Original Article

Pilot testing of a computer-based self-instructional module on organ donation for improvement in knowledge and acceptability of nurses working in the intensive care unit of a tertiary care institute

Poonam Joshi[1], Merin Thomas[2], Gopichandran Lakshmanan[1], Rakesh Garg[3], Sanjeev Lalwani[4], Arti Vij[5], Ahamadulla Shariff[6]

[1]College of Nursing, [2]Department of Nursing Services, [3]Department of Onco-Anesthesiology and Palliative Medicine, [4]Department of Forensic Medicine, [5]Organ Retrieval and Banking Organization, [6]Computer Facility, All India Institute of Medical Sciences, New Delhi, India.

ABSTRACT

Objectives: Nurses are an integral team member in intensive care units (ICU) and can play important role in facilitating the organ donation process. Hence, the sensitisation of these nurses is important. The aim of the study was to assess the effectiveness of a computer based self-instruction module (CBSIM) in terms of improving the knowledge and acceptability of nurses in relation to organ donation.

Materials and Methods: In this prospective study, 56 nurses working in an ICU were enrolled using the total enumeration technique. After filling up of the demographic profile, nurses attempted online pre-test, containing 20 randomly selected multiple-choice questions (MCQs) from a validated and pre-tested question bank containing 150 MCQs. The intervention consisted of self-paced CBSIM containing nine modules on different aspects of organ donation. The intervention was completed in 25 ± 5 days, followed by an online post-intervention test. Acceptability of the CBSIM by nurses about organ donation was assessed as a secondary outcome on a 5-point Likert scale.

Results: A significant gain in knowledge scores was observed after the CBSIM (4.9 ± 1.14 vs. 7.35 ± 1.34, $P < 0.001$) with high acceptability of CBSIM by most of the nurses (59.2%).

Conclusion: CBSIM was effective in improving the knowledge of nurses related to organ donation and highly acceptable to most of the nurses working in ICU. Hence, CBSIM can be used as a method of learning for nurses.

Keywords: Knowledge, Nurses, Computer-based self-instructional module, Effectiveness, Acceptability

INTRODUCTION

Transplantation of human organs from one individual to another is undoubtedly one of the greatest breakthroughs in medical sciences.[1] Modern medical and surgical techniques, along with the use of immunosuppressive agents, have transformed organ transplantation from experimental procedures to acceptable treatment modality for end-stage renal, liver, pancreatic, heart and lung disease in patients.[2] Surgical replacement of end-stage organ with a healthy donated organ is a ray of hope for the patients with end-stage organ failures. In India, the concept of cadaveric organ donation is growing relatively at a slower pace as evidenced by the

doubling of the deceased organ donation rate from 0.16 million population in 2012 to 0.34 population in 2014.[2] Unfortunately, Indian patients in need of organs are unable to benefit from medical advancement due to the shortage of organs available for transplantation.[3]

Nurses play an important role in managing critically ill patients in the intensive care unit (ICU). Being an integral part of the ICU team, they can be a great help for process of the organ procurement from the potential brain dead donors. Lack of awareness among the general public about organ donation (80.1%) and absence of faith in the health-care system (40.3%) are the two important reasons along with religious beliefs and superstitions (63.4%).[3,4] These limitations can be taken care by preparing the health-care personnel (HCP), who can motivate public for organ donation. Nurses while working in ICU can impart timely counselling to the families of brain-dead patients. However, appropriate training is lacking among HCP especially nurses.[5-9] This can be attributed to inadequate information provided at pre-service nursing education programs and the diversity in training of nurses across the country.

Application of technology in education has made computer-based self-instructional modules (CBSIM) popular among learners due to interactive, accessible, self-paced and flexible ways of giving multimedia presentations that utilise textual materials, sound, motion and visuals. The CBSIM is capable of improving cognitive knowledge of the learners in a short period with higher satisfaction in contrast to the conventional method.[10-14] In the present study, the investigator intended to determine the existing knowledge of nurses related to organ donation, to develop and test the effectiveness of CBSIM and to gauge its acceptability. It was hypothesised that there would be a significant improvement in knowledge scores of the nurses after the implementation of CBSIM on organ donation as assessed by a structured questionnaire.

MATERIALS AND METHODS

This quantitative, single arm and pre-test-post-test design study was conducted among 56 nurses working in adult medical and surgical ICU after ethical clearance from the institute ethics committee (vide no. IEC/461/8/2018). The nurses were enrolled using total enumeration technique. Nurses willing to participate and available during the study were included. Nurses who could not complete the modules were excluded from the study. Eligible participants were provided the study protocol and written informed consent was obtained. Confidentiality and anonymity of subjects were assured. The duration of the study was 12 months, during which the module was developed, validated and pilot tested among the nurses. The development of the computer-based self-instructional module (CBSIM) was based on review of literature by the researcher along with relevant information

related to organ donation from the government website and documents.

The demographic profile was recorded from the nurses. They were provided with a unique identity (ID) and passwords to have access to the CBSIM. Computer based pre-intervention assessment of knowledge related to organ donation was done with 20 randomly selected questions from a set of 150 pre-validated and tested multiple-choice questions (MCQs) on organ donation. For every correct response, a score of 'half' and for incorrect 'zero' score was given. Overall knowledge scores were graded out of ten. The knowledge scores were further categorised as excellent ($\geq$8), good (6–7.9) and poor (<6). Acceptability of nurses for CBSIM was assessed using an acceptability performa having ten items on a 5-point Likert scale as highly satisfied (5), satisfied (4), uncertain (3), unsatisfied (2) and highly unsatisfied (1). The overall obtained acceptability scores were categorised as high ($\geq$40), moderate (35–39) and low (<35) with maximum possible acceptability score of 50.

Intervention

The intervention consisted of the CBSIM having nine modules, namely (i) definitions related to organ and tissue donation, (ii) type of organ donation, (iii) brain death, its criteria and diagnostic tests, (iv) legal and ethical issues concerning organ donation, (v) role of a nurse in counselling relatives of a brain dead patient, (vi) voluntary organ donation. (vii) process of organ donation, (viii) medical management of the brain-dead patient and (ix) nursing care of the critically ill patient and counselling family members about organ donation. Each module was of 35–40 min duration. Two videos on overview of organ donation and diagnosis of brain death (available in the public domain) were also incorporated in modules. Permission to use the videos was obtained from Mohan Foundations a nodal agency, promoting organ donation in the India. The entire study material was developed using text and images and flow diagrams in Microsoft PowerPoint Presentation. The educational material was uploaded by the department of computer facility to make it accessible to the nurses, through an intranet facility in two desktop computers available in the ICU. Nurses were denied access to the CBSIM on their laptops and mobile phone because of the testing of the pilot project. It was an individual self-paced module reading as per the availability of time in the ICU. In-service education coordinator posted in the department ensured that each nurse gets some 15–20 min to go through the module each day. The participants could have access to one module at a time in a sequential manner. After completion of each module, as part of self-assessment, nurses had to attempt a set of MCQ. Immediate correct responses were provided to the respondents by the computer. A nurse educator posted in the unit motivated the nurses to complete the program. Post-intervention assessment with 20 randomly selected

MCQs was done at the end of the program. Both pre- and post-intervention tests were individually invigilated by the researcher by allowing only two nurses to compete the assessment on the desktops used for the training purpose. Time taken to complete the assessment was 20 min. Certificate of attendance with 8 credit h was auto-generated at the end of CBSIM as part of the continuing education program. The researcher did not have access to the results until the end of the study.

Data analysis

The independent variable was the CBSIM and the dependent variables were the knowledge and acceptability of nurses in relation to CBSIM. The obtained data were downloaded and saved in an excel sheet and analysed using SPSS 22.0. Descriptive and inferential statistics were computed. Data were checked for normality graphically using the histogram. Frequency, percentage, mean, SD, median and range and paired *t*-test for knowledge variable were used with a one-tailed $P = 0.05$ as a set level of significance.

RESULTS

The final sample size for the study was 54, due to drop out of two subjects mainly due to transfer to another facility and other nurses went on long medical leave.

Most of the nurses (79.6%) were <40 years of age with a mean age of 33.75 ± 7.34 years, female (61.1%) and married (68.5%). The majority of nurses (94.6%) were either holding general nursing midwifery or Bachelor in Nursing degree. All nurses had heard of the organ donation concept. Source of information for organ and tissue donation was multiple that is mass media, part of the curriculum, in-service education, magazine/journals and public lecturers. Most of the subjects (68.5%) felt that the publicity about organ donation and transplantation was adequate in the facility. [Table1] Mean knowledge scores of the nurses improved following the completion of CBSIM as compared to the baseline (4.9 ± 1.14 vs. 7.35 ± 1.34) ($P < 0.0001$). [Table 2] The CBSIM was highly acceptable to 59.2% of the nurses with mean overall acceptability score of 41.2 ± 5.1 and item-wise median acceptability scores of 4.[1-4] The majority of nurses found CBSIM comprehensive, interesting, self-explanatory and easy to understand. It was reported that the diagnostic tests were well explained with the help of high-quality videos. The majority of nurses recommended it for all nursing personnel working in the hospital [Table 3].

DISCUSSION

We observed from our study that CBSIM on organ donation was effective in improving the knowledge of nurses and was highly acceptable to most of the nurses.

Organ donation is the cornerstone in the process of transplantation, having culmination of two processes; ending the life of the patient life and obtaining permission for the donation from the relatives of the patient. Nurses, being the important members of the health-care team (HCT) in any ICU, are most intimately involved in end-of-life care and can counsel families for organ donation. The findings of several studies indicate that there is a need to educate members of HCT especially the nurses about organ donation, for better preparation of the families of brain dead patients.[5-8] Lot of patience is required on the part of nurses, as one sitting may not be sufficient to prepare the family of the brain dead patients. Given an excessive load of patients and the inability to spare the nurses from the ICU for in-service education, CBSIM can be an effective way of imparting knowledge in any health care facility.

It is clear that CBSIM improved the knowledge of participants in this study, but the present study did not address how this program impacted clinical outcomes in terms of an increase or decrease in the rate of organ donation. In the present study, most study participants (88.9%) had not signed an organ donation card which reflects on larger societal and cultural issues that impact knowledge and attitudes about organ donation in India. Therefore, there is a need to prepare the health-care professionals (HCP) in the area of organ donation, who, in turn, can interact with patients and the families in providing meaningful, insufficient information related to organ donation. The help of the spiritual leaders can also be sought to make the concept of organ donation popular to the relatives of brain dead patients in an ICU after their thorough sensitisation with the concept.

CBSIM is a self-paced program that can be operated anywhere, anytime as per the convenience of the nurses. This kind of program would help nurses to update their knowledge related to organ donation and counsel families of brain-dead patients. However, the success of the CBSIM depends on the motivation level of the participants. In the present study, nurse educator of the unit motivated nurses regularly to complete the CBSIM. The incentive was provided to the participants by awarding them 8 credit h on their successful completion of the program. Many studies have already proven the effectiveness of CBSIM for HCP.[9-14] Providing access to CBSIM through the internet on personal laptops and mobiles can improve the usability of CBSIM among the nurses in a relatively shorter time as compared to the 25 ± 5 days taken to complete all the modules in the present study. The findings of the present study are in tune with the studies by Bloom *et al.*, Bloomfield *et al.*, Cantrell *et al.*, Huckstadt and Hayes *et al.*, Hasselbring and Jim *et al.*[9-15] who have concluded that self-paced and self-directed CBSIM can act as an alternative to conventional teaching and may help in optimal utilisation of resources in resource constraint country like India.

Table 1: Demographic profile of nurses (*n*=54).

Variable		f (%)
Age (years)		33.75±7.34*
	21–30	20 (37)
	31–40	23 (42.6)
	41–50	11 (20.4)
Sex	Male	21 (38.9)
	Female	33 (61.1)
Marital status	Married	37 (68.5)
	Single	17 (31.5)
Religion	Hindu	35 (64.8)
	Christian	16 (29.6)
	Muslim	3 (5.6)
Professional qualification	GNM	23 (42.6)
	BSc (Nursing)	28 (51.9)
	MSc (Nursing)	3 (5.6)
Total experience (years)		9.5 (2.4–16.2)**
Experience in the present area (years)		5.8 (1–10)**
Heard of organ donation	Yes	54 (100)
Source of Information about organ donation (multiple responses#)	Mass media	28 (51.9)
	Part of curriculum	22 (40.7)
	In-service education	28 (51.9)
	Magazine/Journals	16(29.6)
	Public lecture	12 (22.2)
Attended seminar or workshop on organ donation	Yes	33 (61.1)
	No	21 (38.9)
Information about organ donation (self-report)	Adequate	39 (72.2)
	Inadequate	15 (27.8)
Interested in attending CBSIM (e-learning session) on organ donation	Yes	51 (94.4)
	No	3 (5.6)
Signed organ donation card	Yes	6 (11.1)
	No	48 (88.9)
Personal/family experience with organ donation	Yes	3 (5.6)
	No	51 (94.4)
Counselled any patient's relative for organ donation	Yes	42 (77.8)
	No	12 (22.2)
Nurses have role in motivating patients' relatives for their organ donation	Yes	48 (88.9)
	No	6 (11.1)
Publicity about organ donation and transplantation in hospital	Adequate	37 (68.5)
	Inadequate	17 (31.5)

*Mean±SD, **Median (range). CBSIM: Computer-based self-instruction module, GNM: General nursing midwifery

Table 2: Mean gain in knowledge scores before and after computer based self-instructional module (*n*=54).

Variable	Mean knowledge scores before CBSIM	Mean knowledge scores after CBSIM	*P* value
Knowledge	4.9±1.14	7.4±1.34	0.001**

Paired *t*-test, *P*<0.05. CBSIM: Computer-based self-instruction module

The present study has some limitations. The absence of a control group, small sample size and a single-centre study limit the generalizability of the study findings. CBSIM has no utility in a setting with no computers and internet facilities.

There is a need for replicating the study using a large sample size in multiple settings. A randomised controlled trial may further prove the efficacy of CBSIM by comparing with offline classroom educational programs on organ donation. The present research design did not relate the rate of organ donation from brain dead patients in the facility with the implementation of this project.

In the present study, nine modules were used to update the knowledge of nurses covering different aspects of organ donation at a reasonable time. Use of flow charts, images with some text, audio and video ensured a better understanding of organ donation concept. Computer-based pre-test and final

Table 3: Acceptability of nurses in relation to CBSIM (*n*=54).

S. No.	Statement		Median score (range)
1.	Comprehensive in providing information related to brain death		4 (1–5)
2.	All the tests done to diagnose brain death could be understood well		4 (2–5)
3.	Each module was self-explanatory		4 (2–5)
4.	It was easy to understand the key concepts related to organ and tissue donation		4 (1–5)
5.	Interesting to go through		4 (2–5)
6.	Videos were informative and of very high quality		4 (1–5)
7.	Entire content was well organised		4 (2–5)
8.	Module has covered all important aspects related to organ and tissue donation		4 (1–5)
9.	It would be helpful in counselling relatives of brain dead patients after completing the module		4 (2–5)
10.	I would recommend it for all nursing personnel to go through it		4 (3–5)
11.	Categories of acceptability (f(%))	High (≥40)	32 (59.2)
		Moderate (35–39)	17 (31.4)
		Low (<35)	5 (7.4)
	Overall acceptability score (mean±SD)		41.2±5.1

CBSIM: Computer-based self-instruction module

post-intervention tests were done under the strict supervision of the researcher, controlling the possibility of impersonation. In the present study, researcher bias has been minimised by making researchers having no access to results until the end of the study. The pre- and post-intervention assessments were done using randomly auto-selected questions from a question bank having 150 items by the system; spread over 1 month had taken care of the spill-over effect and suggests retention of knowledge.

CONCLUSION

CBSIM was effective in improving the knowledge of nurses related to organ donation and highly acceptable to most of the nurses working in ICU. Hence, it can be used as a method of learning for nurses.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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