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Short Communication

Neonatal Hypothermia Monitoring and Alerting Device, Acceptability among Mothers and Caregivers

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ABSTRACT

Context: Prevalence of hypothermia is reasonably high in India. 56.2% of Very Low Birth Weight (VLBW) infants experience hypothermia both in the postnatal wards and step-sown nurseries as well as in the community. Hypothermia leads to significant morbidity on its own and acts as a serious complication along with the co-morbidities. A hypothermia monitoring and alert device was innovated by BEMPU Health (BEMPU TempWatch).
Aims: To understand the views of usage among mothers and caregivers who used this novel device on babies who were discharged from neonatal unit.
Settings and Design: Feedback study
Methods and Material: A Feedback questionnaire was designed and provided to 43 of 50 mothers of newborns enrolled in the TempWatch group in an RCT examining the clinical outcome of weight gain. This paper exclusively alludes to the feedback component of the study.
Statistical analysis used: Descriptive analysis using MS Excel.
Results: The majority of mothers responded that TempWatch had been useful in detecting low temperature (100%). 79% of the caregivers felt that the alarm was sufficiently audible. They were satisfied with the size and shape (98%), was not causing any skin rashes and irritation- 98%. 95% thought it was helpful in the baby's transition from the hospital to home. 70% of mothers rated their overall satisfaction with a score of 5/5. 28% of the mothers rated their scoring as a 4/5.
Conclusions: Mothers using the BEMPU TempWatch with their infants find the device useful, accurate, and appropriate for their infants, and are highly satisfied with the device.

Key-words: Hypothermia Monitoring, Neonate, caregivers, KMC, Feedback
Key Messages: The acceptability of neonatal hypothermia monitoring devices, among mothers and caregivers was positive

INTRODUCTION

In India 28% of babies are born Low Birth Weight (LBW), meaning they weigh less than 2,500g at birth. [1] LBW babies are particularly vulnerable to various complications that contribute to their increased risk of morbidity and mortality. Hypothermia, or body temperature less than 36.5°C, is one significant risk factor for low birth weight in sick newborns that increases their risk of illness and death. [2] One large study found that 56.2% of Very Low Birth Weight (VLBW) infants experience hypothermia. In VLBW infants in particular, hypothermia has been shown to be associated with an increased risk of intraventricular hemorrhage (IVH) and mortality. [3]

The WHO recognizes the importance of thermal protection for newborns and the effectiveness of skin-to-skin contact, or Kangaroo Mother Care (KMC) for maintaining newborns' temperature. Among LBW newborns, those who receive KMC as compared to standard care have been shown to have lower mortality rates. [4] The BEMPU TempWatch (previously called the BEMPU Bracelet) was designed to promote KMC for newborns experiencing hypothermia. The TempWatch is a bracelet device that detects and alerts for hypothermia in neonates. [5] Parents whose newborns use the device are trained to respond to its alarm with thermal care measures including KMC. [6] They also learn that if despite these measures the device continues to alarm, indicating prolonged hypothermia, they should seek skilled care as the baby may be experiencing sepsis or other complications.

The accuracy of the TempWatch has been clinically validated; a controlled prospective study conducted which determined that the sensitivity and specificity of the device in diagnosing hypothermia were 98.6% and 95% respectively. Its positive predictive value was 83.6%, and its negative predictive value was 99.6%. The TempWatch was found to be 95.8% accurate at diagnosing hypothermia. [5] However, there still exists a need for information on the acceptability of various aspects of the device among parents who use it for their newborns and on parents' perception of the device's utility. A feedback study was administered as part of a larger RCT on the TempWatch at Fernandez Hospital, Hyderabad, to gain a better understanding of mothers' opinions on various aspects of the device.

MATERIALS AND METHODS

A Randomized Controlled Trial was conducted at Fernandez Hospital, Hyderabad, India, to determine the effect of use of the BEMPU TempWatch on weight gain in preterm infants as compared to the standard of care. Ethics committee approval from Fernandez Hospital was obtained prior to the start of the study. Eligible babies (stable Very Low Birth Weight (VLBW) infants with weight >1200g or PMA>32 weeks, breathing room air) were randomized to the BEMPU group or standard care group on admission to the Kangaroo ward. They continued to wear the Tempwatch even after discharge and the study ended 28 days after randomization. Infants in the BEMPU group wore the device 24 hours a day and hypothermia alarms were confirmed with a digital thermometer in the study group., Hypothermia was treated with skin to skin care, feeding and appropriate clothing. Infants' weight was recorded in both groups from enrollment until discharge and weekly after discharge until study completion. At the end of the study period, the investigator provided a questionnaire (Figure 1) to mothers of infants enrolled in the TempWatch group in the weight gain study, and their answers were recorded. The research team analyzed these questionnaire answers.

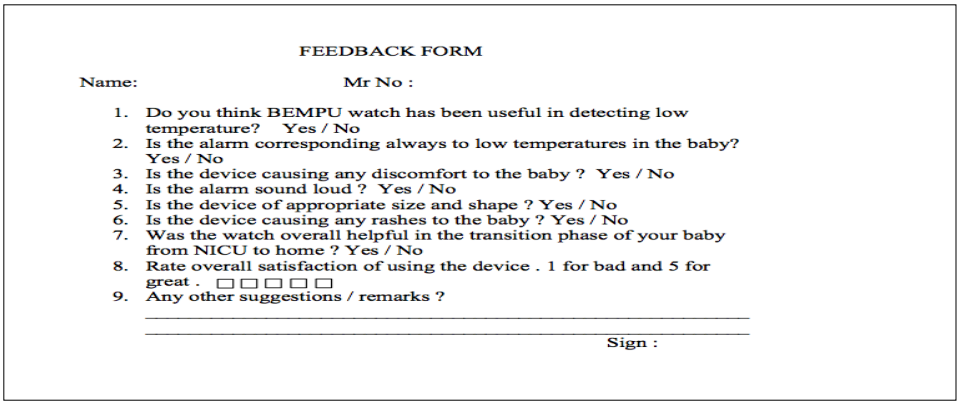
RESULTS

A total 100 mother infant dyads were enrolled in the original trial and 50 in the intervention arm. Of the infants randomized to TempWatch group, 43 mothers finished the study questionnaire. The mean maternal age of mothers enrolled in this study is 29.45years. Seventy percent of mothers were graduates and all were literates. The mean birth weight and the mean gestation of infants born to these mothers were 1196.5grams and 30.48 weeks respectively. The mean infant age at enrolment was 23.2 days and the mean age at hospital discharge was 29.3 days.

In the intervention group, 43 (100%) of mothers responded "yes" that the TempWatch device had been useful in detecting low temperature. Thirty nine (91%) of mothers said the alarm was corresponding to low temperatures in the baby all the time; one mother (2%) said it corresponded most of the time, one mother

(2%) never heard the bracelet alarm, one (2%) was not sure, and one (2%) did not answer. 42 (98%) of mothers said the device was not causing any discomfort to the baby; one (2%) said the device was causing discomfort. Nine mothers (21%) said the alarm sound was loud and 34 mothers (79%) said it was appropriately loud. 42 mothers (98%) said the device was an appropriate size and shape; one (2%) said it was not. 42 mothers (98%) said the device was not causing rashes; 1 (2%) said it was. 41 mothers (95%) said the device was helpful in the transition of the baby from the NICU to home, one (2%) said it was not helpful, and one (2%) did not answer. Mothers also rated their overall satisfaction with the device, with a score of 1 as "bad" and a score of 5 as "great." No mothers gave ratings of 1 or 2. 1 mother (2%) gave a score of 3, 12 mothers (28%) gave a score of 4, and 30 mothers (70%) gave a score of 5. Figure (3)

Figure 1. BEMPU TempWatch



FEEDBACK FORM

Name: Mr No :

1. Do you think BEMPU watch has been useful in detecting low temperature? Yes / No
2. Is the alarm corresponding always to low temperatures in the baby? Yes / No
3. Is the device causing any discomfort to the baby ? Yes / No
4. Is the alarm sound loud ? Yes / No
5. Is the device of appropriate size and shape ? Yes / No
6. Is the device causing any rashes to the baby ? Yes / No
7. Was the watch overall helpful in the transition phase of your baby from NICU to home ? Yes / No
8. Rate overall satisfaction of using the device . 1 for bad and 5 for great . ☐☐☐☐☐
9. Any other suggestions / remarks ?

Sign :

Figure 2: Feedback Questionnaire

Table: Feedback questionnaire answers

SN	Response	Number (%) of respondents
1	**TempWatch device had been useful in detecting low temperature**	43 (100%)
2	**TempWatch's alarm was corresponding to low temperatures in the baby**	
	Corresponding to low temperatures in the baby all the time	39 (91%)
	Corresponded most of the time, one mother	1 (2%)
	Never heard the bracelet alarm	(2%)
	Was not sure	(2%)
	Did not answer	(2%)
3	**Did the device cause any discomfort?**	
	Device did not cause any discomfort	42(98%)
	Device was causing discomfort	1 (2%)
4	**Was the alarm Sound loud**	
	The alarm was sufficiently audible	34 (79%)
	The Alarm was loud	9 (21%)
5	**Did the device caused any rashes**	
	The device did not cause any rashes	42 (98%)
	The device caused rashes	1 (2%)
6	**Is the device of appropriate size and shape**	
	TempWatch is an appropriate size and shape	42 (98%)
	TempWatch is not an appropriate size and shape	1(2%)
7	**Was TempWatch helpful in the transition of the baby from the NICU to home?**	
	TempWatch was helpful in the transition of the baby from the NICU to home	41 (95%)
	TempWatch was not helpful in transition of the baby from the NICU to home	1 (2%)
	Did not answer	1 (2%)
8	**Overall satisfaction with the device (1 as "bad" and a score of 5 as "great)**	
	Scored 5	30 (70%)
	Scored 4	12 (28%)
	Scored 3	1 (2%)

DISCUSSION

The existence of clinical evidence supporting a medical innovation is not always sufficient for its widespread implementation; cultural and social context play an important role in the uptake and acceptance of an innovation. [7] While there exists clinical evidence supporting the efficacy of the BEMPU TempWatch, there is a lack of published data regarding users' opinions of the device. The findings from this feedback study are positive regarding mothers' perceptions of the device's utility, accuracy, physical comfort, form, and safety. The overwhelmingly high satisfaction ratings among mothers further demonstrate their positive experiences with the device. While the question on the bracelet's alarm being loud was intended to ask whether the sound was loud enough to be heard if the baby was swaddled or caregivers were not close by, the wording of the question was somewhat unclear. Future versions of this survey will ask more clearly whether the device's alarm sound was appropriately loud, or whether it was too loud. Regarding the one reported case of a rash, the mother told the study team that the bracelet was worn too tightly, so the study team did not feel that the bracelet's material resulted in the rash.

CONCLUSION

The results from this feedback study are promising for the acceptability of the device in larger-scale deployments in India. Mothers using the BEMPU TempWatch with their infants find the device useful, accurate, and appropriate for their infants, and are highly satisfied with the device.

REFERENCES

1. India: Profile of preterm and low birth weight prevention and care. https://www.everypreemie.org/.
2. Thermal Protection of the Newborn: a Practical Guide. Geneva: Maternal and Newborn Health/Safe Motherhood Unit, World Health Organization; 1997.
3. Miller SS, Lee HC, Gould JB. Hypothermia in very low birth weight infants: distribution, risk factors and outcomes. Journal of Perinatology. 2011;31.
4. Boundy EO, Dastjerdi R, Spiegelman D, et al. Kangaroo Mother Care and Neonatal Outcomes: A Meta-analysis. Pediatrics. 2015;137(1).
5. Tanigasalam V, Bhat BV, Adhisivam B, Balachander B, Kumar H. Hypothermia detection in low birth weight neonates using a novel bracelet device. J Matern Fetal Neonatal Med. 2019 Aug;32(16):2653-2656.
6. BEMPU TempWatch. Bempu Health. https://www.bempu.com/tempwatch. Accessed April 15, 2019.
7. Barriers to Innovation in the Field of Medical Devices: Background Paper 6. World Health Organization; 2010.

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