The Non-pneumatic Anti-Shock Garment (NASG): Research to Date & Implementation Challenges

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The Non-Pneumatic Anti Shock Garment (NASG)

Neoprene and Velcro lower-body first aid device

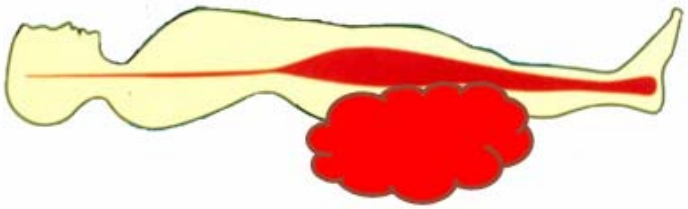
Applies Circumferential Counterpressure

Reverses shock by shunting blood to vital organs

Decreases further blood loss

Mechanism of Action

In decompensatory shock, the heart, lungs and brain are deprived of oxygen as blood accumulates in the lower part of the body



In obstetric hemorrhage, blood also leaves the body through the vagina or pools in the retroperitoneal area

The NASG reverses shock by shunting blood from the lower extremities and abdomen to the heart, brain, lungs

It reduces blood loss because it compresses the blood vessels. When the radius of a blood vessel is decreased, blood flow through the vessel is decreased

Number of women treated with NASG in studies:

- Egypt Pilot = 260
- Egypt II = 558
- Nigeria = 573
- Zambia = 1711
- Zimbabwe = 507

---------- Total = **3609**

Obstetric Hemorrhage

- Ectopic pregnancy
- Molar pregnancy
- Complications of abortion
- Abruption of placenta
- Ruptured uterus
- Uterine atony (35%)
- Vaginal, cervical or genital lacerations
- Retained placenta or tissue
- Placenta previa
- Placenta accreta

Pre-Post Intervention Study

N=1442

Egypt: 2 facilities

Phase	N=990
Pre-intervention	432
NASG	558

Nigeria: 4 facilities

Phase	N=452
Pre-intervention	175
NASG	277

Pre-Intervention Phase

Standard Care

Data Collection

NASG Phase

Standard Care

+

Data Collection

Study Entry Criteria

- Women with hypovolemic shock secondary to obstetric hemorrhage (any etiology)
- Estimated blood loss ≥750 mL (> 1000 in Egypt)
- One or more clinical signs of hypovolemic shock
  - systolic blood pressure [SBP] < 100 mmHg
  - pulse > 100 beats per minute [BPM]

Study Outcomes

- Median blood loss

  (measured with a plastic closed end calibrated collection drape)
- Emergency hysterectomy
- Severe end organ failures morbidity
  - Renal failure
  - Cardiac failure
  - ARDS
  - CNS
- Mortality

Condition on Study Entry

	Pre 697	NASG 835	P value
Estimated revealed blood loss Mean mL (SD)	1210.0 (507.7)	1327.5 (480.7)	<.0001
Median mL (IQR)	1000 (1000-1500)	1200 (1000-1500)	
MAP < 60	181 (29.9)	321 (38.5)	0.001

Results: N=1442
Measured Blood Loss

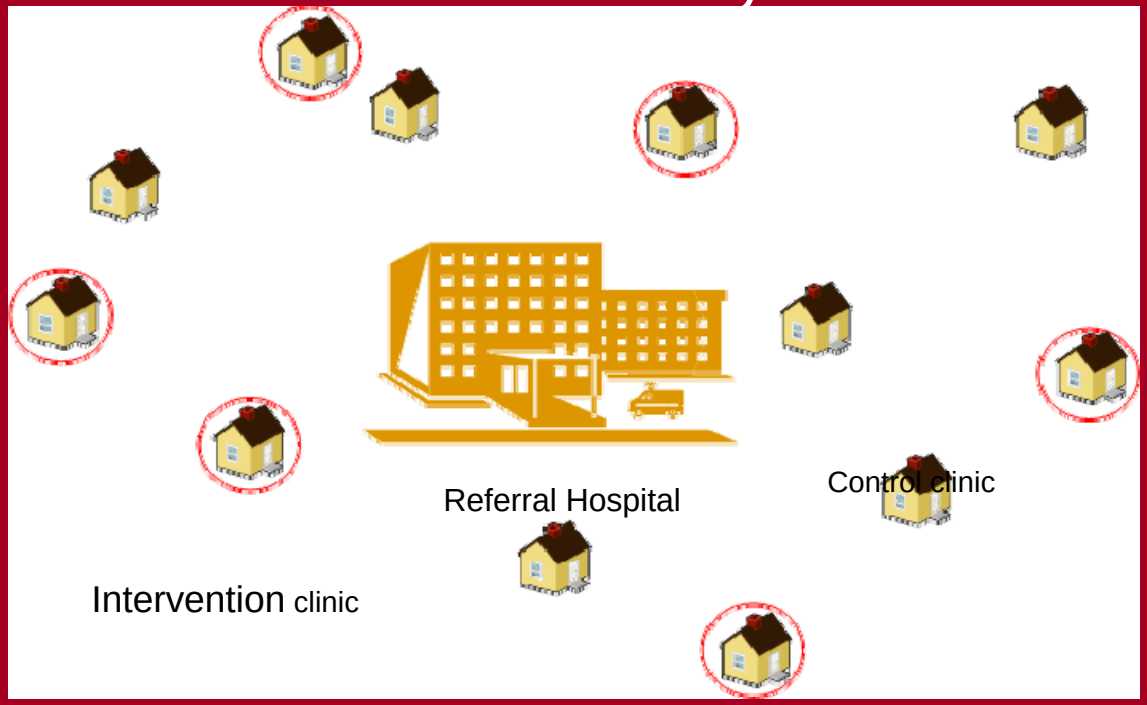
	Pre (N=607)	NASG (N=835)	P value
Measured vaginal blood loss in drape:			
Mean mL (SD)	443.5 (346.1)	240.0 (199.4)	<0.001
Median mL (IQR)	400 (250-500)	200 (150-250)	<0.001

	Pre (N=607)	NASG (N=835)	Relative Risk (95%CI)	P value
E hyst	20 (8.9)	14 (4.0)	0.44 (0.23-0.86)	0.013
Morbidity	21 (3.7)	6 (0.7)	0.20 (0.08-0.50)	0.001
Mortality	38 (6.3)	29 (3.5)	0.56 (0.35-0.89)	0.013

CRCT - Zambia & Zimbabwe

- Does transport in an NASG from a PHC to a referral hospital result in decreased maternal mortality and morbidity?

Site	Clusters
Harare	12
Lusaka	12
Copperbelt	14



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Challenges

- Which systems have to be in place for the successful implementation of the NASG?
- What are the barriers to the implementation of the NASG?

Necessary Systems

- Access to basic PPH interventions/treatment and appropriate referrals
- Regional agreement to implementation vs. single site, need buy in of system of referral from Hospital to community
- Financial support: purchase of NASG and on-going training (use, up-keep)
- Adoption of NASG into standard medical practice and hospital procedure
- Mechanism to clean/return NASG to first responders from transfer site (midwife, ambulance drivers, etc)

Barriers

- Provider skepticism of NASG efficacy, resistance to change
- Implementation by foreign agency vs. local agency
- Lack of familiarity from staff, patients, patients' family
  - If not could = premature removal
- Poor capacity to properly clean NASG between uses
- Documented NASG misuse as prophylactic tool
- Misperception of NASG as treatment = > complacency

“Complacency”

- Documented in all studies that despite women in the NASG phase often being in significantly worse shape on study entry (objective marker, % of women with MAP < 60),
- Significantly fewer women receive resuscitation according to protocol (in the first hour post study entry)
  - 1500 mL IV fluids
  - Blood products

% of Women with MAP < 60 Receiving Resuscitation in First Hour, n= 502 (35%)

Resuscitation Treatments in First Hour after Study Entry	Pre-intervention MAP < 60 N= 181 (29.9)	NASG-intervention MAP < 60 N=321 (38.5)	P value
≥1500 mL IV fluids	67.4% (122)	54.8% (176)	P=0.006
Blood transfusion	45.9% (83)	32.7% (105)	P=0.003

Discussion
Questions?
More information?

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Full Reference List

www.lifewraps.org