

Role of learning material delivered by short message service in addressing to the gaps in the knowledge of nursing personnel related to newborn care by one of the reviewers in a selected neonatal intensive care unit of tertiary care facility

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ABSTRACT

Objectives: The present study was undertaken (i) to evaluate the role of short message service (SMS) in improving the knowledge scores of nurses in the key areas of newborn care (NBC) and (ii) to explore the perception of nurses regarding the delivery of SMS on NBC. **Methods:** This pre-experimental (one group pre-test post-test) study was conducted on 30 nurses working in a tertiary level neonatal intensive care unit (NICU). The effectiveness of SMS delivery in reducing the gaps in the knowledge of nurses related to NBC was measured in terms of gain in knowledge scores using a structured knowledge questionnaire. The perception of nurses toward the delivery of information on NBC using SMS was also assessed on 5 point likert scale. **Results:** The knowledge scores of nurses improved significantly after the SMS delivery on NBC (pre and post, 9.6 ± 2.2 , 17.13 ± 1.2 ; $p < 0.005$). The nurses' overall perception about SMS delivery on NBC was good. **Conclusion:** SMS delivery on NBC has a potential role in updating and refreshing the knowledge of nurses working in NICU.

Key words: Knowledge, Mobile phone, Newborn care, Nurses, Perception, Short message service

Neonatal health is the key to child survival and well-being [1]. Neonatal period poses a great challenge in the clinical care and public health. Nearly, 99% of all the neonatal deaths occur in low- and middle-income countries [2]. Majority of these deaths are caused by infections, prematurity, and asphyxia [1,2]. The common identified reasons for high-neonatal mortality are mainly lack of competent and adequately skilled professionals in the hospitals, weak health systems with limited infrastructure, and low density of skilled health professionals [3,4]. Action plan developed by the WHO [4] aims toward strengthening and investing in care during labor, child birth, and the 1st day and week of life and improving the quality of maternal and newborn care (NBC).

Nurses are the important members of health-care team; play significant role in the neonatal care at all health-care facilities such as subdistrict, district, and higher level. Nurses are the interface with the community and the family in regard to the promotion of healthy NBC practices. Care of neonates is largely shouldered by nurses in any neonatal intensive care unit (NICU). Moreover, contribution of the nurses is more important at subdistrict and district levels due to shortage of neonatologists. It is the nurses who primarily provide the life-saving interventions under the guidance of neonatologist to the sick babies admitted in NICU. In the present study, NBC was operationally defined as providing essential NBC and performing critical procedures

such as monitoring sick neonates, intravenous cannulation, endotracheal suction, administration of fluids and drugs, and gavage feeding. Apart from providing NBC, nurses also maintain various neonatal equipment such as radiant warmer, incubator, cardiac monitor, phototherapy unit, and ventilators, required for managing sick neonates. They are not only responsible for managing sick neonates but also for counseling mothers about breast feeding, home care of low birth weight babies to instituting Kangaroo Mother Care and stabilizing sick neonates brought to health facility [5].

Hence, newborn health can be achieved by providing evidence-based clinical guidelines to the nursing personnel. Mobile phones have become an integral part of everyday life. Using short message service (SMS) through mobile phones encourages communication among health-care professionals by sending and receiving text messages [6]. The same has been used undoubtedly as an innovative methodology in education, teaching health-care professionals in the past few years [7]. There are few studies [8-10] that indicate the use for SMS for bringing awareness among patients about the disease management and nursing students in enhancing their knowledge related to medication calculation, but no research has been done to test the direct effect of SMS in enhancing the knowledge of nurses related to NBC. Therefore, the present study was conceptualized to evaluate the effectiveness of using mobile phone SMS in terms

of gain in knowledge related to NBC among nurses and to find out their perception about the use of SMS in neonatal education.

METHODS

In a pre-experimental study, using one group pre-test post-test design, 30 nurses working in a tertiary level NICU were recruited, using simple random sampling technique from the cohort of 60 nurses. Our NICU is having facility for admitting all types of high risk and pre-term neonates, where neonatal in-service education is a regular feature. The sample size calculation was based on the obtained mean knowledge score of the nurses (5.17±2.47 [2-9.5, max score 10]) in an initial pilot study. We presumed that a rise of the score to 7.0 would be the reflection of improved knowledge. With 90% power and 0.5% level of significance, the expected sample size was 21. Considering 10-20% drop out rate; we planned to recruit 30 nursing personnel.

The inclusion criteria included the nurses using the mobile phones for receiving and delivering SMS, available during the study and willing to participate. An approval from the Institute Ethics Committee was obtained. Informed written consent was taken from the nurses working in NICU after assuring them the confidentiality and anonymity.

Tools for data collection included the demographic sheet, pre-validated and tested knowledge questionnaire and the perception scale. Reliability of tools was established before the use ($\alpha=0.89$, $\alpha=0.85$). The knowledge questionnaire had 20 items including 10 multiple choice questions and 10 true/false type questions based on the care of the baby at birth, infection control and prevention, monitoring a sick neonate, administering intravenous medications, orogastric (OG) feeding, prevention of retinopathy of prematurity (ROP), and care of baby on mechanical ventilation. A score of one was given for correct response and 0 for incorrect response with the maximum possible score of 20. The perception scale had 10 items in which the nurses were requested to opine on the content delivery, clarity, relevance, usefulness, and satisfaction with the information received through SMS on 5 point likert scale as very good (5), good (4), uncertain (3), poor (2), and very poor (1).

Demographic data were collected, and baseline knowledge of nurses was assessed using a knowledge questionnaire before the delivery of SMS. 30 SMS (one SMS per day) related to NBC covering key areas such as care and assessment of baby at birth per day, infection control and prevention, continuous positive airway pressure ventilation, OG feeding, ROP screening, newborn individualized developmental care and assessment program, peripherally inserted central catheter, monitoring and caring sick neonates, neonatal resuscitation, and neonatal equipment's were delivered to the study participants over a period of 30 days by the principal investigator (PI). The messages were tailored depending upon the identified needs of nurses working in NICU by the nurse educator (PI). Post-intervention knowledge scores of nurses related to NBC and their perception about the use of SMS for delivering information on NBC were assessed on 31st day.

Data were coded and entered in Excel sheet and analyzed using appropriate descriptive and inferential statistics with the

Statistical Package for the Social Sciences 19.0. The frequencies, percentage, mean, standard deviation, and median were computed for the demographic data and perception related to SMS. The knowledge scores of nurses were compared using paired t-test. The $p<0.05$ was taken as significant.

RESULTS

Median age of the nurses enrolled for the study was 29 (23-42) years. Majority of the nurses were sister Grade II (bedside nurses) resided in urban area. Majority of the nurses (53.3%) were diploma holders in general nursing and midwifery with the mean NICU experience of 2.9±3.2 (0.1-16) years. Majority of the nurses (66.6%) had attended in-service neonatal education programs conducted in the unit. All the enrolled nurses had personal mobile phones, communicating through SMS, and half of them were reading all the messages and spent less than 1 h for self-study or reading clinical-related problems (Table 1). There was significant gain in post-knowledge scores as compared to pre-knowledge scores (9.6±2.2 vs. 17.8±1.2, $p<0.05$) (Table 2).

Table 1: Demographic characteristics of nurses working in NICU (n=30)

Variable	F (%)
Age (years)*	29 (23-42)
Residence	
Rural	7 (23.3)
Urban	23 (76.7)
Professional education	
GNM	16 (53.3)
BSc. Nursing	11 (36.7)
MSc. Nursing	3 (10)
Designation	
Sister Gr II	27 (90)
Sister Gr I	3 (10)
Total professional experience (years)*	7 (0.8-16)
Experience in NICU (years)*	2 (0.1-16)
Attended in-service education	
Yes	20 (66.7)
No	10 (33.3)
Have personal mobile?	
Yes	30 (100)
Communicate through SMS?	
Yes	30 (100)
How many SMS you read in your mobile in a day?	
All	15 (50.0)
>10	8 (26.7)
5-10	4 (13.3)
<5	3 (10.0)
How many hours do you spend for self-study/reading clinical-related problems?	
<1 h	30 (100)

*Median range. NICU: Neonatal intensive care unit, GNM: General nursing and midwifery

Perception of nurses toward the delivery of information on NBC using SMS was good in terms of content delivery, clarity, relevance of message, usefulness, etc. (Table 3).

DISCUSSION

Findings of the present study reveal significant gain in the knowledge scores of nurses following the reception of SMS on NBC. Perception of all the nurses toward the delivery of information on NBC using SMS was good. SMS allows rapid reception and reply at low cost. It is an interactive service, and very simple, fast, and confidential that can be operated any time even while travelling. The SMS technology provides the potential for collaborative interaction and learning opportunities for geographical dispersed persons and groups [9]. The wide spread usage, easy availability of mobile phones, and no requirement for any technological training enables the use of these devices for educational purpose [7]. Significant improvement in the knowledge scores of nurses following the reception of SMS suggests the success of delivery of text messages. Similar findings were reported by Kavari and Asadi [10] and Chang and

Tsao [11]. However, due to the absence of control group, the gain in knowledge scores cannot be attributed purely to the SMS delivery.

Receiving medical information on NBC through SMS is the latest, low-cost method of disseminating the best clinical knowledge to the nurses in the form a daily mini capsule. In NICU, nurses need frequent small knowledge updates on day-to-day basis to provide quality care to newborns in addition to regular in-service neonatal education programs. Instant knowledge updates of the nurses through SMS delivery could be a useful step in improving neonatal care in NICU in tune with evidence-based recommendations; especially, in places where there are limited opportunities for continued neonatal nursing education. In our study, all the nurses did spend <1 h time in studying the clinical conditions. In view of that situation, updating them with SMS can be a wonderful idea. It can supplement the knowledge acquired through regular in-service education programs to some extent, especially for those nurses who are not able to attend the regular in-service neonatal nursing education program.

Walsh and Brinker [12] reported the positive perceptions of the university students toward SMS privacy and convenience. In the present study also, the participants' perception on the delivery of information through SMS was good. They perceived that SMS is a novel idea to update one's knowledge in NBC. It was also opined that the learning material through SMS was complete, clear, relevant, and useful. The received information on NBC has made nurses more knowledgeable, and confident. Nurses were satisfied with the information provided on NBC and wanted more SMS on NBC in the future.

Table 2: Knowledge scores related to NBC before and after SMS delivery (n=30)

Knowledge scores	Mean±SD		p value
	Before SMS delivery	After SMS delivery	
	9.6±2.2	17.8±1.2	0.004*

Paired t-test, *p<0.05. SMS: Short message service, NBC: Newborn care, SD: Standard deviation

Table 3: Perception about the use of SMS on NBC

Perception	Rating	F (%)	Median (range)
Content/learning material delivered through SMS was complete	Good	7 (23.3)	5 (4-5)
	Very good	23 (76.7)	
Message sent related to NBC practices was clear	Good	5 (16.7)	5 (4-5)
	Very good	25 (83.3)	
Message sent related to NBC practices was relevant	Good	6 (20)	5 (4-5)
	Very good	24 (80)	
Message sent related to NBC practices was applicable in NICU	Good	5 (16.7)	5 (4-5)
	Very good	25 (83.3)	
Information received through SMS was useful for me	Good	5 (16.7)	5 (4-5)
	Very good	25 (83.3)	
Information related to NBC practices through SMS has made me knowledgeable in NBC practices	Good	5 (16.7)	5 (4-5)
	Very good	25 (83.3)	
Information related to NBC practices through SMS has made me confident in dealing with newborns	Good	4 (13.3)	5 (4-5)
	Very good	26 (86.6)	
I am overall satisfied with the information provided by SMS related to NBC	Good	6 (20)	5 (4-5)
	Very good	24 (80)	
Getting information through SMS is a novel idea to update oneself in NBC	Good	4 (13.3)	5 (4-5)
	Very good	26 (86.6)	
I would be happy to receive more SMS related to newborn practices in the future	Good	5 (16.7)	5 (4-5)
	Very good	25 (83.3)	

SMS: Short message service, NBC: Newborn care, NICU: Neonatal intensive care unit

Pre-experimental, a weak design was used in the present study. It was not possible for us to have the control group from the same setting as we feared of the contamination of sample during the study. Therefore, absence of control group in the present study limits its generalizability. In addition, in view of the ongoing in-service neonatal education in the unit, we cannot conclusively confirm that the gain in knowledge scores was purely due to the education imparted through SMS. A study with delivery of information on NBC through SMS along with skills development and assessing the transformation of knowledge into practice can be done in the future. There is also need for assessing the long-term effects of SMS delivery on essential NBC provided by the nurses.

CONCLUSION

SMS delivery on NBC has a potential role in updating and refreshing the knowledge of nurses working in NICU. Hence, it may be used to give frequent updates to the nurses on regular basis.

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