Non-pneumatic Anti-shock Garment

unicef
for every child
Supply Division

Overview

The challenge

Post-partum hemorrhage (PPH) – or severe bleeding after childbirth – is the largest direct cause of maternal mortality worldwide, responsible for more than a quarter of the 300,000 estimated deaths each year.

These women are dying from preventable causes related to pregnancy and childbirth, with 94 per cent occurring in low- and middle-income countries, in areas where the nearest health facility with comprehensive obstetric care may be hours away.

Many of these deaths could be prevented with timely and effective maternal health care management and equipment.

The response

The Non-pneumatic Anti-Shock Garment (NASG) is a low-cost first-aid device that limits persistent PPH. It's a compression suit originally designed with technology from the United States National Aeronautics and Space Administration (NASA). At NASA, anti-gravity uniforms were developed to keep astronauts from blacking out during extreme acceleration by squeezing the arms and legs to push blood towards the head. This same technology is used in the NASG, with external pressure applied to a woman's lower body to drive blood upward.

The NASG reduces blood flow to the uterus and treats hypovolemic shock It can keep a woman with PPH alive for up to 48 hours. Without it, she may bleed out within 30 minutes. This buys critical time to transfer a patient to healthcare and provide treatment.

It is lightweight, washable and can be reused up to 144 times.

A large evidence base indicates that the NASG is effective in reducing maternal mortality. The World Health Organization (WHO) recommends it as a temporary measure until appropriate care is available (2012). The NASG has been included in the WHO, UNICEF, and United Nation's Population Fund (UNFPA) interagency list of medical devices for essential interventions for reproductive, maternal, newborn and child health (2015).

Although there are some countries that have successfully scaled the NASG, UNICEF estimates that the global demand is much higher, given that five per cent of all women giving birth suffer from PPH. As such UNICEF added the NASG to its portfolio of innovation projects – to use its know-how capacity in scaling proven technologies to ensure this life-saving product is available and accessible.

The impact

The NASG has been used by UNICEF, UNFPA, NGOs and governments over the past five years, saving thousands of mothers' lives. It costs as little as US $0.50c to save a life with the NASG.

UNICEF has added the NASG to its Supply Catalogue and is providing technical guidance and support for its procurement, distribution, and implementation. With UNICEF's expertise in scaling proven technologies, the NASG can reach more mothers, ensuring future PHH deaths are prevented.

"No woman should die to give life. NASG is a highly cost-effective intervention, and our Government is committed to provide these to all health facilities conducting deliveries to save our mothers."
- Hon. Sir Puka Temu, Minister of Health and HIV/AIDS, Papua New Guinea

Key figures

Issue

5% of all women giving birth suffer from PPH.

300,000 women die each year during pregnancy or childbirth (over 25% from PPH).

94% of maternal deaths occur in low- and middle-income countries in locations far from obstetric care.

Response

US $0.50c average price to save a mother's life with NASG*

Up to 48 hours
The NASG can keep a woman with PPH alive for up to 48 hours.

11 countries are introducing NASG through UNICEF.

*Based on UNICEF data on NASG pricing ($68) and average number of times the product can be washed and reused (144)

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Timeline

After WHO's inclusion of the NASG in the global PPH recommendations in 2012, its adoption and uptake has been limited due to a lack of knowledge about the product, a relatively high cost, and low support via global funding initiatives. The NASG was added to UNICEF's product innovation portfolio in 2019 to dedicate efforts to increasing access worldwide. The below chart illustrates the history of the NASG, from the introduction of the technology in 1969 to today.

1969
NASA compression suits first modified to treat a patient suffering from severe PPH

1990s
NASG is first commercially available (via ZOEX)

2004
First clinical studies published, noting significant reduction in maternal mortality

2012
WHO adds NASG to global PPH recommendations and guidelines

2018
UNICEF adds NASG to its innovation portfolio to improve scaling activities

Late 2019
NASG is available for purchase via UNICEF's Supply Catalogue

2020-2022→
UNICEF continues efforts to ensure its introduction in appropriate locations

The NASG is available for purchase via the UNICEF Supply Catalogue

Impact

Literature review on the NASG notes a strong link to preventing maternal deaths. There have been over 36 publications on the NASG since 2004. All clinical studies noted the significant impact the NASG has on reducing maternal mortality at a low cost (currently approximately US$0.50 per use). The results from the six countries that participated in the clinical studies are in the chart to the right.

Countries studied	% reduction in mortality
Egypt	69%
India	53%
Nigeria	68%
Tanzania	67%
Zambia & Zimbabwe	54%

One key example of impact is found in Papua New Guinea (PNG). The risk of dying during childbirth in PNG is extremely high. According to UNICEF PNG, as much as one in every 120 women die during pregnancy or childbirth. However, many deaths may go undocumented, as many women give birth outside the formal health system. PPH is one of the leading causes of maternal mortality, in addition to resource-constrained health centres and hospitals that may not have the staff or supplies needed to save a woman's life.

UNICEF Health Officer, Paula Pauwe, demonstrates how to apply the NASG in Mendi, Southern Highlands Province. © UNICEF PNG/Dozier/2019

However, UNICEF and the Government of PNG are committed to improving the situation, by investing in obstetric care services and implementing new technologies, like the NASG, to prevent the unnecessary deaths.

UNICEF first introduced the NASG into the country in March 2019. Since then, the innovation has supported hundreds of mothers who were suffering from PPH.

Scaling the NASG

UNICEF analyzed the barriers to scaling the NASG to understand why it has not been introduced in appropriate settings and is now implementing solutions.

Barriers to scale:

- Low awareness of the NASG's value
- Relatively high cost and low availability
- Lack of national policy on the NASG
- Non-functional care and maintenance systems.

UNICEF response (in partnership with UNFPA):

- Increase awareness by developing documentation on procurement and programming for the NASG, including a package of technical resources for countries, while improving communications efforts by documenting local findings (for example, story telling and sharing evidence through webinars).
- Improve institutional capacity by working with governments to advocate about the importance of the NASG to reduce maternal deaths.
- Improve care and maintenance by developing and sharing appropriate guidance on how to use the NASG.

For more information: www.unicef.org/innovation/productinnovation

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