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Neonatal Hypothermia: A Solution-Focused Field Assessment in Bangladesh

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BACKGROUND AND AIMS

Hypothermia is a significant cause of newborn morbidity and mortality in low-resource settings [1]. High prevalence of hypothermia has been identified even in warmer tropical environments [2]. The prevalence of hypothermia in hospital-based studies seems to be as high as 85% [3]. Our goal was to better understand challenges in neonatal hypothermia management that MSF staff face in a rural refugee context in Bangladesh.

METHOD

A field visit to a dedicated 100-bed secondary care neonatal/paediatric/BEmONC facility and PHC maternity clinic serving both host and a refugee population was conducted in February 2020. Direct observation and more than a dozen interviews with MSF field and HQ staff were performed, following a human-centered design research protocol [4,5]. A patient journey map was created to identify the warming gaps between newborn delivery and patient discharge was created (Fig.1). A framework for evaluating existing warming devices in MSF was created (Fig.2).

RESULTS

Transport to, admission process and hospital stay in the neonatal unit were identified by the field staff as the periods with higher incidence of neonatal hypothermia. The staff described many newborns as arriving at the facility “cold and wet”, some as walk-ins carried by their parents after home delivery, others referred from non-MSF facilities that did not properly stabilize the newborns before transportation.

Although the facility had access to many different forms of newborn warming, none were completely sufficient to prevent and treat newborn hypothermia in these scenarios.

Despite Kangaroo Mother Care (KMC) being the gold standard for prevention and treatment of neonatal hypothermia in stable babies, cultural resistance to the practice reduced uptake in Goyalmara. In addition, KMC was not feasible for more unwell babies, highlighting the need for supplemental newborn warming devices. Finally, studies have shown that even a 30-minute break in KMC can result in an infant temperature drop of 1.5°C [6], a mild hypothermic state that increases the morbidity risk by 80% [7].

Warming devices available were radiant warmers and conductive warmers, both devices theoretically well-suited to the context. However, the conductive warming device was not considered trustworthy or effective by field staff. The fabric material of the mattress retained stains even after appropriate cleaning protocol. The conductive warmer was also fragile and difficult to repair, restricting its use. Some staff were unable to determine whether the device was functioning properly even when operating at the maximum heat setting, as the warmer would not necessarily feel warm to the touch.

In contrast, radiant warmers were preferred and perceived as effective, but their insufficient quantity and their limitation of use during transport emphasized the need for complementary tools. The two radiant warmers in the maternity unit strained the capacity of the building electrical system, infrequently leading to blown fuses that restricted warmer function until a technically-trained staff member could reset the breaker.

The newborn unit had two wall-mounted air-conditioning units that could heat the room, but the implementation was limited. There was no way to monitor the actual room temperature. The room was drafty, limiting how long the warm air was retained without power. When both units were running, the room became uncomfortably warm for clinical staff. Both AC units were observed to be running the first day of the study, one unit was turned off the second day and both units were off on the third day.

Although popular with health staff and families, survival blankets were vulnerable to misuse for hypothermia treatment. These blankets only offer insulation, helping the newborn to retain their body heat. They do not provide any additional warming. Survival blankets were observed in use underneath a radiant warmer in a way that could lead to the infrared energy being reflected away from the newborn.

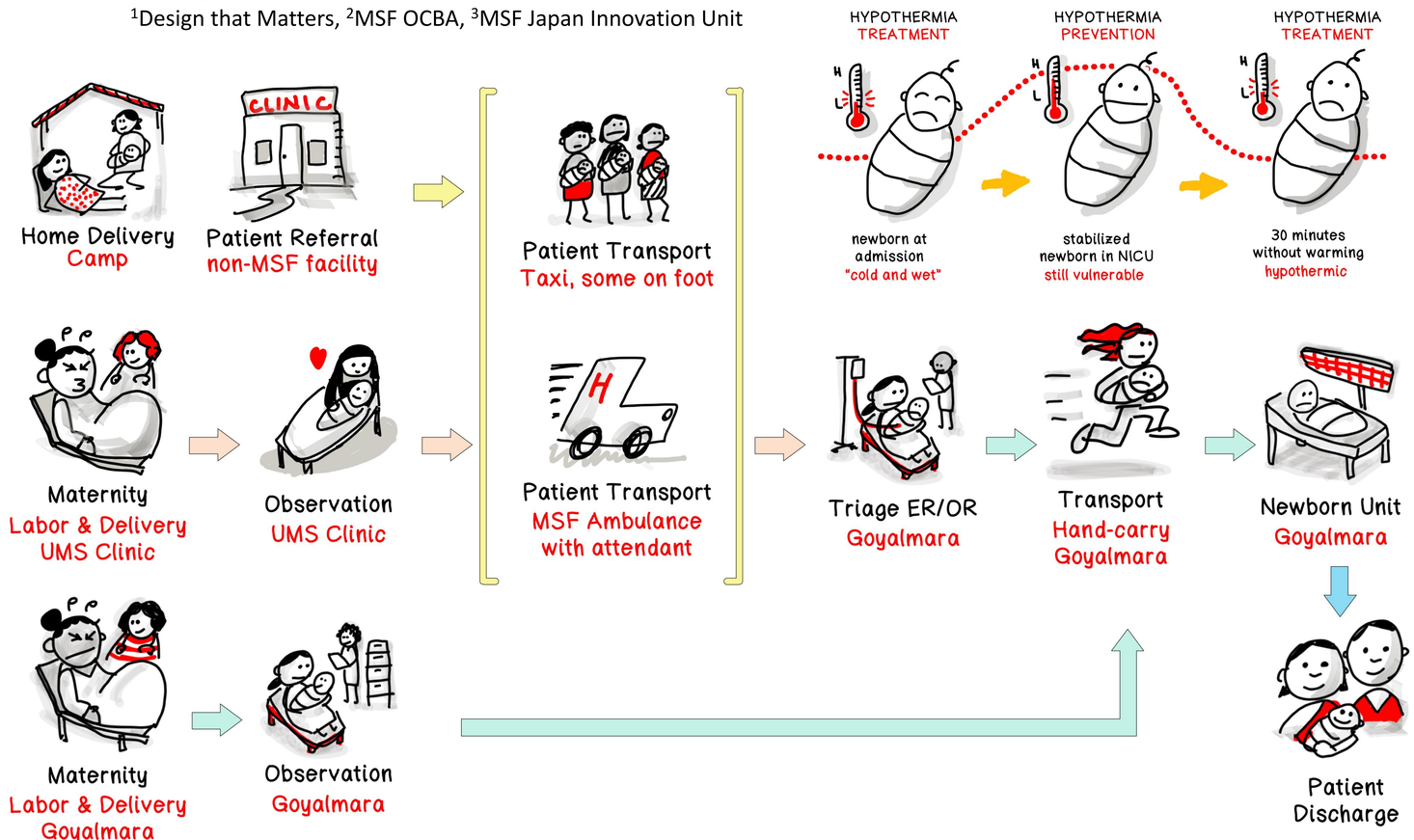

Figure 1 Newborn journey map at UMS Clinic and Goyalmara Hospital

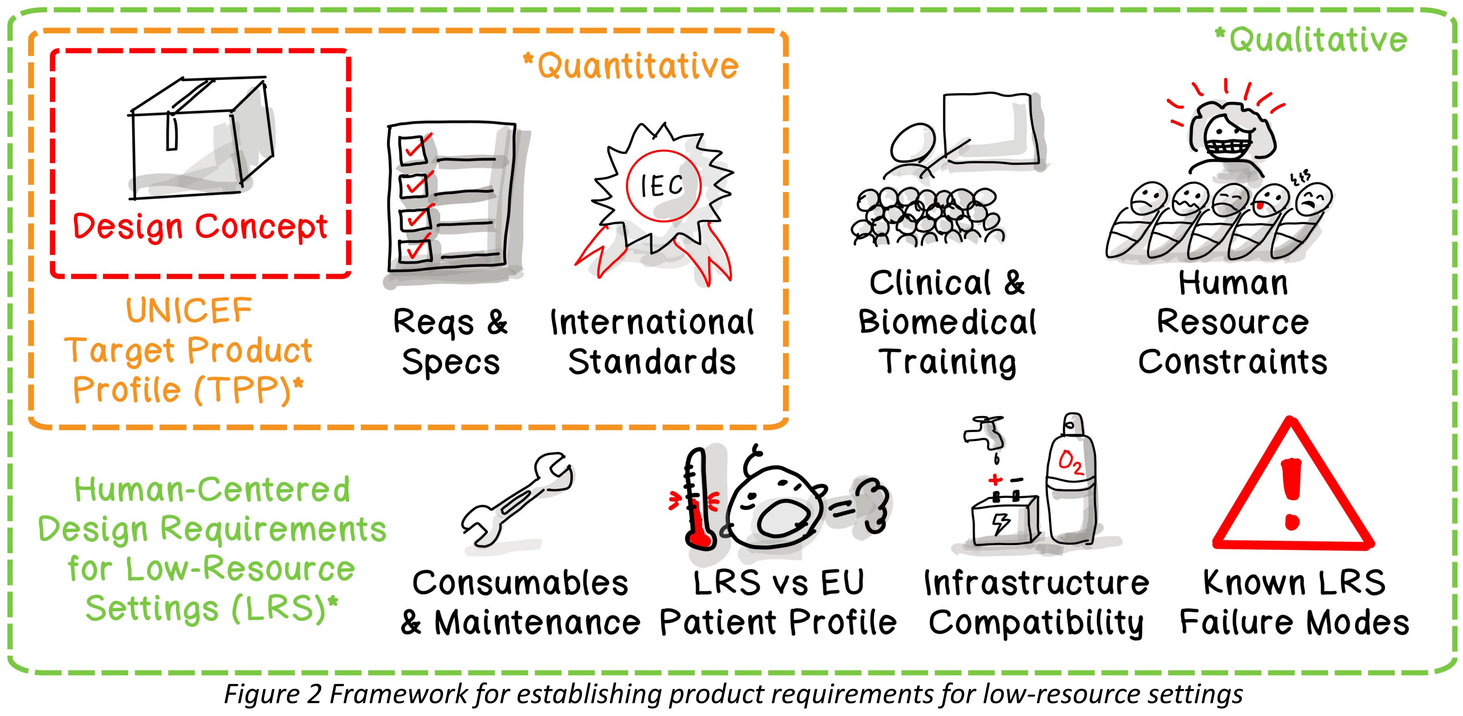

Figure 2 Framework for establishing product requirements for low-resource settings

Figure 3 from L: Kangaroo Mother Care (Afghanistan); Amecosy Conductive Warmer, Ceratherm Radiant Warmer (Goyalmara)

Figure 4 from L: HVAC unit, Survival Blanket (Goyalmara); Locally-purchased Convection Warmer (UMS)

Locally-manufactured convective warmers to stabilize hypothermic newborns were used in an emergency ward and a maternity ward, despite the known risks of scalding newborns and of starting fires. These devices were left over from the initial emergency stages of the project, but the team had yet to find suitable replacements for hypothermia treatment in the MSF catalog.

CONCLUSION

Hypothermia appears to be a challenging problem without appropriate management tools in the Bangladeshi context. The project utilises sub-par, non-quality-assured convection warmers which underlines the urgency of improving prevention and identification of more effective management solutions for neonatal hypothermia to improve patient care.

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