



सत्यमेव जयते

Health Technology Assessment in India

Department of Health Research, MoHFW



Cost Effectiveness Analysis of Hypothermia Detection Devices (BEMPU, ThermoSpot and Fever Watch) for Premature and Low Birth Weight Neonates in India

POLICY BRIEF

SUMMARY

Hypothermia has been defined by World Health Organization (WHO) as body temperature below the normal range (36.5°C – 37.5°C) and has been sub-classified into three grades; mild (36.0°C – 36.5°C), moderate (32.0°C – 35.9°C), and severe (<32.0°C) hypothermia. Premature and Low Birth Weight (LBW) neonates are at a greater risk for hypothermia because they lack body fat and have poor thermal regulation system. Often it goes undetected until it reaches a severe state where several complications arise and can even lead to death. The current standard of care (SoC) for detecting hypothermia includes measuring the body temperature of neonates every six hours with an axillary thermometer at neonatal intensive care unit (NICU). Early detection and continuous monitoring for hypothermia is desirable to prevent progression of hypothermia from the mild range to a more severe condition that can lead to further complications. This study aimed to assess the cost effectiveness of hypothermia detecting devices such as BEMPU, ThermoSpot and Fever Watch to monitor the body temperature continuously and give either a visual or audio-visual alert when the new-born's body temperature drops, in NICU setting for premature and low birth weight neonates in India. This study concluded that neither of the interventions are cost-saving from a societal perspective.



BEMPU HYPOTHERMIA ALERT DEVICE

Recommendation

- Based on the ICER value, the CEA shows that Bempu and Thermospot are not cost-effective devices for detecting hypothermia in premature and low birth weight neonates in India.
- Considering that in practical terms these devices provide continuous monitoring as opposed to intermittently by the standard of care, we could have accepted the marginally higher cost if they resulted in an increase in life years, but this was not the case.
- When data becomes available of its use in a community setting; with the device being worn by discharged/at home pre-term babies, then the CEA could be re-visited with the fresh data.
- It is worth remembering that the device will not be a remedy for societal barriers like gender based discrimination, neglect of female new-borns that exist in some parts of the country nor of poor awareness of post detection care of new-borns.
- Additionally, it has been claimed that neonatal hypothermia is more due to the lack of knowledge about hypothermia and its prevention rather than lack of equipment.



FEVER WATCH

Objective: To assess the cost effectiveness of BEMPU Hypothermia Alert device, ThermoSpot and Fever Watch against the standard of care i.e. thermometer in early detection of hypothermia among premature and low birth weight neonates in India.

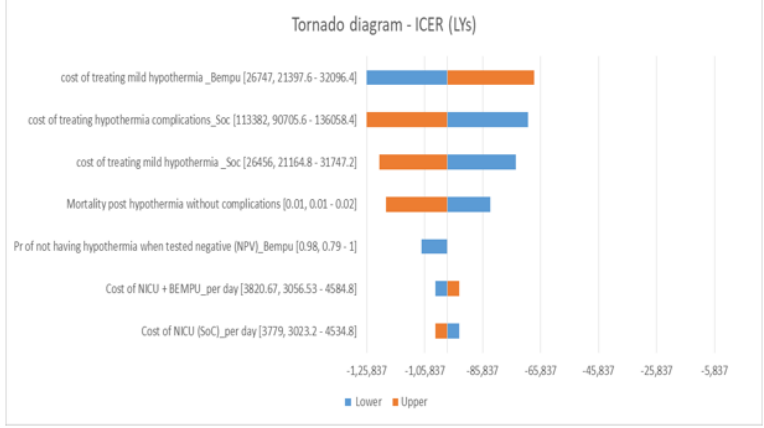
Rationale: Hypothermia is common in infants born at hospital (prevalence range, 32% to 85%) and at home (prevalence range, 11% to 92%), even in tropical environments with the highest prevalence among LBW newborns, it would require frequent or continuous temperature monitoring to prevent this condition from progressing. However, SoC is available, it is largely designed for facility level care, which requires health-literate caregivers. Non-invasive newly introduced hypothermia detecting devices specifically designed for newborns, monitor the neonate's body temperature around the clock and gives either a visual or audio-visual alert

Findings: Cost-effectiveness analysis results were estimated from societal perspective. Table-1 shows cost parameters of intervention and standard of care. Results of **Table 1: Estimated incremental cost and effects of interventions vs. standard of care**

Standard of care	
Cost for treating 100 neonates	1534431
Cost for treating per neonates	15344
Life years gained	55.540
BEMPU	
Cost for treating 100 neonates	1614096
Cost for treating per neonates	16141
Life years gained	55.537
Thermospot	
Cost for treating 100 neonates	2103779
Cost for treating per neonates	21038
Life years gained	55.490
Incremental cost in compared to SoC	
BEMPU	796
Thermospot	5693
Incremental life years gained	
BEMPU	-0.010
Thermospot	-0.060
Incremental cost effectiveness ratio	
BEMPU Vs. SoC	-128207
Thermospot Vs. SoC	-102660

*Measured the cost in INR

Figure -1: Tornado diagram for OWSA



References:

- 1) <https://www.viaglobalhealth.com/product/bempu-hypothermia-device/>
- 2) <https://www.deccanchronicle.com/gadgets/110116/watch-ing-over-your-childs-health.html>
- 3) Lunze, K., Bloom, D. E., Jamison, D. T., & Hamer, D. H. (2013): The global burden of neonatal hypothermia: Systematic review of a major challenge for newborn survival, BMC Medicine, pp. 11-24.

one way sensitivity analysis are presented in a Tornado Diagram in Fig. 1. Both interventions lie in north-west quadrant of the cost-effectiveness plane which implies that the interventions are not cost-effective when compared to optimum use of standard of care with Thermometer (Fig 2). Fig 3 shows results from a simulation performed as part of the probabilistic sensitivity analysis (PSA). In the analysis, we reported findings by considering per capita gross domestic product of India as on April 2019 as threshold for determining the cost-effectiveness. India had a GDP per capita of INR. 1, 42,034 (2045.794 USD) in April, 2019 as per Census and Economic Information Centre (CEIC) data.

Figure -2: Cost effectiveness plane for BEMPU and ThermoSpot against Thermometer

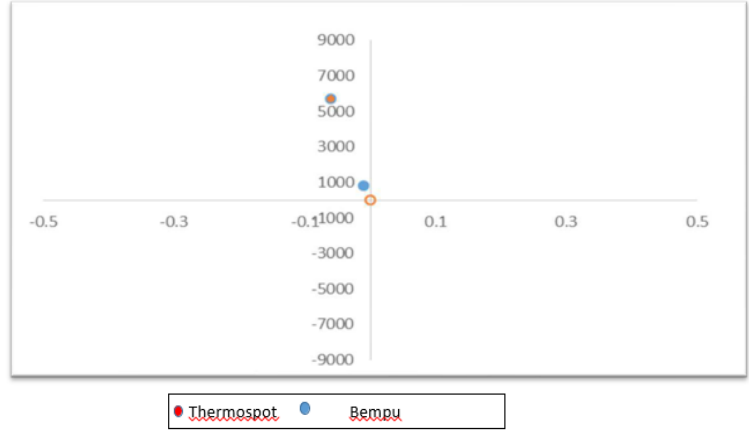
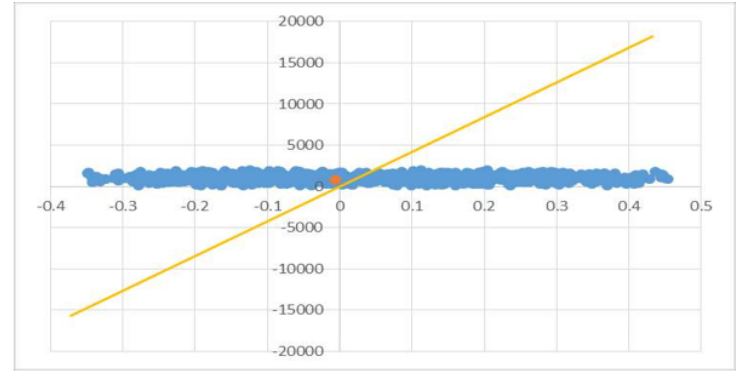


Figure 3: Cost effectiveness plane with incremental cost effectiveness ratio for BEMPU Probabilistic Sensitivity Analysis



Conclusion

The analysis carried out in this study shows that neither of the interventions are cost saving from a societal perspective. Based on the ICER value, this CEA shows that Bempu and Thermospot are not cost-effective devices for detecting hypothermia in premature LBW neonates. However, this study was carried out based on very limited evidence, a well-designed primary study that generates good quality evidence, would enable revisiting the CEA especially in community settings, which is potentially the setting where the use of such devices is needed.