Manipal Journal of Nursing and Health Sciences

Volume 6 | Issue 2 Article 2

7-1-2020

Effectiveness of computer-assisted teaching program on knowledge and practice of postnatal mothers regarding newborn care

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Cover Page Footnote

I express a deep sense of gratitude to Principal, Government College of nursing Holenarasipura. Sincere gratitude to all the postnatal mothers for participating in this study.

Original Article

Effectiveness of computer-assisted teaching program on knowledge and practice of postnatal mothers regarding newborn care

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Abstract

Introduction: The arrival of a newborn in a family is a complex and significant event. There will be a series of functional changes to prepare the newborn for the passage across the bridge between gestation, within and outside the womb. Lack of essential newborn care is one of the leading causes of neonatal morbidity and mortality. To prevent these problems, practices such as clean cord care, thermal regulation and initiating breastfeeding immediately after birth could play an essential role. The objective of the study is to determine the effectiveness of computer-assisted teaching program on knowledge and practice of postnatal mothers regarding newborn care**. Method**: An evaluative approach with one group pre-test and post-test design was adopted. A structured knowledge questionnaire and practice checklist was constructed, and a computer-assisted teaching program was developed, content validity and reliability of the data collection instrument was established. Using a nonprobability convenient sampling technique study was conducted among 50 postnatal mothers in Holenarasipura Government Hospital. A structured knowledge questionnaire was used to assess the knowledge and practice checklist was used to determine the self-reported practice. After the implementation of a computer-assisted teaching program, post-test was conducted on the fourth day using the same structured questionnaire and observational checklist. The results were described by using descriptive and inferential statistics. **Result**: The analysis of pre-test and post-test knowledge showed that the mean percentage of post-test knowledge score (77.2%) was higher than the mean percentage of pre-test knowledge score (48%). The mean percentage of the post-test practice score (76.2%) was higher than the mean percentage of the pre-test practice score (45.2%). There was a significant difference between the mean pre-test and post-test knowledge score ($t_{(cal)}$ =42.83, $t_{(49)}$ =1.96, $p < .05$) as well as practice score ($t_{(cal)}$ = 30.03, $t_{(49)}$ =1.96, $p < .05$), which revealed that computer-assisted teaching program was effective in improving the knowledge and practice of postnatal mothers regarding newborn care. **Conclusion:** The results of this study showed that the computer-assisted teaching program was effective in improving the knowledge and practice of postnatal mothers regarding newborn care. This training program can be implemented at the OPD level for educating postnatal mothers and family members during antenatal visits or in the wards to empower them to provide comprehensive newborn care.

Keywords: Newborn care, postnatal mother, computer-assisted teaching program.

Introduction

Birth of the newborn is the first turning point in life and considered as the happiest event in the family, which could increase the strength in a family. Dominic, Joy, Kurian, Jose and Shilpa (2013) found that immediately after birth, the newborn must make rapid adjustments successfully to adopt outside the womb. The care and love from the mother are critical to the newborn to survive after the delivery. The first hour of life outside the womb is a time when a baby sees his or her parents for the first time and a family is formed.

The foundation for a good life is laid during the first year of life. During the first year of life, the psychological and biological needs are to be met properly to ens

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Manuscript received: 09 September 2019
Revision accepted: 03 April 2020

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How to cite this article: Mallika, M., Shilaja K G (2020). Effectiveness of computer-assisted teaching program on knowledge and practice of postnatal mothers regarding newborn care. *Manipal Journal of Nursing and Health Sciences*, 6 (2). 1-8.

the healthy development of the child (Subbiah, 2003). The health of the precious resource 'newborn' depends on nurturing practice (K.C. Leena, 2014)

The report of UNICEF shows a high rate of neonatal death (about 0.75 million) every year in India. There has been a significant decrease in the neonatal mortality rate (NMR) from 52 per 1000 live births in 1990 to 28 per 1000 live births in 2013. India contributes to one-fifth of global live births and more than a quarter of neonatal deaths. The global NMR findings between 1990 and 2017 NMR show a decreased by 51% of deaths per 1000 live births. The estimated number of neonatal deaths during the same period decreased from 5.0 million to 2.5 million. There is a wide variation in the annual NMRs with the highest rate being reported form central Africa and South Asia (Hug et al., 2019).

Even though the mothers are the caregiver for children irrespective of education, income and social class differences, the studies report inadequate knowledge of newborn care (Majumder, 2018). The newborn is supersensitive, delicate and susceptible to infections and injury which can quickly harm if not taken care of (Phillips, 2013) Care received by the newborn soon after the birth plays a significant role in reducing the neonatal morbidities and mortalities. Essential newborn care practices like clean cord care, thermal regulation and initiating breastfeeding immediately after birth in the hospital are followed to ensure maintaining the good health of the newborn and thus reduce neonatal morbidity and mortalities. This study aimed to assess the knowledge and practice level of postnatal mothers regarding newborn care.

Objectives of the study

- To assess the knowledge and practice among postnatal mothers regarding newborn care.
- To develop and implement a computer-assisted teaching program.
- To evaluate the effectiveness of computer-assisted teaching programs by comparing the pre-test and post-test knowledge score of postnatal mothers regarding newborn care.

Materials and methods

An evaluative approach using one group pre-test and post-test was adopted for conducting this study. By using a convenient nonprobability technique, 50 mothers were selected from Government hospital Holenarasipura who met the sampling criteria. The inclusion criteria were: Given birth to a normal baby and willing to participate in the study. The neonates who were ill and mothers with postnatal complications were excluded from the study. Ethical committee clearance was obtained from the institutional ethics committee, and permission was obtained from the Medical Officer, Government Hospital, Holenarasipura. Informed consent was taken from the participant during the study. Demographic proforma, structured knowledge questionnaire and observational checklist were used to collect data from the study participants. Demographic proforma included 11 items such as age, age of marriage, religion, education status, type of family, obstetric score, monthly income, occupation source of information regarding newborn care and mode of delivery. A structured knowledge questionnaire was divided into six sections that included 40 questions. Each multiple-choice had four options with one correct response. Each item had a score of '1' for the correct answer and '0' for the wrong answer. The aspects of newborn care covered in the structured knowledge questionnaire included characteristics of newborn, breastfeeding, temperature maintenance, care of umbilical cord, personal hygiene and immunization. Knowledge scores were classified as inadequate (0-20), moderate (21-30) and adequate (31-40). The observational checklist for assessing the practice was prepared with essential aspects of newborn care. The observational checklists included ten questions with YES or NO options. This tool contained positive ended statements in which one score was given for 'yes' and 0 score for 'no'. The total score was divided into poor, average and good. The score for poor is 0-4, average is 5-7 and good is 8-10.

All the tools and computer teaching programs were given to the nine experts. The modification was made as per the suggestion by the experts.

The reliability coefficient of the tool was calculated using a split-half method followed by Karl Pearson's coefficient of the Spearman-Brown Prophecy formula. The reliability of the questionnaire was found to be r (5) = 0.94, and r = 0.96 for practice rating scale. A pilot

study was conducted among five postnatal mothers, and the study was found to be feasible.

The computer-assisted teaching program was developed by the researcher and implemented by presenting the teaching program on a laptop. It included PowerPoint presentation containing all the aspect of newborn care like definition and goals of newborn care, characteristics of the newborn, general behavior of newborn, head to foot assessment, immunization, follow up, immediate primary care of newborn including warmth, kangaroo mother care, breastfeeding, demand feeding, burping, skincare and baby bath, care of umbilical cord, care of the eye, clothing of baby, weighing, change of diaper. Visual aids added included newborn postures, characteristics and healthy skin of newborn, umbilical cord, genitalia, reflexes, wrapping of baby, breastfeeding technique, positioning, burping, care of the eye, changing of diaper and immunization chart pictures. The duration of the teaching program was 45 minutes.

After obtaining informed consent, a pre-test on knowledge and practice was obtained on day one of the delivery. This was followed by computer-assisted teaching to the postnatal mother and her relatives in the postnatal ward with the help of a laptop/ward computer. After four days of implementation of the computer-assisted teaching program post-test was done by investigator.

Results

Socio-demographic variables

The findings of the study demonstrated that 48% of the postnatal mothers (21) belonged to the age group of 19-21 years, 50% (25) were married. Most of the postnatal mothers 88% (44) were Hindus, many of them with secondary education 34% (17) and 34% (17) of them were graduates. Many of the postnatal mothers, 68% (34) belonged to a nuclear family, 44% (22) were primipara, and 44% (22) mothers' monthly income was between Rs 1001-1500. The majority of the postnatal mothers 84% (42) were homemakers, 64% (32) of them did not receive any information on newborn care, most of them 92% (46) underwent normal delivery (Table 1).

Table 1:
Frequency and Percentage Distribution of Subjects according to Selected Demographic Variables.

N=50

Variables	Frequency(f)	Percentage (%)
Age (years)		
19-21	24	48.0
22-23	14	28.0
24-26	12	24.0
Age at marriage		
18-19	25	50.0
20-21	18	36.0
22-25	7	14.0
Religion		
Hindu	44	88.0
Muslim	6	12.0
Educational status		
Primary	16	32.0
Secondary	17	34.0
Graduate	17	34.0
Type of family		
Nuclear	34	68.0
Joint	11	22.0
Extended	5	10.0
Obstetrical score		
Primipara	22	44.0
Multipara	18	36.0
Grand multipara	10	20.0
Monthly income (INR)		
Rs.1,001-1,500	22	44.0
Rs.1,501-2,000	19	38.0
Rs.2,001-3,000	9	18.0
Occupation		
Homemaker	42	84.0
Self-employed	8	16.0
Received information about newborn care		
No	32	64.0
Yes	18	36.0
If yes, source of information		

Variables	Frequency(f)	Percentage (%)
Electronic media	12	24.0
Family members	4	8.0
Health Professionals	2	4.0
Mode of Delivery		
Normal	46	92.0
Instrumental	4	8.0

Knowledge of postnatal mothers regarding newborn care

Results of the study revealed that in the pre-test, 62% (31) postnatal mothers had inadequate knowledge, 38% (19) had moderate knowledge regarding newborn care whereas in the post-test 40% (20) postnatal mothers gained moderate knowledge and 60% (30) had gained adequate knowledge regarding the newborn care (figure 1).

The study reveals that the postnatal mother had 35.5% of knowledge on the characteristics of the newborn. Breastfeeding practice was known by 50.4% of them. Around 51.6% were aware of temperature maintenance and care of umbilical cord was known by 52.05% of them. In the area of personal hygiene, 48.4% were aware of the immunization of newborns.

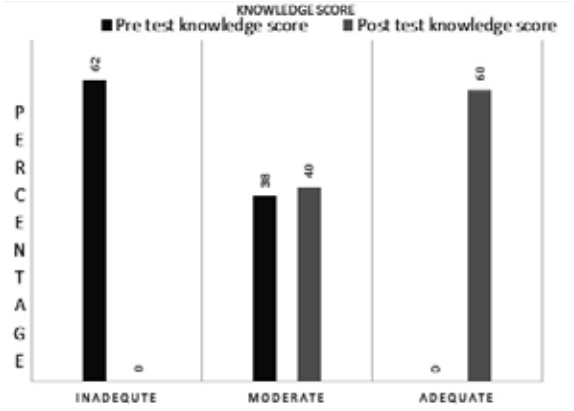

Figure 1: Column diagram showing the percentage distribution of pre and post knowledge scores regarding newborn care

The mean percentage of the post-test knowledge score, 77.2%, was higher than the mean percentage of pre-test knowledge score (48%) (Table 2).

The practice of postnatal mothers

The results of the study reported that in the pre-test 64% (32) postnatal mothers had inadequate practice and 36% (18) postnatal mothers had reasonable practice on newborn care whereas in the post-test 56% (28) acquired adequate practice and 44.0% (22) postnatal mothers acquired moderate practice on newborn care (figure 2).

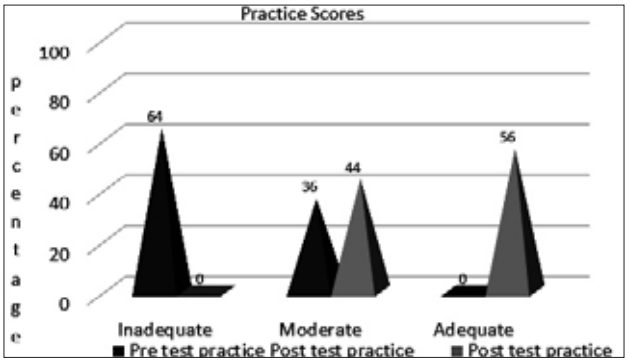

Figure 2: A pyramidal diagram showing the percentage distribution of pre and post-test practice score regarding newborn care

The mean percentage of the post-test practice score (76.2%) was higher than the mean percentage of the pre-test practice score (45.2%) (Table 3).

Association between knowledge, practice and demographic variables

The findings of the study showed that there was a significant association between the pre-test knowledge and demographic variables like educational status, source of information regarding newborn care, type of source, obstetric score and monthly income (P<.05) indicating that knowledge was dependent on these demographic variables. For variables like age, age at marriage, occupation, religion, type of family, and mode of delivery, there was no significant association found between the pre-test knowledge and these variables (Table 4).

Table 2:
Mean, Median, Range, Mean Percentage, and Standard Deviation of Pre-test and Post-test Knowledge Score

N=50

Knowledge score	Max possible score	Range	Mean	Median	Mean %	SD
Pre-test	40	14-24	19.20	20	48.0	6.9
Post-test	40	22-38	31.01	32	77.2	9.8

Table 3:
Mean, Median, Mean Percentage, and Standard Deviation of Pre-test and Post-test practice level

N=50

Practice level	Maxi. possible score	Range	Mean	Median	Mean %	SD
Pre-test	10	3-6	4.52	4	45.2	1.2
Post-test	10	6-9	7.62	8	76.2	1.0

Table 4:
Association between Knowledge, Practice and Demographic Variables

N=50

Demographic Variables	Category	Sample	Knowledge Level				χ^2 Value	P Value
			Inadequate		Moderate			
			N	%	N	%		
Age Group (years)	19-21	24	16	66.7	8	33.3	3.26 NS	.196
	22-23	14	6	42.9	8	57.1		
	24-26	12	9	75.0	3	25.0		
Age at marriage (years)	18-19	25	17	68.0	8	32.0	1.75 NS	.418
	20-21	18	9	50.0	9	50.0		
	22-23	7	5	71.4	2	28.6		
Educational status	Primary	16	6	37.5	10	62.5	9.12*	.010
	Secondary	17	15	88.2	2	11.8		
	Graduate	17	10	58.8	7	41.2		
Occupation	Homemaker	42	26	61.9	16	38.1	0.01 NS	.975
	Self-employed	8	5	62.5	3	37.5		
Mode of delivery	Normal	46	29	63.0	17	37.0	0.27 NS	.606
	Instrumental	4	2	50.0	2	50.0		
Source of information	No	32	24	75.0	8	25.0	6.38*	.012
	Yes	18	7	38.9	11	61.1		
Type of source	Electronic media	12	6	50.0	6	50.0	9.68*	.032
	Family members	4	0	0.0	4	100.0		
	Health Professionals	2	1	50.0	1	50.0		
	No	32	24	75.0	8	25.0		
Religion	Hindu	44	28	63.6	16	36.4	0.42 NS	.519
	Muslim	6	3	50.0	3	50.0		
Type of family	Nuclear	34	22	64.7	12	35.3	0.37 NS	.830
	Joint	11	6	54.6	5	45.4		
	Extended	5	3	60.0	2	40.0		
Obstetric score	Primipara	22	16	72.7	6	27.3	9.36*	.009
	Multipara	18	13	72.2	5	27.8		
	Grand multipara	10	2	20.0	8	80.0		
Monthly income	Rs.10,01-1,500	22	16	72.7	6	27.3	7.45*	.024
	Rs.1,501-2,000	19	13	68.4	6	31.6		
	Rs.2,001-3,000	9	2	22.2	7	77.8		

* Significant at 5% Level, NS: Non-significant

In order to find a significant association between the practice score of postnatal mothers and selected demographic variables, the chi-square test was computed. A significant association was found between pre-test practice score and selected demographic variables age, education, and monthly income. It is inferred that the practice was influenced by age, education, and monthly income. The study found no association between the knowledge and variables like age at marriage, religion, type of family, occupation, obstetric score, mode of delivery, source of knowledge and type of source regarding newborn care.

Discussion

This study revealed that there was a significant gain in knowledge and the postnatal mother acquired adequate practice regarding newborn care. The current study shows there was a significant difference between the mean pre-test and post-test scores of knowledge and practice. The mean post-test knowledge score

Table 5:
Association between demographic variables with pre-test practice level on newborn care

N=50

Demographic Variables	Category	Sample	Practice Level				χ^2 Value	P Value
			Low		Moderate			
			N	%	N	%		
Age group	19-21	24	13	54.2	11	45.8	7.09*	.029
	22-23	14	13	92.9	1	7.1		
	24-26	12	6	50.0	6	50.0		
Age at marriage	18-19	25	16	64.0	9	36.0	1.89 NS	.389
	20-21	18	13	72.2	5	27.8		
	22-23	7	3	42.9	4	57.1		
Educational status	Primary	16	7	43.8	9	56.2	7.38*	.025
	Secondary	17	10	58.8	7	41.2		
	Graduate	17	15	89.2	2	11.8		
Occupation	Homemaker	42	27	64.3	15	35.7	0.01 NS	.923
	Self-employed	8	5	62.5	3	37.5		
Mode of delivery	Normal	46	29	63.0	17	37.0	0.23 NS	.633
	Instrumental	4	3	75.0	1	25.0		
Source of information	No	32	21	65.6	11	34.4	0.10 NS	.750
	Yes	18	11	61.1	7	38.9		
	Family members	4	2	50.0	2	50.0		
	Health professionals	2	1	50.0	1	50.0		
	No	32	21	65.6	11	34.4		
Religion	Hindu	44	29	65.9	15	34.1	0.58 NS	.446
	Muslim	6	3	50.0	3	50.0		
Type of family	Nuclear	34	22	64.7	12	35.3	1.62 NS	.445
	Joint	11	8	72.7	3	27.3		
	Extended	5	2	40.0	3	60.0		
Obstetric score	No	22	13	59.1	9	40.9	1.41 NS	.495
	One	18	11	61.1	7	38.9		
	Two	10	8	80.0	2	20.0		
Monthly income	Rs.10,01-1,500	22	12	54.6	10	45.4	6.22*	.045
	Rs.1,501-2,000	19	11	57.9	8	42.1		
	Rs.2,001-3,000	9	9	100	0	0.0		

* Significant at 5% Level, NS: Non-significant

(77.2%) was higher than the mean percentage of pre-test knowledge score (48%), and the post-test practice score (76.2%) was higher than the mean percentage of pre-test practice score (45.2%).

The study revealed that the postnatal mother had 35.5% of knowledge on the characteristics of the newborn. Breastfeeding practice was known by 50.4% of them. Around 51.6% were aware of temperature maintenance; care of umbilical cord was known by 52.05% of them. In the area of personal hygiene is 48.4% were aware of the immunization of newborns.

These findings are further supported by a cross-sectional study among 380 postnatal mothers on knowledge of postnatal mothers on essential newborn care practices at the Kenyatta National Hospital. The study revealed that 90% of mothers had reported having the knowledge regarding breastfeeding and 99.7% were aware of the vaccination of neonates (Amolo, Irimu, & Njai, 2017). A cross-sectional survey regarding the knowledge and practice among 30 postnatal mothers on newborn care in tertiary care hospital of Udupi district reported good knowledge (76.6%) and excellent practice (53%) on newborn care. The area wise analysis showed inadequate knowledge of mothers in the area of umbilical cord care (35%), thermal care 76%, and vaccine-preventable disease (Castalino, 2014). In this study, the researcher found that 35.5% had inadequate knowledge regarding the characteristics of newborn care. About 52.0% of postnatal mothers had inadequate knowledge regarding the care of the umbilical cord.

The study revealed that in the pre-test, 62% (31) postnatal mothers had inadequate knowledge, 38% (19) had moderate knowledge whereas in the post-test 40% (20) postnatal mothers gained moderate knowledge and 60% (30) had gained adequate knowledge At the same time in the pre-test most of the postnatal mothers 64% (32)had inadequate practice and 36% (18) postnatal mothers had a reasonable practice whereas in the post-test 56% (28) acquired adequate practice and 44% (28) postnatal mothers acquired moderate practice regarding newborn care. The study is further supported by a study on the knowledge, attitude, and practice regarding routine newborn care among mothers in a rural community of Bangalore in Karnataka (Shetty, 2012).

Conclusion

The study shows that postnatal mothers do not have adequate knowledge and practice on newborn care. Based on the findings, it was presumed that a computer-assisted teaching program was effective in improving the knowledge and practice of postnatal mothers regarding newborn care. Nurses should take the initiative in educating postnatal mothers with audiovisual aids. It helps them to gain knowledge and a high impact on practice. It is recommended to conduct a demonstration based study with the control group, including all aspects of newborn care. The study also can be conducted to determine the long term effectiveness of computer-assisted teaching programs. This study was confined to a specific geographical area with 50 populations and did not have a control group. This limits the generalization of the results.

Acknowledgement

I express a deep sense of gratitude to Principal, Government College of nursing Holenarasipura. Sincere gratitude to all the postnatal mothers for participating in this study.

Sources of support: None
Conflict of interest: None declared
Source of support in the form of grants: None

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