract monitoring and payments—in New Zealand, DHBs are funded on a population-based-funding- formula (PBFF) which aims to fairly distribute available funding between DHBs according to the relative needs of their populations and the cost of providing health and disability services—as shown by WIES² data (derived from discharge clinical coding data);
- Research into diseases, injuries and patient outcomes;
- Benchmarking of clinical practice between hospitals; and
- Improving hospital practices and resource allocation—detecting where clinical problems are that need addressing at a public health level.

At a DHB level, accurate PPH coding is essential to meet a number of important outcomes and actions. For example an accurate discharge record is important for continuity of care between different providers and to facilitate future care episodes. The correct coding of PPH on a woman’s clinical record should facilitate a heightened alert to her carers that she is at
increased risk of further PPH in her subsequent pregnancies and require preventative treatment.

Accurate data capture and coding is essential for DHB planning purposes. These data provide the basis for decisions on the allocation of resources (human and plant) at a local level as well as a national level. They are important in discussions about population-based funding and increase of funding requests as they provide tangible evidence and compelling justification of the need.

Finally these data contribute to the routine audit and quality monitoring processes within a DHB and can provide early indicators of change. These early indicators can then play a role in signaling a need for research or for generating new questions that can add to new knowledge that improve the care of women during and after their delivery.

Lessons learned and other qualitative outcomes for the maternity service

A number of positive changes in the maternity service were also anecdotally observed and reported. Maternity Service providers at WDHB speak of having greater trust in the coded data for PPH. Clinicians appear to have greater awareness and interest in clinical documentation and an understanding of the coding process. It is likely that this is a result of their involvement in developing the new Labour and Birth Summary form.

A new and valuable relationship between WDHB clinicians and coders has developed as a natural result of their collaboration redesigning the birth summary form and procedure. The maternity services also now have a direct line of communication with their key maternity coder. The monthly meeting between clinical service and the coders is an innovation unique to the maternity service. Clinical coders have been empowered by the maternity service to identify areas of concern, such as those they believe may be leading to under-coding, and to communicate these directly with clinicians. There is a sense of clinicians taking their concerns seriously, probably since the value of the coder's role has been made clear to the service through the recent process. Clinicians are reported to be enthusiastic and interested in this monthly feedback on PPH rates and appear interested to hear how well they have been completing the documentation.

A key challenge to implementing a new process for PPH was buy-in from clinicians, who were not initially convinced that low recorded rates of PPH were a problem. There was mistrust of the data, blame placed on the coders and a sense that this would be a waste of time for already overburdened clinicians. The key to bring staff on board as part of the change was the presentation of unequivocal evidence from the audits that the 4–6% coded rates for PPH were in fact invalid. Clinicians were educated about the link between the importance of appropriate documentation around PPH to enable accurate coding, which in turn impacts the amount of funding received by the maternity service.

It became clear during this process that the precise terminology required of clinicians for coding purposes is not something that is taught at medical, nursing or midwifery school and many clinicians were unaware of the downstream effects of their documentation on their clinical service. However, once staff members understood the value of clinical coding and the role they each played in the “big picture”, they were eager to collaborate.

Extension of the approach to other innovation projects

The successful clinical engagement achieved through this project has already led to further projects aimed at improving the quality of clinical documentation for other important conditions which have resource implications from accurate coding. Key conditions identified for maternity services include post-caesarean wound infection, anaemia, gestational diabetes mellitus and hypertension. Waitemata DHB is also looking to commence the same process in other services including Paediatrics and Gynaecology.

On reflection, the key elements that made the process and the outcome so successful and transferable were:

1. Use Health Round Table data as a starting point to detect discrepancies and pick one or few conditions. Do not be complacent about apparently low rates of morbidity at your institution.
2. A dedicated resource team is essential. It should comprise a public health physician, quality midwife and a decision support team.
3. Seek to improve data validity at source.
4. Clinical ownership of the redesign process and collaborative involvement with senior clinicians and coding team is crucial.
5. Sustaining interest is difficult but essential.
6. Changing mind sets, processes and actual practices takes time. Don’t lose patience!

Conclusion

We have been able to highlight improvements in the quality of clinical coding as a consequence of an innovative process implemented in the maternity service at the WDHB. A process of operational research and quality improvement, with new forms and a new collaboration between clinicians and clinical coders, has improved accuracy of documentation and coding, and successfully changed practices. This paper provides an example of how to evaluate and update coding as well as a process for changing the way clinicians and coders work that could benefit other services in WDHB as well as in other New Zealand district health boards.

Competing interests:
Nil.

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