CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	A review of the current management of postpartum haemorrhage in the Republic of Ireland, using a case study approach
Authors	Fitzgerald, Imelda;O'Connell, Rhona;Hughes, Paul;Lyons, Priscilla;McKernan, Joye;Greene, Richard;Corcoran, Paul
Publication date	2022-12
Original Citation	Fitzgerald, I., O'Connell, R., Hughes, P., Lyons P., McKernan, J., Greene, R. and Corcoran, P. (2022) 'A review of the current management of postpartum haemorrhage in the Republic of Ireland, using a case study approach', MIDIRS Midwifery Digest, 32 (4). pp. 505-511
Type of publication	Article (peer-reviewed)
Link to publisher's version	https://www.midirs.org/informing/midirs-digest-table-of-contents/
Rights	© MIDIRS 2022.
Download date	2026-11-01 09:28:11
Item downloaded from	https://hdl.handle.net/10468/14297

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

A review of the current management of postpartum haemorrhage in the Republic of Ireland, using a case study approach



Imelda Fitzgerald, Rhona O'Connell, Paul Hughes, Priscilla Lyons, Joye McKernan, Richard Greene, Paul Corcoran

ORIGINAL

Abstract

Objective: To get a better understanding of the steps taken during a postpartum haemorrhage (PPH) in the Republic of Ireland.

Design: Population-based retrospective cohort study. Hospital births in Ireland during 2020.

Methods: A PPH proforma data collection tool was used to understand what occurred during each PPH, the management provided to the woman and the medication received.

Main outcomes: Escalation of care to multidisciplinary team (MDT), mode of birth, quantifying blood loss.

Results: The 53 PPH proformas collected from two maternity units were comprised of: 43 per cent (23) mild PPH (500–1000ml); 34 per cent (18) moderate PPH (1000–1500ml); and 22 per cent (12) severe PPH (over 1500ml). The blood volume ranged from 500ml to 4.1litres. The most immediate response on recognition of a PPH, by midwives or obstetric doctors who diagnosed the blood loss following childbirth as excessive, was to administer a Syntocinon infusion as the first line of treatment.

Conclusions: Potential improvements for care during a PPH include: the first treatment of 'hand on fundus, call for help'; midwives managing the PPH with use of other treatments and medications while escalating care; timely escalation of emergency phone; an MDT approach to manage the PPH; and quantification of blood loss.

Keywords: Ireland, postpartum haemorrhage, childbirth

Introduction

Postpartum haemorrhage is the single most common cause of maternal mortality globally, with 99 per cent of all maternal deaths occurring in low-income countries. PPH is commonly defined as a blood loss of 500ml or more within 24 hours after birth, while severe PPH is defined as a blood loss of 1000ml or more within the same time frame (World Health Organization (WHO) 2012).

Ireland has the highest birth rate of the 28 European Union countries, at 12.9 live births per 1000 people (Greene et al 2021). In 2019, the national birth rate in the Republic of Ireland was 57,983. Of this number, 39.2 per cent were nulliparous and 60.2 per cent were multiparous women. The caesarean section rate was 34.5 per cent, an increase from 33.8 per cent in the previous year, and the PPH rate was 8.2 per cent, also an increase from eight per cent in 2018.

Between 2011 and 2018, the severe maternal morbidity (SMM) rate has varied from 3.83 to 6.68 morbidities per 1000 maternities and the single largest contributing morbidity is major obstetric haemorrhage (MOH), accounting for 55 per cent of all cases (Leitao et al 2020).

Several recent publications have noted that an increasing trend in PPH incidence rates in the past two decades is not explained by corresponding changes in risk factors. Hypotheses in previous studies suggest that inexperienced clinical staff, increasing rates of induction of labour, maternal obesity (Fyfe et al 2012) and injuries of the cervix and uterus may all be contributing to the increasing incidence of serious morbidity and mortality (Quinn 2014).

The aim of this paper is to consider the current practice for PPH through case studies and find out if changes could be made to improve these standards.

Using a case study approach, the authors reviewed previous PPHs to understand more about each one and observe the steps that were taken during the obstetric emergency. This approach also considered if

there were common patterns emerging from the data that may explain the continued rise in PPH rates. This is the first time a case study approach has been used to obtain data in this manner, which is important as this novel approach may provide a different perspective on the findings in the study. It may also provide future researchers with a concept to approach research using a different perspective.

Methods

Data collection

The data were obtained from a collection tool called the 'PPH Proforma'. The data were collected over a three-month period from February to May 2020, from a level two secondary maternity unit (Hospital A) and a level three tertiary maternity hospital (Hospital B) in the Ireland South Women & Infants Directorate.

PPH proforma

The Proforma tool was developed by the National Perinatal Epidemiology Centre (NPEC) and the National Women and Infants Health Programme (NWIHP) in 2018, using electronic health records (EHRs) to capture management details in the event of a major obstetric haemorrhage.

It was envisaged that this would not only aid a standardised approach to succinct documentation for retrospective review of the event but also act as a prompt to clinicians for salient interventions during the event, including a quantitative approach to estimating blood loss.

The PPH proforma was completed by midwives and members of the obstetric team following a PPH of 500ml or more. The care provider completing the PPH proforma was asked to include the woman's demographic details (name, address, medical record number, date of birth), the date and time of the event, body mass index (BMI), gravida, parity, onset of labour, category of pregnancy and delivery method.

The PPH proforma is in seven parts, under these headings:

- estimating blood loss
- communication
- manual steps to stop the bleeding
- IV fluids
- drugs
- surgical procedure
- blood products given following the PPH.

Each step taken, and the time it was performed during the PPH, is documented on the proforma.

The findings from each of the seven headings were put into an Excel spreadsheet and vignettes written up to create a timeline for each PPH. These vignettes were then analysed by a staff midwife and consultant obstetrician to gain better insight into the events that occurred and to review the timing, the treatment and the management in each case.

Following the review of the 53 proformas and vignettes, an audit of the women's notes was performed by the authors to see if further information was available in the medical notes but not documented on the proforma.

Study population

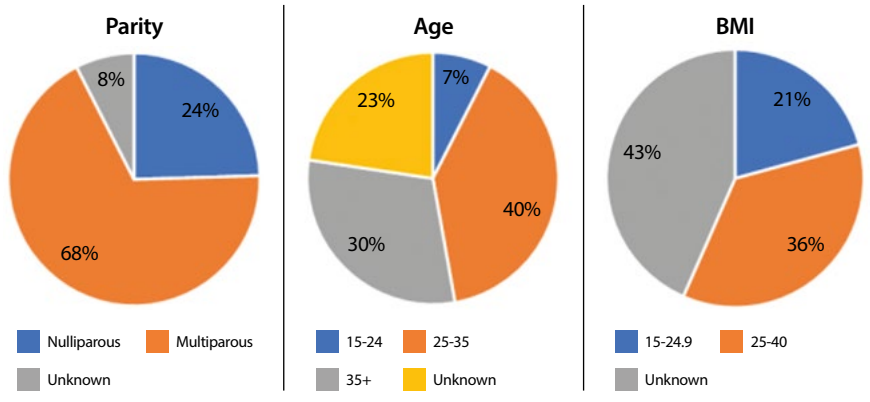
There was a combined birth rate of 8162 in hospitals A and B in 2019. Of these births, the PPH rate was 10.3 per cent.

Hospital A provides acute services to the population of that county. The maternity department is within a large acute hospital. This maternity department has four individual birthing suites, a 22-bedded postnatal ward, a six-bedded gynaecology ward and an eight-bedded antenatal ward. There is also a stand-alone outpatients department for antenatal, gynaecology, uro-dynamics and midwifery-led scanning.

Hospital B is a large tertiary maternity service that amalgamates care from three maternity units and the gynaecological services from one hospital. This hospital is comprised of a 12-bedded birthing suite, an 87-bedded postnatal ward, a 31-bedded antenatal ward and a 24-bedded gynaecology ward. There is a standalone outpatient department for antenatal, gynaecology, uro-dynamics, colposcopy and midwifery-led scanning.

From reviewing the EHRs to understand more information that may have contributed to the PPH, it was noted that 42 per cent had a spontaneous onset of labour (SOL), 34 per cent had an induction of labour (IOL), four per cent had macrosomia, six per cent hypertension and three per cent had placental complications during their labour/birth. There were no cases of prolonged rupture of membranes (PROM).

Figure 1. Maternal demographics



All the 53 PPHs occurred during the timeframe and were all included in the study. All women gave birth in either Hospital A or Hospital B. In Figure 1, the women's age at the time of childbirth ranged from 21 to 45 years of age. Their BMIs ranged from 20-35.

Findings

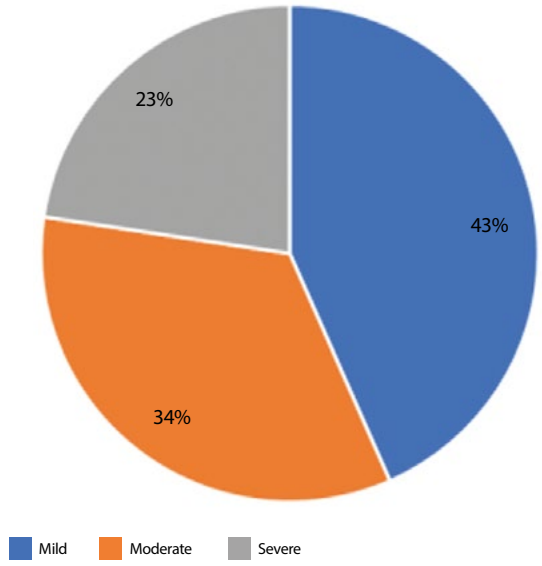
Each PPH is unique and depends on many factors, including a history of PPH, mode of birth, pre-existing complications and the four Ts (tone, trauma, thrombin, tissue) that are responsible for PPH. Following a review of 53 PPH proformas completed by Hospital A (n=22) and Hospital B (n=31), the findings were divided into four groups for further discussion: risk factor for PPH; outcomes; management; and documentation.

Risk factor for PPH

There were no grand multiparous women or multiple pregnancies in this study. One of the PPHs was associated with a placental abruption and another from placental accrete. Twenty-one per cent (10) of the PPHs were following delayed placenta separation and manual removal.

Outcomes

Figure 2. Frequency of PPH outcomes



In Figure 2, the PPH proformas comprised 43 per cent (23) mild PPH; (500ml–1000ml); 34 per cent (18) moderate PPH (1000ml–1500ml); and 23 per cent (12) severe PPH (over 1500ml). The blood volume ranged from 500ml to 4.1 litres.

Mode of birth comprised: 50 per cent spontaneous vaginal deliveries (SVDs); 33 per cent instrumental births; four per cent emergency lower segment caesarean sections (EM LSCS); and 13 per cent elective lower segment caesarean sections (EL LSCS).

Figure 3 shows the severity of PPHs following different modes of birth. PPHs following an SVD were made up of eight mild, seven moderate and six severe bleeds, in contrast to PPHs following an instrumental birth (14 mild; one moderate and no severe bleeds). PPHs after an emergency LSCS resulted in no mild or moderate bleeds but two severe bleeds. PPHs following an EL LSCS resulted in no mild, three moderate and three severe bleeds.

All but one woman received active management of the third stage of childbirth. In Hospital A, the local policy is to administer 5IU of Syntometriene following the delivery of the anterior shoulder, in the absence of blood pressure complications in pregnancy and labour. In Hospital B, 10IU intramuscular (IM) of Syntocinon is the first line prophylactic to reduce the risk of PPH.

Management

Escalation via the obstetric emergency number was used in six per cent (2) of the PPH emergencies. In Hospital A, as it is a smaller maternity unit with a birth rate of 1896 births per annum, the local policy for escalation to senior staff includes midwives from other departments. The midwives go to where they are called to assist during an obstetric emergency.

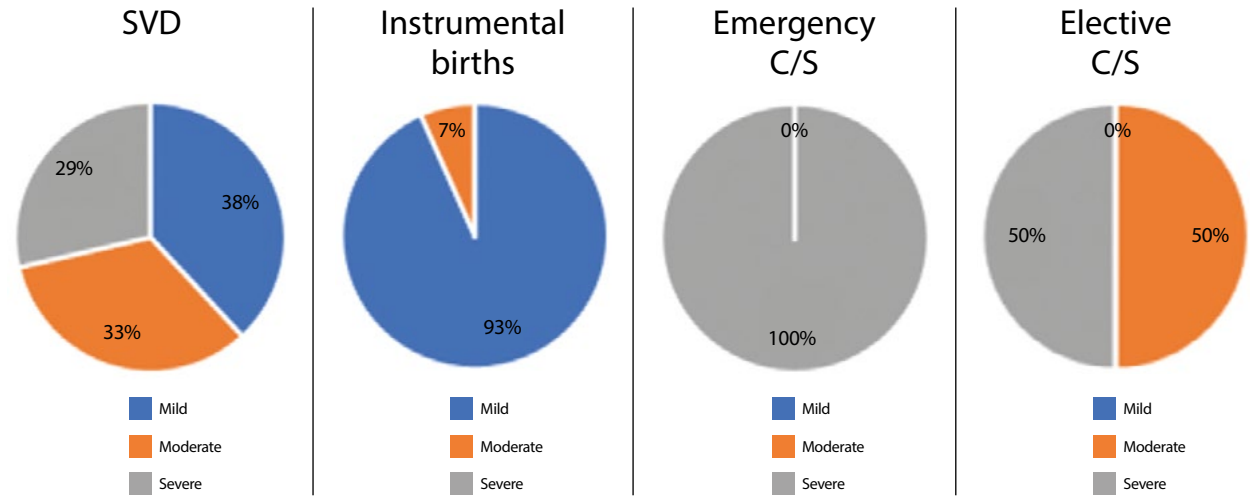
In Hospital B, the local policy is to call the emergency phone which is made up of a team of obstetric, anaesthetic and midwifery staff to respond to the emergency. In the majority of cases reviewed, the medical doctor or senior midwives were called directly by the midwife caring for the woman to 'review excessive blood loss' or contacted for a 'concern due to bleeding'. This occurred in 98 per cent (51) of events documented instead of an emergency phone being used. The records show that all staff responded to an escalation within five minutes and senior escalations were also made as appropriate.

Under the heading 'estimating blood loss' on the PPH proforma, the midwife or obstetrician was able to separate each item used during the PPH (sanitary pad, gauze swabs, bodily fluids, tampon, incontinence sheet, under buttocks drape, 25 x 25 swabs, kidney dish and spillage on floor), and weigh it to get a more accurate estimate of the blood volume lost during the PPH.

Blood volume was estimated visually in 32 per cent (17) of cases and weighed in 68 per cent (36) of PPHs. Visual estimation was used in 13 per cent of mild PPHs (<1000ml), nine per cent of moderate PPHs (<1500ml) and eight per cent of severe PPHs (>1500ml).

The most immediate response of midwives and obstetric doctors was to administer a Syntocinon infusion as the first line of treatment: 75 per cent (40). Rubbing up the fundus to encourage the uterus to

Figure 3. Mode of birth and rate of PPH



contract, was documented in 64 per cent (34) of cases. Of the 34 cases in which rubbing up the fundus was documented, the time and duration was missing from 50 per cent (17) of the proformas. This made it difficult to confirm when this management was performed. In all cases, further administration of other medications to control bleeding or procedures was not performed by midwives until the obstetric team was present for the PPH.

Blood transfusion following the PPH occurred in 13 per cent (6) of cases. It ranged from two units of blood products to 10 units of blood products, depending on the volume of blood lost during the PPH.

Nearly all the PPHs (96%) were managed by a combination of manual steps to stop bleeding and medication management, including Syntocinon infusion (75%), tranexamic acid (36%) and bi-manual compression (9%). The remaining two cases required more extensive treatments of balloon tamponade and a B-lynch suture. One of these two cases had recurrent secondary PPHs and a hysterectomy was considered, but not performed.

Documentation

Documentation varied throughout the proformas; it is understood that not every PPH will require all the medications, treatment or management options available but that this will depend on the circumstances.

When the proformas were being analysed, some of the details were missing. This was also the case in a study by Smit et al 2014 and suggests midwives may need to improve their documentation. In 47 per cent (25) of cases, some of the demographic details about the woman were missing from the proforma, including the time and date of the event (11%), parity at the time of childbirth (9%), mode of birth (4%) and, in one case, there were several hours difference from the time when the bleed occurred to when care was escalated or any treatment was given. Thirteen per cent (7) of the proformas did not include total blood volume. This information was subsequently gathered when cross-referencing the mother's maternity chart.

From cross-checking the proformas and performing an audit of the woman's notes it was found that 25 per cent (6) did not have a diagnosis of PPH on their notes. This meant that, when the woman was discharged, future support she may need in the community from her general practitioner (GP) or public health nurse (PHN) may not be received due to a lack of documented information pertaining to the PPH and the care received while in hospital. It was also found that the proforma completed following the PPH had been scanned into these six women's notes but was not included in the discharge letter to the GP and PHN.

Just three women (10%) were documented as having been debriefed regarding the PPH, either immediately following the PPH or in a phone call follow up in the postnatal period.

Discussion

The majority of the PPHs reported in the proformas were mild and this finding suggests, as Leveno et al 2003 suggest, that the majority of women would not require major intervention to stop the bleeding. From reviewing the data, active management of the third stage, rubbing up the fundus and the Syntocinon infusion, were sufficient to stop the bleeding. In the cases where the bleed was significant (>1500ml), more invasive treatment and management were required by the MDT to control the bleed. These women also required closer monitoring in the high dependency unit (HDU), fluid replacement and longer hospital inpatient stays.

Half the women in this study had an SVD. Hou et al (2017) suggest this mode of birth results in fewer PPHs in comparison to instrumental and caesarean birth. This paper found that more women had a severe bleed following an SVD (6), followed by an El LSCS where there were three severe bleeds, an EM LSCS had two severe bleeds and, lastly, following an instrumental birth there was one moderate bleed. A study by Hawker et al (2020) found that method of birth was an important risk factor for PPH and may be a better predictor of PPH than antenatal risk factors.

The first line of management for a PPH is rubbing up the fundus to try to contract the uterus and stop the bleeding. Analysis in this study showed staff were more focused on commencing an oxytocin infusion instead of following basic training: 'hand on fundus and call for help'. This move away from treating the bleeding at the potential source, could result in delay in getting the uterus to contract and lead to further bleeding, particularly for women who have had an SVD.

Current literature states that anaemia, multiple pregnancy, prolonged labour, grand multipara and blood clotting disorders (Fawcus & Moodley 2013) are some of the risk factors for PPH, but they were not found to be contributing factors in this paper. The authors found this interesting: it highlights that other factors may be responsible for the continuing rise in PPH rates, and that further research is needed in a case study approach of PPHs to understand more about why they occurred.

The risk factors identified in this paper that may have contributed to the PPH include IOL (32%), placental complications (4%), hypertension (4%), and macrosomia (3%). Our findings show that over one-third of women post-IOL had a PPH. A number of authors (Phillip et al 2004, Al-Zirqi et al 2009, Rossen et al 2010, Davey et al 2020) have found an association between IOL and PPH rates.

Another vital aspect of quality care in maternity services following a PPH is accurate documentation. The PPH proforma is a useful tool to use in hindsight to document how events unfolded, if it is filled in correctly. Over half the proformas analysed had information missing, including demographic details, volume of blood lost, timing of medication, treatment and escalation of care not documented. This information is essential for the care the woman will receive in the short and long term including: the quality of information available to the woman if medical staff need to refer back to their maternity notes for future pregnancies; if the woman requests more information about the PPH; or if the woman wants to understand more about the care she received following the PPH.

This study also highlighted a lack of informational and emotional support being provided to women following a PPH. Of the 53 women included, there was documentation for only three women receiving some form of explanation following the event.

Experiencing a PPH can evoke many different emotions for women and their families and can result in many psychological and physical issues in the short and long term. Thompson et al (2011) and Morton et al (2012) state that, following a PPH, all women need to be supported emotionally and provided with information. This will help them to understand what happened and better prepare them to care for themselves and their newborns, physically and emotionally, in the immediate postnatal period and in the long term.

Comparison of Hospital A and Hospital B

Hospital A's birth rate is four times smaller than Hospital B's. This may be one reason why, at local level, the escalation of care following a PPH was conducted in a different manner compared to the emergency phone system used in Hospital B. All escalation of care in Hospital A is done by contacting each doctor individually instead of one phone call alerting senior members of the health care team to an emergency. As a result, staff members spent more time away from the obstetric emergency to call for help, and 23 per cent (5) of major PPHs (>1500ml) were from Hospital A.

From the reported cases it is noted that Hospital B used the emergency phone system only twice. Both hospitals used a similar way to escalate care and contacted the doctors and senior staff directly, instead of using the emergency phone system. There are many different possible explanations for why this method was used to communicate excessive bleeding (geographical location of staff, slow trickling bleeds, retained placenta, observations triggering, doctor present for birth).The authors suggest that, if the emergency phone was used more often, it could reduce the time delay in care provided during the PPH and provide midwifery staff with multidisciplinary support for earlier management for the situation.

As stated in previous literature, the gold standard for accurately measuring blood loss following childbirth is quantification (Ladouceur & Goldbort 2019, Bell et al 2020). Hospital A visually estimated blood loss 58 per cent (11) of the time, whereas Hospital B used the same measurement 15 per cent in the same period. Visual estimation of blood loss has been shown to be an inaccurate measurement to assess bleeding quantity and a change in practice in both hospitals could see care during a PPH being escalated sooner, and the rate of PPH in Hospital A reducing. A quantification approach would also optimise escalation at an earlier time, where small recurrent bleeds or trickling bleeds are occurring.

Role of the midwife

Midwives were the main care provider (58%) for the women at the time of the PPH. Midwives are trained to a high standard to detect, respond and escalate care during a PPH, as appropriate, and also assist in the support needed to care for women throughout the event. This multi-professional approach plays a vital role in the provision of high-quality care for mothers and their babies (Royal College of Obstetricians and Gynaecologists (RCOG) 2021).

Further training and education sessions for obstetric emergencies could enhance midwifery practice. Understanding the treatment and medication options and using these by agreed protocols, in consultation with medical staff, could speed up the escalation pathway and reduce the rates and severity of PPH. This may be one way to ensure midwives are providing the care the woman needs, while working with the multidisciplinary team to minimise the blood loss during a PPH.

All midwives in this review responded to the event appropriately, as per the local policy in each hospital. This highlights the high standard of care that is provided by midwives, the ability to respond and escalate care when appropriate and continue to work as an autonomous practitioner.

Conclusion

This study has taken an in-depth look into 53 previous PPHs and found that there were potential improvements for care including: the first management response of 'hand on fundus, call for help'; the potential value of midwives managing the situation with use of other treatments and medications while waiting for the MDT; timely referral using an emergency phone system; and quantification of blood loss. Approaches to information and emotional support for the woman experiencing a PPH offer a real opportunity for improvement. Further research is needed.

Conflicts of interest

The authors declare that no relevant or material financial interests relate to the research described in this paper.

The views expressed in the submitted article are the authors' own and not the official position of an institution or funder.

Acknowledgments

We are grateful to the units for the participation in this project. We thank the women and the staff of the maternity units who facilitated data collection and submission.

Authors

Lead author

Mrs Imelda Fitzgerald, Midwife BSc MSc RMT, Cork University Maternity Hospital, Cork, Ireland. Email: Imeldahanley@yahoo.co.uk. Twitter: @meldafitz13

Co-authors

Dr Rhona O'Connell, Senior Midwifery Lecturer, University College Cork, Cork, Ireland.

Dr Paul Hughes, Consultant Obstetrician and Gynaecologist, Kerry University Hospital, Tralee, Co Kerry, Ireland.

Ms Priscilla Lyons, Clinical Midwife Manager 2, Kerry University Hospital, Tralee, Co Kerry, Ireland.

Joye McKernan, Research Officer, National Perinatal Epidemiology Centre (NPEC), Cork University Maternity Hospital, Cork, Ireland.

Professor Richard Greene, Professor of the National Perinatal Epidemiology Centre (NPEC), and Professor of Clinical Obstetrics, National Perinatal Epidemiology Centre (NPEC), Cork University Maternity Hospital, Cork, Ireland.

Dr Paul Corcoran, Senior Lecturer in Epidemiology, National Perinatal Epidemiology Centre (NPEC), Cork University Maternity Hospital, Cork, Ireland.

References

Al-Zirqi I, Vangen S, Forsén L, Stray-Pedersen B (2009). Effects of onset of labor and mode of delivery on severe postpartum hemorrhage. *AJOG* 201(3):273.e1-9.

Bell SF, Watkins A, John M, Macgillivray E, Kitchen TL, James D, Scarr C, Bailey CM, Kelly KP, James K, Stevens JL, Edey T, Collis RE, Collins PW (2020). Incidence of postpartum haemorrhage defined by quantitative blood loss measurement: a national cohort. *BMC Pregnancy and Childbirth* 20(271). https://doi.org/10.1186/s12884-020-02971-3 [Accessed 8 August 2022].

Davey MA, Flood M, Pollock W, Cullinane F, McDonald S (2020). Risk factors for severe postpartum haemorrhage: a population-based retrospective cohort study. *ANZJOG* 60(4):522-32.

Fawcus S, Moodley J (2013). Postpartum haemorrhage associated with caesarean section and caesarean hysterectomy. *Best Practice & Research Clinical Obstetrics & Gynaecology* 27(2):233-49.

Fyfe EM, Thompson JM, Anderson NH, Groom KM, McCowan LM (2012). Maternal obesity and postpartum haemorrhage after vaginal and caesarean delivery among nulliparous women at term: a retrospective cohort study. *BMC Pregnancy and Childbirth* 12(112).

Greene RA, McKernan J, Manning E, Corcoran P, Byrne B, Cooley S, Daly D, Fallon A, Higgins M, Jones C, Kinsella I, Murphy C, Murphy J, Bhuinneain MN (2021). Major obstetric haemorrhage: incidence, management and quality of care in Irish maternity units. *European Journal of Obstetrics, Gynecology and Reproductive Biology* 257:114-20.

Hawker L, Weeks A (2020). Postpartum haemorrhage (PPH) rates in randomized trials of PPH prophylactic interventions and the effect of underlying participant PPH risk: a meta-analysis. *BMC Pregnancy and Childbirth* 20(1):107. https://doi.org/10.1186/s12884-020-2719-3 [Accessed 8 August 2022].

Hou L, Hellerstein S, Vitonis A, Zou L, Ruan Y, Wang X, Zhang W (2017). Cross sectional study of mode of delivery and maternal and perinatal outcomes in mainland China. *PLoS One* 12(2):e017177. https://doi.org/10.1371/journal.pone.0171779 [Accessed 8 August 2022].

Ladouceur MK, Goldbort J (2019). A proactive approach to quantification of blood loss in the perinatal setting. *Nursing for Women's Health* 23(6):471-7. https://doi.org/10.1016/j.nwh.2019.09.007 [Accessed 8 August 2022].

Leitao S, Manning E, Corcoran P, Campillo I, Cutliffe A, Greene RA (2020). *Severe maternal morbidity in Ireland. Annual report 2018*. Cork: National Perinatal Epidemiology Centre. https://www.ucc.ie/en/media/research/nationalperinatalepidemiologycentre/SMMReport2018270820Linked.pdf [Accessed 8 August 2022].

Leveno KJ, Cunningham FG, Gant NF *eds* (2003). *Williams manual of obstetrics*. 1st ed. New York: McGraw-Hill:192-4.

Morton C, Price M, Lydon A (2012). *Women's experience of obstetric haemorrhage: informational, emotional and physical health*. California Department of Public Health.

Phillip H, Fletcher H, Reid M (2004). The impact of induced labour on postpartum blood loss. *Journal of Obstetrics and Gynaecology* 24(1):12-15.

Quinn MJ (2014). Genetic contribution to postpartum haemorrhage in Swedish population: cohort study of 466 686 births. *BMJ* 349:g4984. https://doi.org/10.1136/bmj.g4984 [Accessed 8 August 2022].

Rossen J, Okland I, Nilsen OB, Eggebø TM (2010). Is there an increase of postpartum haemorrhage, and is severe haemorrhage associated with more frequent use of obstetric interventions? *Acta Obstetricia et Gynecologica Scandinavica* 89(10):1248-55.

Royal College of Obstetricians and Gynaecologists (RCOG) (2021). *RCM and RCOG joint statement on multi-disciplinary working*. https://www.rcm.org.uk/media-releases/2018/march/rcm-and-rcog-joint-statement-on-multi-disciplinary-working/ [Accessed 25 August 2022].

Thompson JF, Roberts CL, Ellwood DA (2011). Emotional and physical health outcomes after significant primary post-partum haemorrhage (PPH): a multicentre cohort study. *ANZJOG* 51(4):365-71.

World Health Organization (WHO) (2012). *WHO recommendations for the prevention and treatment of postpartum haemorrhage: evidence base*. http://apps.who.int/iris/bitstream/handle/10665/75519/WHO_RHR_12.29_eng.pdf?sequence=1 [Accessed 8 August 2022].

Fitzgerald I, O'Connell R, Hughes P, Lyons P, McKernan J, Greene R, Corcoran P. MIDIRS Midwifery Digest, vol 32, no 4, December 2022, pp 505-511.

Original article. © MIDIRS 2022.

For more information on this topic see MIC database search packs: PN29 Postpartum haemorrhage; PN192 Postpartum haemorrhage: prevention.