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Perspective

The Prevention of Postpartum Hemorrhage in the Community

João Paulo Souza*

Department of Reproductive Health and Research, World Health Organization, Geneva, Switzerland

Postpartum hemorrhage is associated with one-quarter of all maternal deaths and severe maternal morbidities in the world [1,2]. Uterine atony is the most common underlying condition leading to postpartum hemorrhage [3] and robust evidence indicates that uterotonics used during the third stage of labor are effective in reducing postpartum bleeding [4–6]. Oxytocin has been shown as the most efficacious uterotonic for this indication and the World Health Organization recommends IM/IV oxytocin (10 IU) as the uterotonic drug of choice [7]. Misoprostol and other injectable uterotonics are recommended as alternatives for the prevention of postpartum hemorrhage in settings where oxytocin is unavailable [7].

The availability of oxytocin at the point of care is limited by constraints in the cold supply chain (oxytocin is a thermolabile medication) and the skills and resources necessary for using injectable medications. Ergot derivatives (e.g., ergometrine) are not an alternative in this situation because these medications also require the use of injections and are thermolabile. In addition, ergot derivatives are contra-indicated in women with hypertensive disorders, so their use in unscreened populations should be avoided [7]. Thus, despite the superior efficacy of oxytocin, the use of misoprostol (600 mcg, oral route) for prevention of postpartum hemorrhage in communities and under-resourced settings is quite attractive due to the ease of administration and less complex logistics.

The administration of oxytocin via a Uniject device (i.e., a disposable single-use syringe pre-filled with oxytocin [10 IU]) is an alternative that simplifies the use of oxytocin in under-resourced settings and could be a solution to offer the most efficacious uterotonic to women giving birth in communities and under-resourced settings. In this week's issue of *PLOS Medicine*, Cynthia Stanton and colleagues have conducted research that provides crucial evidence to support the use of oxytocin in a Uniject device [8]. This community-based, cluster-randomized trial was conducted in four rural districts in Ghana with 54 community health officers being randomly allocated to either intervention (provision of one IM injection of oxytocin [10 IU] in a Uniject device one minute after birth, 689 parturient women studied) or control (no provision of prophylactic oxytocin, 897 parturient women studied) groups. In this trial, women receiving oxytocin had a substantial reduction in the risk of postpartum hemorrhage (RR: 0.49; 95% CI: 0.27–0.88). Importantly, there were no cases of oxytocin use before delivery of the baby. Based on these findings, Dr. Stanton and colleagues conclude that community health officers using prophylactic oxytocin administered via Uniject can effectively and safely prevent PPH at home births.

Successful completion of this challenging trial is important because it demonstrates the feasibility, safety, and impact of a community-based PPH prevention strategy. It should be noted that this evidence contributes to equity in health as it extends the application of the most efficacious uterotonic for PPH prevention to the community and under-resourced settings. Based on this evidence, prophylactic oxytocin can be offered by community health officers to all women during the third stage of labor.

However, the use of a disposable pre-filled syringe only partially solves the problems related to using oxytocin in under-resourced settings. Cold supply chain issues remain an important obstacle and the skills to administer an IM injection (although simplified) are still required. Thus, investment in the research and development of a thermostable and similarly effective uterotonic is highly

Linked Research Article

This Perspective discusses the following new study published in *PLOS Medicine*:

Stanton CK, Newton S, Mullany LC, Cofie P, Tawiah Agyemang C, et al. (2013) Effect on Postpartum Hemorrhage of Prophylactic Oxytocin (10 IU) by Injection by Community Health Officers in Ghana: A Community-Based, Cluster-Randomized Trial. PLoS Med 10(10): e1001524. doi:10.1371/journal.pmed.1001524.

Cynthia Stanton and colleagues conducted a cluster-randomized controlled trial in rural Ghana to assess whether oxytocin given by injection by community health officers at home births was a feasible and safe option in preventing postpartum hemorrhage.

The Perspective section is for experts to discuss the clinical practice or public health implications of a published study that is freely available online.

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* E-mail: souzaj@who.int

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desirable. Efforts should be dedicated to optimize the use of cold supply chain for health products at the country level (e.g., harmonizing vaccines' and oxytocin's cold supply chains), and the capacity of community health officers to administer IM injections should be strengthened. Another major limiting factor is the fact that oxytocin in Uniject is not commercially available, and the industrial capacity needs to be established or expanded for meeting the demand of large scale implementation programs. It should be noted that despite the efforts to increase the coverage of skilled birth attendance, unassisted births in poor communities will persist as a reality in the foreseeable future in many parts of the world. This is a situation where misoprostol has a potential role, particularly if self-administered [7,9]. In this context, the efforts to ensure that every woman receives a prophylactic uterotonic during the postpartum period (be it oxytocin or misoprostol) should prevail and competition between methods should be avoided. The best solution is context-specific, and the evidence provided by Stanton and colleagues' trial expands the boundaries of oxytocin use to the community through trained health officers and Uniject.

It should also be noted that the effort to increase the coverage of uterotonics for postpartum prevention is only one component of the more comprehensive approach that is needed to reduce postpartum hemorrhage–related deaths. Prophylactic uterotonics are the single most effective clinical intervention for reducing blood loss after delivery, but they are certainly not sufficient. Prophylactic uterotonics will reduce blood loss, but some women will bleed after delivery even after receiving a prophylactic uterotonic. If this happens, prompt referral and comprehensive emergency care are crucial elements for survival. Delays in recognizing postpartum hemorrhage, accessing health facilities, and receiving appropriate care in health facilities are major determinants of maternal mortality. The importance of comprehensive emergency care in the management of postpartum hemorrhage (including uterine massage, additional uterotonics, crystalloid products for intravenous fluid resuscitation, blood products, temporizing measures [e.g., balloon tamponade], and access to obstetric surgery) cannot be overemphasized.

If substantial reductions in PPH-related maternal mortality are to be achieved, not only is universal prevention of PPH needed, but also timely and comprehensive emergency care, functioning referral systems, and quality care in health facilities should be available to all women facing complications during pregnancy, childbirth, and the postpartum period.

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