Final Project (Curriculum)

Accurate Measurement of Postpartum Blood Loss: An In-service Short Course for Professional Birth Attendants in Papua New Guinea

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Introduction

Postpartum hemorrhage is a leading cause of maternal mortality and morbidity globally, especially in low-resource settings. Saving lives during and after postpartum hemorrhage depends in part on accurate measurement of blood loss during and after childbirth. Many health care professionals around the world do not use accurate methods for measuring blood loss. This issue becomes even more critical in rural areas and in low-resource settings, where there are fewer supplies, equipment, and expert personnel to treat hemorrhage and its sequelae. This curriculum is for a short course of continuing education serving rural professional birth attendants in Papua New Guinea, to equip and motivate them to use quantitative blood loss estimation when attending births.

Step 1—What general problem is this curriculum designed to address?

The problem:

This curriculum is designed to address the problem of health care providers inaccurately estimating blood loss during and after childbirth. When physicians, midwives, nurses,

community health workers, and other personnel do not perform accurate blood loss assessment after a birth, it can lead to under-recognition and treatment of postpartum hemorrhage (PPH), or sometimes over-estimation and over-treatment of physiological amounts of bleeding (Lertbunnaphong et al., 2015). (Normally, postpartum blood loss includes intrapartum blood loss as well.) An estimated 295,000 mothers die in the childbearing year globally (World Health Organization, 2019), many of them due to postpartum hemorrhage (Say et al., 2014). PPH is considered to be the leading cause of maternal mortality globally (Kassebaum et al., 2016). In addition, PPH causes many cases of maternal morbidity such as anemia, "adult respiratory distress syndrome, shock, disseminated intravascular coagulation, acute renal failure, loss of fertility, and pituitary necrosis" (Committee on Practice Bulletins-Obstetrics, 2017). Many if not most cases of PPH-caused morbidity and mortality can be prevented or minimized. For these reasons, accurate assessment of postpartum blood loss is a key skill for health care providers to learn and practice (Girault et al., 2018).

Who the problem affects:

Clearly the mothers who die in the childbearing year are the central victims of this tragedy. Their families' well-being also suffers, especially that of their neonates and young children (Hough et al., 2021). In cases of morbidity after PPH, it decreases the women's quality of life, sometimes permanently (for example, in cases of hysterectomy for major PPH). The sequelae from PPH-related morbidity can also reduce mothers' ability to care for their children and family (Moucheraud et al., 2015; Reed et al., 2000).

This problem also affects the health care providers, who suffer from incomplete or insufficient knowledge of how to measure blood loss, and therefore cannot give as good of care as they ought.

What people are doing now:

Many health care providers use methods of estimating blood loss by visual estimation of blood on disposable underpads, sheets, pan/bowl, floor, and in suction collection during cesarean sections. This has been shown to be frequently inaccurate, particularly for higher or lower levels of blood loss (Maslovitz et al., 2008).

What people should be doing:

Some professional groups (AWHONN, 2015, p. 1), governments (Bingham et al., 2011), hospitals, and educational institutions are implementing quantitative blood loss (QBL) assessment such as gravimetric blood loss measurement to replace estimated blood loss (EBL) assessment. This involves using more objective measurements of the quantity of blood lost. For example, measuring the tare weight of commonly used items like underpads, sheets, and gauze, and keeping a sensitive scale nearby to weigh the items containing blood, and subtracting the tare. Some are also instituting more rigorous guidelines for PPH assessment and management, and training students and healthcare providers in it. This should be more widespread to improve the quality of care for women experiencing hemorrhage during and after childbirth. Partnerships can be a key to success, and it is important to obtain top-down buy-in from stakeholders, and train all relevant providers as much as possible.

Step 2—What are the identified needs of targeted learners?

My targeted learners for this project would be midwives and community health care workers who attend births in rural Papua New Guinea. They are more neglected than urban health care workers in terms of training, continuing education, equipment, supplies, and professional consultation opportunities. They also practice farther from hospitals and advanced emergency medical care. They would likely prefer demonstration and hands-on training rather than reading and lecture. This would be determined during a pre-course data collection, likely using key informant interviews and focus groups. Physicians should also be offered an opportunity to receive and practice the same content but perhaps in a separate event and style of presentation, in order to fill in possible gaps in their knowledge, get them on board, and ensure consistency of postpartum blood loss estimation. Statistics keepers for the health facilities and provincial departments of health should also be informed, since having more accurate measurements of postpartum blood loss may seem to increase the incidence of postpartum hemorrhage, though it is only increasing the recognition of it.

What I need to find out: what are their most common current methods of measuring PPBL? Do they express willingness to learn and adopt new methods? How long should the training be to adequately pass on the new skills and let them practice? What schedule and venue and budget could be arranged? Could this training be piggy-backed onto an already-planned continuing education event, to save resources? What are their preferred learning styles and activities?

Methods for data collection

- Communicating with my contacts in rural health clinics (Messenger, WhatsApp, phone, email).
- Communicating with provincial health administrative officials. Would require contacting intermediaries to get names, contact information, and relevant advice on approaching the topic.
- Conducting an online search of relevant journal articles related to estimation of PPBL in low-resource settings as well as well-resourced settings.
- I could also communicate with one or two expatriate health professionals who have observed or worked alongside rural health workers at deliveries.

The data collected would then need to be analyzed, and used to shape the curriculum content, strategies, and implementation process.

The identified needs of targeted learners (presumptive—to be confirmed by data collection)

1. To appreciate the need for accurate postpartum blood loss assessment
2. To understand normal and abnormal ranges of blood loss
3. To identify methods of accurate PP BL assessment
4. To gain the cognitive and psychomotor skills necessary to perform accurate PPBL assessment
5. To have their hospital, obstetric practice, and/or institution establish QBL as a standard and a habit for all deliveries

Step 3—What are the goals, outcomes and competency-based objectives for the curriculum?

Goal:

Targeted learners will improve in their ability to accurately assess postpartum blood loss, leading to more accurate recognition and treatment of postpartum hemorrhage. The ultimate goal is that fewer women would suffer morbidity and mortality secondary to postpartum hemorrhage, but this is not feasible to measure within this project.

Outcomes:

1. Targeted learners will appreciate the need for accurate postpartum blood loss assessment
2. Targeted learners will understand normal and abnormal ranges of blood loss
3. Targeted learners will identify methods of accurate PP BL assessment
4. Targeted learners will gain the cognitive and psychomotor skills necessary to perform accurate PPBL assessment
5. Targeted learners will advocate for their workplace to establish quantitative blood loss (QBL) assessment as a standard and a habit for all deliveries

Competency-based objectives:

1. Learners will be able to state at least two relevant reasons

that accurate postpartum blood loss assessment is important, and will be able to

explain in what ways their current methods of PPBL assessment are accurate or less accurate

2. Learners will be able to state the normal and abnormal ranges of postpartum blood loss (PPBL)

3. Learners will be able to state at least three methods of accurate PPBL assessment

4. Learners will demonstrate the psychomotor skills necessary to perform accurate PPBL assessment in simulations

5. Learners will describe in short essay form at least two ways they could potentially advocate for their workplace to establish QBL as a standard and habit for all deliveries

Step 4—What educational strategies and activities will best facilitate learning?

1. Pre-instruction assessment of learners' current understanding regarding normal and abnormal ranges of PPBL, and current methods used for assessing PPBL. This could be group discussion or short written surveys. This will help the instructors address pre-conceptions and tailor the course to the learners' situations and current skill level.

2. Short reading assignments, or a short lecture with slides, or a short video for background on why accurate PPBL is important (to help adult learners be motivated by knowing how this will help them)

3. Discussion in small groups of why accurate PPBL is important and how accurate the methods currently used in learners' practices are

4. Short lecture with slides introducing quantitative blood loss (QBL) assessment methods

5. Discussion in small groups of how learners' current practices of PPBL assessment compare with the QBL methods. Learners will be guided in a way that is supportive and non-judgmental, with affirmation of the fact that all humans need to continually learn and grow throughout their life and career, even if they are experienced and/or have advanced training.

6. Practical demonstration by instructor of QBL skills using simulation, with as many real-life details as possible in the setup and role play, to make it feel like a real delivery. Learners can write down their guess of the PPBL quantity for each scenario, then compare with the real amount.

7. Repeated practice of QBL skills by learners in groups of 2 or 3, using simulation, with as many real-life details as possible

8. Individual reflection time (written or silent, or in pairs with each taking a turn) on what each learner thinks of the knowledge and skills content of the course, and if they plan to change their practice, and why and how.

9. Group discussions of how learners can advocate to implement QBL in their workplace

10. Post-course assessment (survey or low-stress test) of learners' understanding of normal and abnormal ranges of PPBL, what they see as the best methods to use for

assessing PPBL, how likely they are to implement QBL in practice, and what the potential barriers and facilitators are to implementing it. Also a request for honest feedback on the course, both positive and constructive criticism.

11. If possible, follow up with learners at a predetermined time after the course (perhaps 1 to 3 months) to survey how they feel their memory is of what they learned, whether they are practicing QBL more, and if any progress has been made in their workplace general practices.

Step 5 - Implementation

What implementation barriers exist and what assets are available?

1. **Resources required, costs, faculty training** -- Rural Papua New Guinea (PNG) has many logistics and infrastructure / travel challenges, and the data bandwidth and technology available would not be conducive to have a virtual course. Given the fact that the target learners are spread around distant rural places, this course will require some funding for the travel of the learners and instructors to the semi-central location, and for the venue, accommodations, and food for the learners and instructors. As the primary instructor, I will need to research and plan in order to be well-prepared to deliver the course. I would also go through the course with the co-instructor first to orient them.
2. **Issues of support and resistance --** I would choose a province where the provincial health administration officials as well as the local health personnel are welcoming to this course. I would ask my friend who is a public health professor at the University of

PNG and/or other friends to help connect me and recommend me. I would either work through an existing non-profit organization or form a non-profit in order to have the program be more formal and allow a memorandum of agreement to be made with the provincial health authority.

3. **Administration and organization --** The communications to set up the course will be challenging due to the situation in PNG (mobile phones out of battery, patchy cell signal coverage, etc.) so an advance trip to the area would be helpful to talk with people in person in order to set up the schedule, venue, and participants, and at the same time collect data on felt needs relevant to the course.
4. Potential barriers
    a. Logistics & infrastructure / travel, limitations in data bandwidth and technology available for virtual course; learners spread around distant rural places
    b. Some target learners may not have enough time due to job constraints or may not be able to all leave their workplace to travel to training
    c. Some of the learners may be resistant to new things or to admitting their current practices are not ideal
5. Potential solutions
    a. Consult with people I know who have run similar continuing education courses rurally
    b. Raise funds both locally from provincial health department and politicians and possibly external non-profit funding. Ideally in the long term I would like to

develop social businesses that exist partly to fund courses like this with part of their profits.

c. Pre-course planning trip; budget for communication, venue, travel, accommodations

d. Hold the course more than once so different learners can come at different times and not leave workplace unstaffed

e. Affirm what they know and the work they already do, and affirm that all health workers are human and thus are never perfect, always have room to grow and learn. Look for a "champion" who agrees with this and can inspire others.

6. **Approach to introducing the curriculum** -- It is a small curriculum and small learner base, so I don't think it needs to have one segment piloted, or to have a phase-in approach. Actually, the curriculum itself is like a segment that is probably best included as part of a bigger curriculum later. For example, it could be integrated into the "Helping Mothers Survive—Bleeding After Birth" curriculum (JHPIEGO, 2021).
7. Feasibility -- This curriculum is likely to be feasible and successful (though probably also with bumps along the way), and likely other regions will also want it to be implemented there. I would like to develop a structure and organization that would make this and similar continuing education easier to implement in every region of every province in PNG, to end up with good coverage and consistency.

Step 6 – Evaluation and Feedback

The users of the curriculum and their needs

The users of this curriculum will be midwives and community health care workers who attend births in rural Papua New Guinea. Some of them will hopefully also be trained to conduct and teach the course as well. Their needs include the need to learn and improve; to feel valued and not neglected; to feel proud of their continuing education and have it recognized; to have mentorship and direct feedback on their practice where possible.

Resources available for evaluation

Since this is a relatively simple and short course, we would budget time during the formation of the curriculum for planning the evaluation; time during delivery of the course for evaluation of the students through simple assessments (given to them as feedback) and evaluation of the course by the learners; and some time after the course for processing all of this in order to make improvements. There are likely some existing curricular resources on the topic that we could borrow from and adapt, including for evaluation.

Measurement method

I think the “single group, pretest - posttest" approach (Thomas et al., 2016) would be sufficient for evaluating the students at the beginning and end of the course, since it is a small, short course and the results of the evaluations are unlikely to be affected by things outside the course or by students maturing.

The pretest and posttest would consist of some multiple-choice questions (for learners who are literate) or more like focus group questions for learners who are not literate, as well as hands-on demonstrations of how they assess PPBL in normal practice (pre-test) and how they are able to use QBL to assess PPBL after the training.

Critical evaluation questions and evaluation design

1. At the end of the course, what percentage of learners can state at least two relevant reasons that accurate postpartum blood loss assessment is important?
2. At the end of this course, what percentage of learners can state the normal and abnormal ranges of postpartum blood loss?
3. By the end of the course, what percentage of learners can demonstrate the psychomotor skills necessary to perform accurate QBL assessment in simulations?

Questions #1 and #2 would use the single group, pre-test/post-test evaluation design, with either written quizzes or verbal, depending on the literacy level of the learners. Question #3 would also use the single group, pre-test/post-test evaluation design, but with demonstrations in a simulation setup.

Ethical issues

I don't think the evaluations for this course will need to be under an institutional review board. They should be fairly easy to keep confidential given that it will be run by me and one co-instructor.

Data collection process

Doing the pre- and post-test and the course evaluations will be required as part of the course before the students get credit for the course. The instructors will collect the data. They will be short evaluations.

Evaluation reports

The students will be given feedback during the course on the results of their pre-tests and post-tests. The learner evaluations of the course will be collated and analyzed by the instructors, and an aggregated summary of the pretest-posttest changes and the main lessons learned from the evaluations will be included in a report to the primary funders.

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