WOMEN'S REFUGEE COMMISSION

Using the Non-pneumatic Anti-shock Garment in Humanitarian Settings:

A Case Study of Promising Practices in Tanzania

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Introduction

Severe bleeding or hemorrhage accounts for nearly a quarter of all maternal deaths globally.[1] In areas of the world where skilled maternal health care is not available or is inaccessible, a woman faces the risk of death or disability every time she becomes pregnant. However, if pregnancy-related complications—like those that cause hemorrhage—are treated appropriately and in a timely manner, almost all of these deaths and injuries can be prevented.

In December 2009, Pathfinder International, in partnership with the Tanzania Red Cross Society (TRCS) and the Kasulu District health authorities, initiated its **Clinical and Community Action to Address Postpartum Hemorrhage (PPH) Model** in Mtabila and Nyarugusu refugee camps and the surrounding host communities in Kasulu District, Kigoma, Tanzania. Pathfinder has also implemented the PPH Model in India, Nigeria, Peru and Bangladesh. This model takes a holistic approach to support women's access to skilled delivery and timely emergency obstetric care (EmOC), involving coordination at multiple levels of the health system and within communities. The components of Pathfinder's PPH model include:

1) **Advocacy** with government officials to promote enabling policies

Cecilia, a 27-year-old mother of eight, went to the clinical officer's home at about 2:00am because she wanted to deliver her baby at the health facility. She did not realize that she was again pregnant with twins. Cecilia was not bleeding when she arrived, but later started bleeding heavily. She does not remember the non-pneumatic anti-shock garment (NASG) being applied. She woke up with an intravenous drip and with the NASG on her. The NASG was removed by a trained health worker, and when asked about how it was taken off, Cecilia remembers they took it off starting with the ankle. She and the twins, Dalton and Denis, four months old in this picture, survived and continue to do well.

2) **Prevention** of PPH through:

   a. Routine practice of the active management of the third stage of labor (AMSTL)

   b. Accurate estimation of blood loss

3) **Management** of PPH through:

   a. Development of systems to transport women to facilities for emergency obstetric care

   b. Identification of the cause of hemorrhage

   c. Fluid replacement and administration of uterotonics[2]

   d. Application of the non-pneumatic anti-shock garment (NASG) to women suffering hypovolemic[3] shock from PPH

   e. Blood replacement and surgery as needed

4) **Information and communication** to pregnant women and other community members on how to recognize and respond to the signs of PPH[4]

The comprehensive Pathfinder PPH Model is not currently included in the standard guidelines of priority reproductive health services in humanitarian settings, known as the *Minimum Initial Service Package (MISP) for Reproductive Health in Crisis Situations.*

Non-pneumatic Anti-shock Garment: Quick Facts

- The NASG is a segmented, lightweight neoprene garment designed for application to the lower extremities and mid-section of the body. It is a low-technology, simple first-aid device to reduce bleeding and reverse hypovolemic shock in women suffering from PPH hemorrhage. The garment applies direct pressure over the uterus and facilitates blood flow, through counter pressure, to the vital organs of the body.[5] The NASG is contraindicated in women with a viable fetus or for bleeding above the diaphragm.[6]
- The NASG is meant to stabilize women suffering from PPH and shock who may experience delays in reaching standard, evidence-based care for PPH and definitive treatment. The NASG does not replace the need for implementing standard protocols, including the provision of uterotonics, intravenous fluids, blood transfusion and other treatments.[7]
- The NASG can be applied by trained community health workers until treatment per PPH protocol is available at the health facility.
- The NASG should be systematically removed only by trained staff.
- The NASG should be cleaned with a diluted bleach solution, hung on a line to dry, stored away from vermin and kept in a visible and accessible place. It can be used up to 40 times.[8]
- Each garment costs $300, but the price can be reduced to approximately $50 if they are purchased in bulk.
- Research on the use of the NASG for women suffering obstetric hemorrhage is led by the University of California, San Francisco, Safe Motherhood Program.
- A five-year randomized-control trial is currently underway in Zimbabwe and Zambia looking at the results of the application of the NASG at the community health care level versus at the higher, referral-hospital level, its impact on morbidity and mortality and the potential side effects of its use.[9]

Dr. Abdelhadi Eltahir of Pathfinder International demonstrates the NASG at Kisulu District Hospital, with Sandra Krause, Director of Reproductive Health Program, Women's Refugee Commission.

10 Steps to Introduce the NASG in Humanitarian Settings

1. **Advocate to achieve stakeholder buy-in**. Pathfinder's initial and ongoing advocacy secured stakeholder buy-in to the project at the national, regional and district levels, particularly with the Ministry of Health, and was essential. This resulted in the identification of champions—such as the Kasulu District Medical Officer—and a successful project that linked refugee and host communities and established humanitarian relief and development sector partnerships. This advocacy may have helped minimize rejection by doctors of an intervention promoting the training of lower cadre health workers, while also leading to the project's expansion in the Kigoma Region.

2. **Integrate the NASG into broader interventions to address emergency obstetric care.** Use of the NASG as a stand-alone intervention is not recommended, but it should be integrated into a larger EmOC framework to address PPH. Pathfinder's PPH Model successfully provided a broader framework for addressing maternal health.

3. **Assess health workers' baseline knowledge and current challenges to successful service delivery.** In Kasulu, health workers' needs assessments and maternal death reviews revealed major gaps in health workers' knowledge and skills, such as the proper dosage of magnesium sulfate, the appropriate way to take blood pressure and accurate use of Active Management of the Third Stage of Labor (AMTSL). In response, Pathfinder and TRCS took immediate corrective actions and tailored the PPH training curriculum to focus more on these gaps. Additionally, health facility assessments helped to identify and address critical structural, equipment, supply and protocol needs to support maternal health care.

4. **Introduce the NASG to referral-level facilities first**. In order to ensure that health workers at referral-level facilities are trained in the proper use of the NASG, including its removal, it is essential to introduce the garment at referral-level facilities prior to peripheral-level health facilities.

5. **Conduct community outreach.** Engaging community members (including women, leaders and traditional birth attendants) helped to identify information, education and communication needs and to overcome challenges in antenatal care attendance, facility-based deliveries and general acceptance of the garment.

6. **Expand use of the NASG to all cadres of health workers to save women's lives in hospitals and in community facilities.** In Kasulu, the NASG was used to stabilize women both within comprehensive EmOC facilities at the district hospital and in two refugee camp hospitals when the appropriate health worker was unavailable or staff were overburdened and delayed in treating the client. The NASG was also used at the peripheral facilities, including once by a nursing assistant to stabilize a woman in the absence of a qualified health worker.

7. **Establish maintenance and storage protocols for the NASG.** Health workers should ensure the garments are cleaned and maintained by storing them away from rodents but should aim to ensure that the garments are easily accessible within the maternity ward.

8. **Establish a system to ensure that the NASG is returned from the referral facility to the community facility.** When women are wrapped in the NASG and transferred to the referral hospital, it is essential that the garment be returned to the peripheral facility it came from as soon as possible, or that a back-up NASG is readily available at the community facility.

9. **Provide training and continued supervision and/or retraining in the use of the NASG**. The need for training and retraining is even greater in crisis-affected settings where political instability, insecurity and staff burnout cause higher rates of health worker staff turnover.

10. **Systematically collect data.** To identify any particular issues related to the use of the NASG in crisis-affected settings that may differ from its use in development settings, it is important to collect information and data on its use in a standardized way.

Dr. Ernest Athumani of the Tanzania Red Cross Society at a training on the NASG for local health providers.

The Women's Refugee Commission (WRC) conducted a field mission to Tanzania to document the implementation of the NASG as part of Pathfinder's PPH Model and to look at the potential of including the garment and the PPH model in humanitarian response.

Key Findings

At the time of the WRC's visit in September 2011, Pathfinder and TRCS had trained 23 health workers—doctors, clinical officers, nurses and nursing assistants—from 11 health facilities on its PPH Model and distributed 12 NASGs to all 11 health facilities, including the Kasulu District Hospital and the two refugee camp hospitals. As of mid-September 2011, the NASG had been used nine times by trained providers: three times by district hospital staff (including twice in the ambulance and once at the maternity ward), four times in TRCS-supported refugee health facilities and twice in surrounding Ministry of Health dispensaries. In each case, the NASG was used successfully and staff did not report challenges or complications. All of the women on whom the garment was used survived. Additionally, the NASG appeared clean and was properly stored in the maternity ward at eight out of nine health facilities visited by the WRC. (In one setting, the NASG was laid out on a bed, in the open, and not properly stored away.) There were no instances of a woman being transferred from a peripheral (community) clinic to a higher-level facility with the NASG on, where it had to be returned to the community clinic immediately—which is a potential area of concern. No particular issues were associated with the use of the NASG in this stable refugee camp environment or in the surrounding host community during and leading up to the assessed time period.

One year after her training, Silatan, a nursing assistant, used the NASG on a 22-year-old woman during an extremely busy night. The woman delivered twins and staff administered AMTSL, including misoprostol. Then, the woman had profuse bleeding. Since the Clinical Officer was not available, the nurses could not start intravenous fluids. Silatan asked the woman's husband to give his wife large amounts of oral rehydration solution.

There was no way to transport the woman to the hospital because it had been raining heavily for a day and a half, and the roads were impassable. So Silatan applied the NASG.

The woman was later transferred to a referral facility to ensure there were no underlying problems.

NASG as Promising Addition to EmOC in Crisis-affected Settings

There are several benefits to using the NASG in conflict- and disaster-affected areas. This simple technology is:

- **Nonconsumable:** One of the most beneficial and practical aspects of the NASG is that it is a fixed commodity and does not need to be resupplied often (notwithstanding the logistics of ensuring the NASGs are returned to community facilities if women are transferred to referral facilities with the NASGs on). Properly cleaned and stored, the NASG could be a ready resource for all trained health providers encountering a woman with PPH, buying lifesaving time until other definitive treatment can be provided. Given the gaps in the supply of uterotonics and other drugs in crisis-affected areas, this is all the more critical.
- **Safe and effective:** A growing body of research is demonstrating that the NASG is safe and effective in development settings, and we found the same to be true in this stable refugee camp setting.
- **Accessible:** Poor access to facilities and shortages in skilled personnel are among the most challenging barriers in crisis-affected settings. The NASG offers a first-aid garment that can help buy precious time for women facing PPH and hypovolemic shock, providing skilled attendants in scarce health care facilities with a simple tool to help save lives.

> *"The NASG must go out to remote areas where transport delays care for women. It will help save a lot of mothers and children."*
> Christina, nurse-midwife, Nyarugusu Refugee Camp

Participants in a training on the NASG each received a garment, displayed here.

Conclusion

The NASG is a first-aid device with great potential to help address PPH and the high rate of maternal mortality in crisis-affected populations; a growing body of research continues to show its effectiveness and safety. Its successful use in development settings (Bangladesh, India, Nigeria and Peru), as well as in refugee camps in Tanzania–with no reported challenges or problems—demonstrates a promising practice.

Other agencies and organizations planning to introduce the NASG in humanitarian contexts should build upon the lessons identified in this Pathfinder/TRCS project.

Moving forward, donors should support buying the garment in bulk, which will greatly reduce its cost. Another immediate priority is conducting operations research on the use of the NASG in a variety of humanitarian contexts. We need to learn how the garment can best be utilized in all kinds of settings, from relatively new emergencies to postcrisis areas in recovery and reconstruction.

"It was an extremely busy day in the labor room," a maternal health care provider at tertiary care facility told the Women's Refugee Commission. "A grand multipara [someone who has had seven or more births] woman delivered using AMTSL [Active Management of the Third Stage of Labor] and was transferred to the postpartum ward. We became busy with other deliveries when someone from the postpartum ward came running to tell us a woman was bleeding heavily, and we rushed to find her unconscious due to PPH. We immediately gave the woman oxytocin, drew blood for type and cross match, started the intravenous solution and checked for the cause of bleeding [inspected for tears and blood clots], conducted uterine massage and wrapped the woman in the NASG. When blood was available, we transfused one unit. In two hours, the woman was stable and regained consciousness."

Notes:

[1] World Health Organization, *World Health Report*, p. 62. http://www.who.int/whr/2005/en/index.html.

[2] Uterotonics are used to induce contraction of the uterus.

[3] Hypovolemic shock is a condition where blood is not circulated adequately through blood vessels to oxygenate vital organs. Symptoms of hypovolemic shock include low blood pressure, high pulse rate, weakness, pallor, cold clammy skin, confusion and loss of consciousness.

[4] Pathfinder International, *Participant's Guide, Prevention, Recognition, and Management of Postpartum Hemorrhage: Clinical and Community Action to Address Postpartum Hemorrhage*, May 2010.

[5] University of California, San Francisco, Safe Motherhood Program brochure "The Non-Pneumatic Anti-Shock Garment (NASG): Simply Saving Lives."

[6] Miller, S., Martin, H., Morris, J., "Anti-shock garment in postpartum hemorrhage," *Best Practice & Research*, Vol, 22, No. 6, pp.1057-1074, 2008.

[7] Ibid.

[8] University of California, San Francisco, Safe Motherhood Program brochure "The Non-Pneumatic Anti-Shock Garment (NASG) Simply Saving Lives."

[9] Ibid.

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