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Effectiveness of Information Booklet on Knowledge of GNM Interns Regarding Care of Neonate with Hyperbilirubinemia in School of Nursing Berhampur, Ganjam

Jayasmini Mohanty[1,*], Mamata Acharya[2]

Abstract

A pre-experimental approach, one group pre-test and post-test design was undertaken among GNM intern students, school of nursing, Berhampur, Ganjam, Odisha, with the objectives to assess the effectiveness of information booklet regarding care of neonate with hyperbilirubinemia among GNM intern students who were selected by using simple random sampling technique. Data were collected by using structured questionnaire schedule from 23.04.2015 to 03-05 2015. The theoretical framework selected for the study was based on the Kings Goal Attainment theory. The reliability score was tested by using split half method. (r=0.78). The collected data were analyzed by using descriptive and inferential statistics. Findings revealed that highest percentage (78%) of the GNM intern students belongs to age group of 20–22 years, 100% of staff GNM intern students were of female gender, 90% of GNM intern students were unmarried, 96% of students belong to Hindu religion and 42% got previous source of knowledge from books and journals. The overall mean knowledge score in pre-test was 26.12±2.58 which is 52.24%, revealing average knowledge whereas in post–test, it was 37±2.21 which is 92.5% revealing very good knowledge and effectiveness was 40.26%. Area-wise assessment shows that during post-test, the highest mean percentage (94.57%) was obtained for the area of "concept and types of neonatal hyperbilirubinemia and the lowest mean score (86%) was obtained for the area "cause and diagnosis of neonatal hyperbilirubinemia". Effectiveness of booklet was from 15.67 to 31.8%. Further, highly significant (p<0.01) difference was found between pre- and post-test knowledge scores and no significant association was found between post-test knowledge scores and all the demographic variables of the GNM intern students, when compared to their age, marital status, religion and previous source of knowledge.

Keywords: Hyperbilirubinemia level, neonate, knowledge, care, information

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INTRODUCTION

Background of the study

"A newborn baby is like the beginning of all things- wonder, hope, a dream of possibilities."
—Eda J. Le Shan

The children of today are the adults of tomorrow who deserve to inherit a safer, fairer and the healthier world. There is no task more important than safeguarding their environment [1].

Jaundice is the most common condition that requires medical attention in newborns. Unconjugated bilirubin is neurotoxic and can cause

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death in newborns and lifelong neurologic sequelelae in infants who survive (kernicterus). The incidence of neonatal jaundice is increased in infants of East Asian, American Indian and Greek descent. Neonatal jaundice first visible in the face and forehead, gradually becomes visible on the trunk and extremities [2].

The worldwide neonatal mortality rate fell by 47% between 1990 and 2015 from 36 to 19 deaths per 1,000 live births. Over the same period, the number of newborn babies who died within the first 28 days of life declined from 5.1 million to 2.7 million [3].

Jaundice is the visible manifestation of hyperbilirubinemia. Clinical jaundice in neonates appears on the face at a serum bilirubin level of 5 mg/dl. The yellowish discoloration is first seen on the skin of face, nosolabial folds and tip of nose. It is detected by blanching the skin with digital pressure in the natural light [3].

Overall incidence of neonatal jaundice as reported by various Indian workers varies from 54.6 to 77%. Hyperbilirubinemia is one of the most common and one of the most problems that occur in the neonates. 35% were having idiopathic jaundice, followed by 30% physiological jaundice and 15% ABO incompatibility [4].

About 5% of babies develop pathological jaundice. Appearance of jaundice within 24 h of age, persist for more than 1 week in term babies and more than 2 weeks in preterm babies. Bilirubin level increases by more than 5 mg/dl per day (Dutta p, 2014) [3].

NEED FOR THE STUDY

Newborn are considered to be tiny and powerless and more of all the treasure to the nation, completely dependent on others for their adaptation in the external environment; within 1 min of birth, the normal newborn adapts from dependent foetal existence to an independent one capable of oxygenation and carryon physiological processes. Understanding and appreciating this transition are vital to the assessment and care of newborn babies (BurkeBL, 2009) [5].

Jaundice is the yellow colour seen in the skin of many newborns. About 60% of all babies have jaundice. When severe jaundice goes untreated for too long, it can cause a condition called kernicterus. Kernicterus is a type of brain damage that can result from high levels of bilirubin in a baby's blood (CDC, 2015) [5, 10].

In 2015, 4.5 million occurred within the first year of life. The risk of a child dying before completing the first year of age was highest in the WHO African Region (55 per 1000 live births), over five times higher than that in the WHO European Region (10 per 1000 live births). Globally, the infant mortality rate has decreased from an estimated rate of 63 deaths per 1000 live births in 1990 to 32 deaths per 1000 live births in 2015. Annual infant deaths have declined from 8.9 million in 1990 to 4.5 million in 2015 (WHO, 2015) [15].

Globally under-five deaths of children is accounting for about 44%. Prematurity was the largest single cause of death in children of under-five, and approximately 50% of under-five deaths were due to infectious diseases (UNICEF, 2015) [2].

Globally, 24 million are at risk for neonatal hyperbilirubinemia-related adverse outcomes. Of these, 0.36% had either Rh disease or developed EHB from other causes, with a 24% risk for death, 13% for kernicterus, and 11% for still-births [4, 5].

As per Khrismed journal of health and research, India accounts for 27.3% of total neonatal deaths in the world. Neonatal morbidity due to hyperbilirubinemia was 12.9% (Rokholia Ritu, 2014) [6].

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As per UNICEF report, 26 million children are born in India each year, 1.2 million die during the first 4 weeks, 30% of the 3.9 million global neonatal deaths. Current neonatal mortality rate (NMR) of 44 per 1,000 live births accounts for nearly two-thirds of all infant deaths and nearly half of under-five child deaths in India [2].

According to Journal of pharmaceutical and biomedical sciences, neonatal morbidity rate in India due to neonatal jaundice is 19.8% [7].

Incidence of neonatal hyperbilirubinemia in India was 29.3 per 1000 live births. Male sex, high birth weight, breast feeding pattern, warm air temperature primiparity, and skilled birth attendance, place of delivery, prolonged labour, oil massage and parental education were significant risk factors (Scrafford C.G. et al, 2013) [23].

According to a report of the United Nations Children's Fund (UNICEF), Orissa is standing third in the list of states with high infant mortality rate. In Orissa, the infant mortality rate is 51 per 1,000 live births (UNICEF, 2015) [2].

Research study conducted at MKCG medical college hospital in Ganjam district found that neonatal morbidity due to neonatal jaundice is an alarming situation, which needs to be detected and managed at the earliest possible. 100 jaundiced neonates were considered as subjects for this study (Mishra J P et al, 2014) [8].

A study was conducted in selected villages of Puduchery to assess the knowledge and attitude on neonatal jaundice among mothers. Finding of the study shows that regarding the knowledge on neonatal jaundice, only 12% mother had adequate knowledge [9].

METHODOLOGY

A pre-experimental approach, one group pre-test and post-test design was used to evaluate the effectiveness of information booklet on knowledge of GNM intern students regarding care of neonate with hyperbilirubinemia.

OBJECTIVES

1. To assess the knowledge of GNM intern students regarding care of neonate with hyperbilirubinemia.
2. To determine the effectiveness of information booklet on care of neonate with hyperbilirubinemia of GNM intern students.
3. To compare the effectiveness of information booklet on knowledge of GNM interns with their demographic variables.
4. To find out the association of post-test knowledge score of GNM intern students regarding care of neonate with hyperbilirubinemia with their selected demographic variables.

HYPOTHESES

- Highly significant difference was found between pre-test and post-test knowledge score ($p<0.01$).
- No significant association was found between pre-test when compared to age, marital status religion and previous source of knowledge ($p<0.05$).

DATA COLLECTION PROCEDURE

1. Permission from concern Authority
2. An experimental approach with one group pre-test and post-test design study was conducted on 50 GNM intern students to assess the effectiveness of information booklet regarding care of neonate with hyperbilirubinemia in school of nursing Berhampur, Orissa. Data were collected from 23.04.2016 to 05.05.2016. Staff nurses were selected by simple random sampling technique. Based on the finding of the study, it can be summarized as follows:

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Period of the Collection

The data was collected from 25.04.2016 to 09.05.2016. During this period, the data was collected by investigator herself by pre-test, post-test and presented information booklet.

Pre-test

Pre-test was conducted among GNM intern students in school of nursing, Berhampur, by using structured questionnaire schedule to assess their existing knowledge on care of neonate with hyperbilirubinemia before implementation of information booklet.

Implementation of Information Booklet

Immediately after pre-test information, booklet was presented to the students and also informed about post-test. The time of questionnaire was varied from 30–40 min.

Evaluation of Information Booklet

Evaluation was done by conducting post-test after 7 days of implementation of information booklet by using the same structured questionnaire schedule which was used for the pre-test.

RESULT

This study dealt with the analysis and interpretation of data collected from 50 GNM intern students from school of nursing Berhampur, District Ganjam, Odisha. The present study was designed to find the effectiveness of information booklet on knowledge of GNM interns regarding care of neonate with hyperbilirubinemia in school of nursing, Berhampur, Ganjam. The data were coded and analyzed as per objectives of the study by using descriptive and inferential statistics under the following headings.

The data was collected from 25.04.2016 to 09.05.2016. During this period, the data was collected by investigator herself by pre-test, post-test and presented information booklet.

Section I: Findings Related to Description of Demographic Characteristics of the GNM Intern Students

Percentage wise distribution of GNM intern students according to their age group depicts that highest percentage (78%) of the GNM intern students were in 20–22 years of age group, whereas 28, 2 and 0% of the GNM intern students were in the age group of 20–29, 20 and >29 years respectively. However GNM intern students in the age group of 20 years were only 0% lowest. It reveals that majority of them were in the age group of 20–22 years (Figure 1).

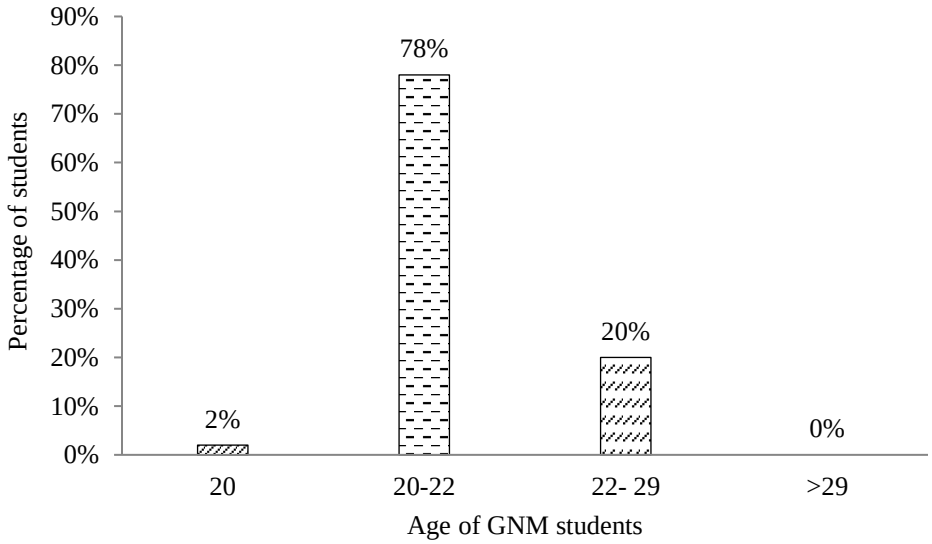

Figure 1. Percentage-wise Distribution of GNM Intern Students.

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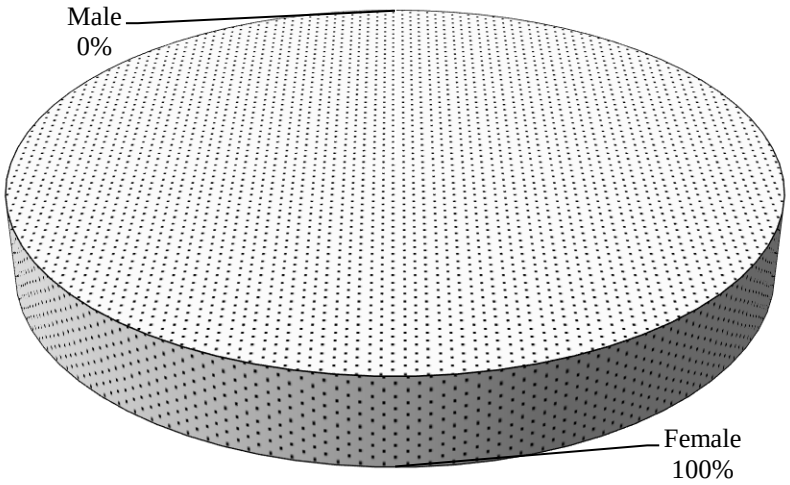

Figure 2. Bar Diagram Shows Percentage-wise Distribution of GNM Intern Students according to Their Gender.

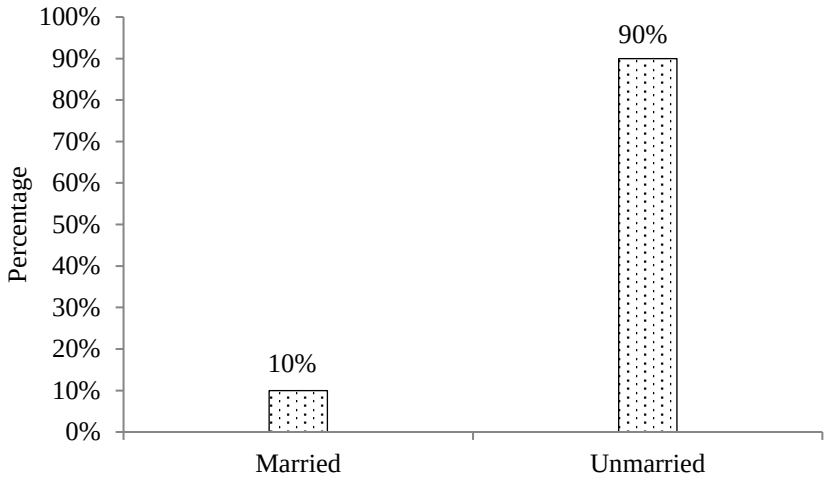

Figure 3. Bar Diagram Shows Percentage-wise Distribution of GNM Intern Students according to Their Marital Status.

Percentage-wise distribution of GNM intern students according to their gender shows that highest percentage (100%) of GNM intern students were of female gender and there is no male gender (Figure 2).

Percentage wise distribution of GNM intern students of according to their marital status reveals that highest percentage 90% of GNM intern students are unmarried, whereas only 10% of GNM intern students are married (Figure 3).

Percentage wise distribution of GNM intern students according to their religion reveals that highest percentage (98%) of GNM intern students were Hinds and 4% of GNM intern students were Christians It reveals that majority of them were Hindus. No one in GNM intern students was Muslim or any other religion (Figure 4).

Percentage wise distribution of GNM intern student's according to previous source of knowledge shows that highest (46%) of GNM intern students got knowledge form book and journals, whereas 22 and 14% of the GNM intern students got knowledge from mass media and workshop and seminar respectively. However, only 14% of GNM intern students got previous source of knowledge from clinical experience (Figure 5).

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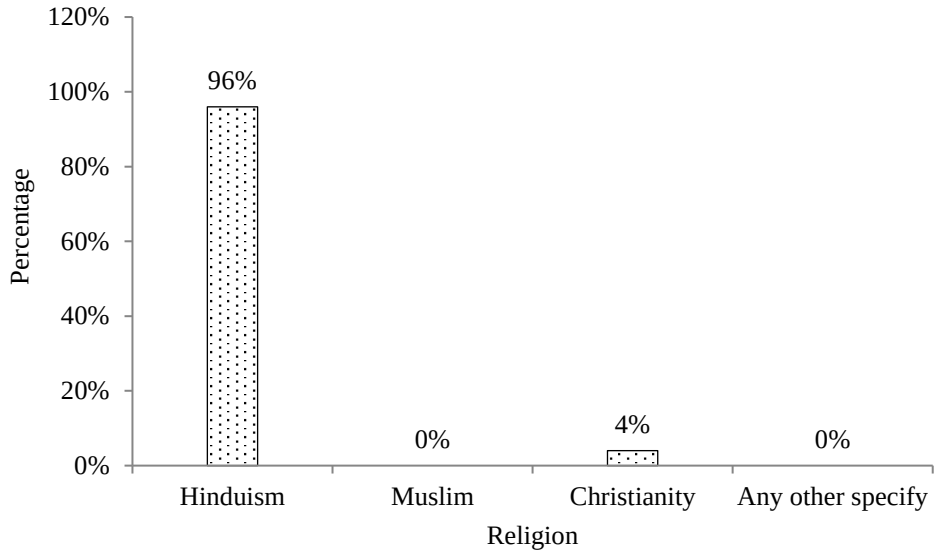

Figure 4. Bar Diagram Shows Percentage-wise Distribution of Mothers of Under-Five Children according to their educational status.

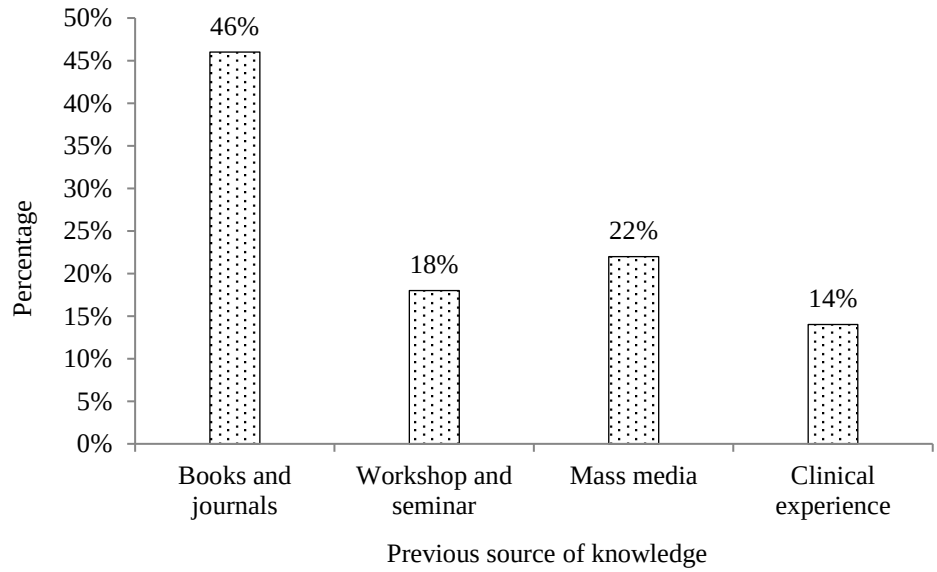

Figure 5. Bar Diagram Shows Percentage-wise Distribution of GNM Intern Students according to Their Previous Source of Knowledge.

Section II: Assessment of Knowledge of GNM Intern Students Regarding Care of Neonate with Hyperbilirubinemia prior to the Implementation of Information Booklet

Area-wise analysis of mean, SD, and mean percentage of pre-test KS of GNM intern students regarding care of neonate with hyperbilirubinemia shows that during pre-test, the highest mean score (12.22±2.00) which is 61.1% of the total score was obtained for the area of "management, complication and prevention of neonatal hyperbilirubinemia". The second highest shows that during pre-test mean score (9.68±1.34) which is 69.14% of the total score was obtained for the area of "concept and types of neonatal hyperbilirubinemia". The mean score (4.22±1.22) which is 70.33% of the total score was obtained for the area of "causes and diagnosis" of neonatal hyperbilirubinemia reveals poor knowledge. It is also observed that overall mean score was (26.12±2.584) which is 52.24% of the total score reveals that the GNM intern students under this study had average knowledge on care of neonate with hyperilirubinemia (Table 1).

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Table 1. Area-wise Distribution of Mean, SD and Mean Percentage of Pre-Test Knowledge Score of GNM Intern Students Regarding Care of Neonate with Hyperbilirubinemia (N=50).

S.N.	Area of Knowledge	Max. Score	Pre-Test		
			Mean	*SD*	*Mean (%)*
1	Concept and types of neonatal hyperbilirubinemia	14	9.68	1.346	69.14
2	Causes and diagnosis of neonatal hyperbilirubinemia	6	4.22	1.226	70.33
3	Management, complication and prevention of neonatal hyperbilirubinemia	20	12.22	2.002	61.1
	Overall Total	40	26.12	2.584	52.24

Section III: Assessment of the Effectiveness of Information Booklet on Knowledge of GNM Intern Students Regarding Care of Neonate with Hyperbilirubinemia after Implementation of Information Booklet

Area wise comparison of mean, standard deviation and mean percentage of pre and post-test knowledge scores (KS) of the GNM intern students regarding care of neonate with hyperbilirubinemia. Conceptual framework shows that the Item wise comparison of pre and post-test knowledge scores of GNM intern students regarding care of neonate with hyperbilirubinemia.

Comparison of pre and post-test KS of student with their demographic variables.

Table 2. Area-wise Comparison of Mean, SD and Mean Percentage of Pre and Post-Test Knowledge Score of GNM Intern Students Regarding Care of the Neonate with Hyperbilirubinemia (No=50).

Area of Knowledge	Max. Score	Pre-test			Post-test			Difference in Mean %
		Mean	*SD*	*Mean %*	*Mean*	*SD*	*Mean %*	
Concept and types of neonatal hyperbilirubinemia	14	9.68	1.348	69.14	13.24	**1.041**	94.57	25.43
Causes and diagnosis of neonatal hyperbilirubinemia	6	4.22	1.226	70.33	5.2	0.857	86	15.67
Management, complication and prevention of neonatal hyperbilirubinemia	20	12.22	2.002	61.1	18.58	1.568	92.9	31.8
Overall total	40	26.12	2.584	52.24	37	2.211	92.5	40.26

Area wise comparison of mean, SD, Mean percentage of pre-test and post-test knowledge score shows that, during post-test, the highest mean score was 18.58±1.568 which was 92.9% of the maximum score which was obtained for the area of "management, complication and prevention of neonatal hyperbilirubinemia" and highest pre-test score 61.01% in the area of "management, complication and prevention of neonatal hyperbilirubinemia". The lowest mean percentage is 86% of total score in post-test obtained for the area "cause and diagnosis of neonatal hyperbilirubinemiat" whereas the lowest mean percentage is 61.1% of the total score was in the area "management, complication and prevention of neonatal hyperbilirubinemia" during pre-test.

Further, pre-test mean score was (26.12±2.58) which is 37% of maximum score and average knowledge whereas it was 92.5% during post-test showing a difference of 40.26% of effectiveness and having a very good knowledge. It was observed that difference between the pre and post-test area wise mean score values vary from 15.67 to 31.8%. Hence, it can be interpreted that information booklet programme was effective in both area wise and overall (Table 2).

Percentage wise distribution of pre and post-test knowledge shows that during pre-test, the highest percentage (70%) of GNM intern students had good knowledge regarding care of neonate with hyperbilirubinemia and the lowest are belongs to (30%) regarding it. Whereas during post-test, highest percentage (98%) of them had a very good knowledge and lowest only (2%) of them had good

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knowledge during post-test (Figure 6). Hence it can be interpreted that the information booklet was effective in improving knowledge of GNM intern students regarding care of neonate with hyperbilirubinemia.

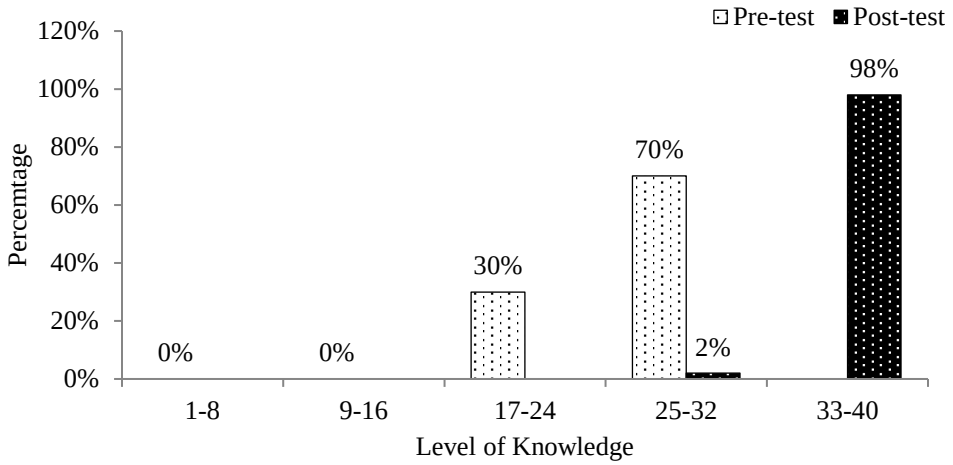

Figure 6. Bar Graph Showing Comparison of Pre and Post-Test Knowledge Score of GNM Intern Students.

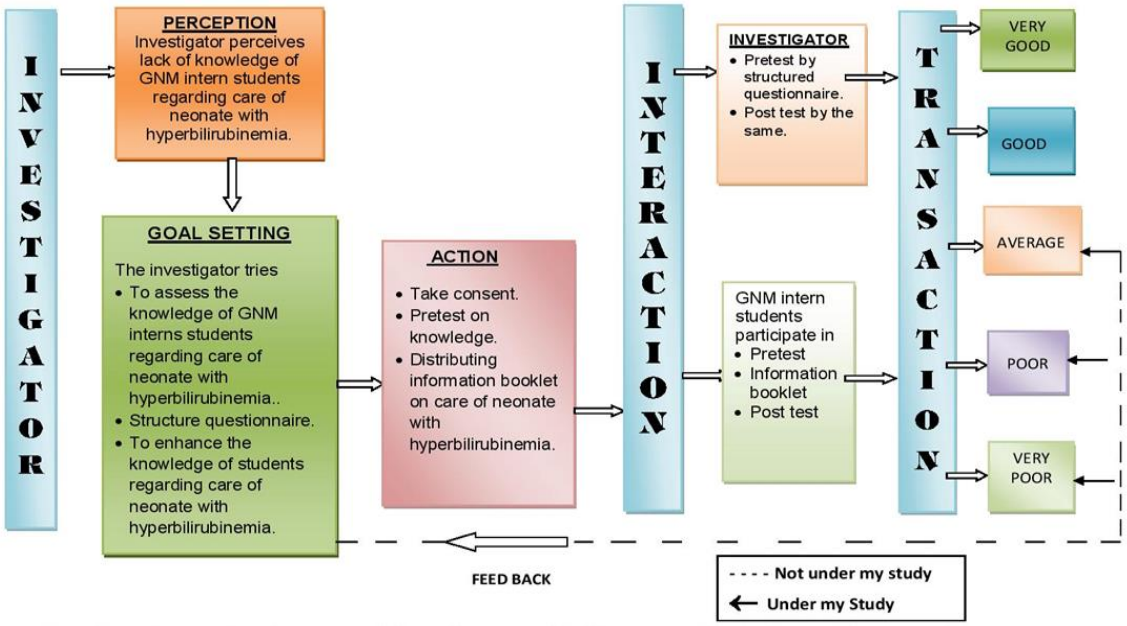

Figure 7. Conceptual Framework based on Modified Imogene King's Goal Attainment Theory.

Section IV: Comparison of Pre-Test and Post-Test KS of GNM Intern Students with their Demographic Variables

Assessment of Effectiveness of Information Booklet with Demographic Variable of GNM Intern Students

Comparison of mean, SD and mean percentage of pre and post-test KS of the GNM intern students regarding care of neonate with hyperbilirubinemia according to their age shows that during post-test, the highest mean score (40±0) which is 100% of the total score was obtained by the student in the age group of 20. The lowest mean score (36.97±2.01) which is (90.62%) of total score was obtained for 20–22 years of age group, whereas lowest score (45%) during pre-test was obtained by the in the age group of 20 years. However, difference in mean percentage varies from 24.67 to 55%. It seems that the information booklet programme was effective for all age groups (Table 3).

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Table 3. Comparison of Mean, SD, and Mean Percentage of Pre-Test and Post-Test KS of GNM Intern Students according to Their Age.

Age in years	No. of students	Pre-test			Post-test			Difference in Mean %
		Mean	*SD*	*Mean %*	*Mean*	*SD*	*Mean %*	
20	1	18	0	45	40	**0**	100	55
20–22	39	26.38	2.69	65.95	36.97	2.01	90.62	24.67
22–29	10	24.6	1.71	61.5	37	2.58	92.5	31
Above 29	0	--	--	--	--	--	--	--
Overall Total	50	26.12	2.58	65.3	37	2.11	92.5	27.05

Table 4. Comparison of Mean, SD, and Mean Percentage of Pre-Test and Post-Test KS of GNM Intern Students according to Their Marital Status.

Type of Gender	No. of students	Pre-test			Post-test			Difference in Mean %
		Mean	*SD*	*Mean %*	*Mean*	*SD*	*Mean %*	
Married	5	24.6	3.57	61.5	37.6	**2.19**	94	32.5
Unmarried	45	26.2	2.44	65.7	36.93	2.12	92.3	26.6
Overall Total	50	26.12	2.58	65.3	37	2.11	92.5	27.05

Table 5. Comparison of Mean, SD, and Mean Percentage of Pre-Test and Post-Test KS of Students according to Their Religion.

Religion	No. of Students	Pre-test			Post-test			Difference in Mean %
		Mean	*SD*	*Mean %*	*Mean*	*SD*	*Mean %*	
Hindu	48	26.18	2.59	65.45	37.06	2.11	92.65	27.2
Christianity		24.5	2.12	61.25	35.5	2.12	88.75	27.5
Muslim	-	-	-	-	-	-	-	-
Any other specify	-	-	-	-	-	-	-	-
Overall Total	50	26.12	2.58	65.3	37	2.11	92.5	27.05

Comparison of mean, SD and mean percentage of pre and post-test KS of the students regarding care of neonate with hyperbilirubinemia according to their marital status shows that during post-test, the highest mean score (37.6±2.19) which is 94% of the total score was obtained by the students who got married. The lowest mean score (36.93±2.12) which is 92.3% of the total score was obtained for the students who are unmarried which was highest (65.7%) during pre-test. However difference in mean percentage varies from 26.2 to 32.5%. It seems that the information booklet was effective for all students who are married or unmarried (Table 4).

Comparison of mean, SD and mean percentage of pre and post-test KS of the students regarding care of neonate with hyperbilirubinemia according to their religion shows that during post-test, the highest mean score (37.06±2.11) which is 92.65% of the total score was obtained by the students who belong to Hindu religion. The lowest mean score (35.5±2.12) which is 88.75% of total score was obtained for the students who belong to Christian religion, which was also lowest (61.25%) during pre-test. However, difference in mean percentage varies from 27.2 to 27.5%. (Table 5).

Comparison of mean, SD and mean percentage of pre and post-test KS of the students regarding care of neonate with hyperbilirubinemia according to their previous source of knowledge shows that during post-test, the highest mean score (38.28±2.05) which is 95.7% of the total score was obtained by the students who got knowledge from clinical experience. The lowest mean score (36.60±2.06) which is 91.5% of total score was obtained for the students who got knowledge from books and journals having not formal educational status which was also lowest (64.22%) during pre-test. However, difference in mean percentage varies from 25.82 to 28.65%. It seems that the information booklet was effective for all students who are having any previous source of knowledge (Table 6).

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Table 6. Comparison of Mean, SD, and Mean Percentage of Pre-Test and Post-Test KS of Students according to Their Previous Source of Knowledge.

Previous Source of Knowledge	No. of students	Pre-test			Post-test			Difference in Mean %
		Mean	*SD*	*Mean %*	*Mean*	*SD*	*Mean %*	
Books and Journal	23	25.69	2.73	64.22	36.60	2.06	91.5	27.28
Workshop and Seminar	9	26.44	1.66	66.1	36.77	2.63	91.92	25.82
Mass Media	11	25.72	2.90	64.3	37.18	1.72	92.95	28.65
Clinical Experience	7	27.71	2.28	69.27	38.28	2.05	95.7	26.43
Overall Total	50	26.12	2.58	65.3	37	2.11	92.5	27.05

Section V: Hypothesis Testing

To assess the effectiveness of information booklet on care of neonate with hyperbilirubinemia was tested by using paired 't' test and X^2 test. Paired 't' test was calculated to assess the significant association of demographic variables with post-test KS of students regarding care of neonate with hyperbilirubinemia.

The hypothesis is tested at 0.05 level of significance.
$H_0$1: There will be significant association difference between mean pre-test and post-test knowledge scores of students regarding care of neonate with hyperbilirubinemia. Null hypothesis rejected.
$H_0$2: There will be no significant association between mean post-test knowledge scores of students regarding care of neonate with hyperbilirubinemia and their selected demographic variables. Null hypothesis accepted.

Table 7. Paired "t" Value of Pre and Post-Test KS of Students Regarding Care of Neonate with Hyperbilirubinemia (N=50).

S.N.	Area	"t" Value	Remarks
1.	Concept and types	16.51	Significant
2.	Cause and diagnosis	6.019	Significant
3.	Complication, management and prevention	16.80	Significant

Paired "t" test calculated to assess the significant difference between pre and post-test KS shows that highly significant difference was found in all areas of neonatal hyperbilirubinemia, these are: Concept and types, cause and diagnosis, complication, management and prevention. Thus the difference in mean score value related to the above mentioned area were true difference. Hence it states that null hypothesis is rejected, and statistical hypothesis is accepted (Table 7).

Table 8. Association between Post-Test KS of the GNM Intern Students of with Their Demographic Variables χ^2 (N-50).

S.N.	Demographic Variable	χ^2 Value	df	Table Value	Level of Significance
1.	Age (in years)	0.126	1	3.84	Not significant
2.	Marital status	0.555	1	3.84	Not significant
3.	Religion	0.007	1	3.84	Not significant
4.	Previous source of knowledge	1.03	1	3.84	Not significant

(P value <0.05)

Chi-square (x^2) was calculated to assess the significant association between selected demographic variables of GNM intern students with their post-test KS regarding care of neonate with hyperbilirubinemia which reveals that no significant association was found between pre-test KS when compared to age, marital status, religion and previous source of knowledge. The calculated value is less than the table value. Hence it can be interpreted that, the difference in mean score related to their demographic variable is not true difference and only by chance (Table 8). Hence the null hypothesis was accepted.

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DISCUSSION, SUMMARY, CONCLUSION, IMPLICATIONS, LIMITATIONS AND RECOMMENDATIONS

A pre-experimental approach with one group pre-test and post-test design was undertaken in school of Nursing Berhampur, Ganjam, Orissa from Dt- 23.04.2016 to Dt- 05.05. 2016 data were collected from 50 GNM intern students, selected by simple random sampling technique through structured questionnaire schedule to assess the "Effectiveness of information booklet on knowledge of GNM intern students regarding care of neonate with hyperbilirubinemia". The collected data were organized, tabulated, evaluated by using descriptive statistics such as mean, median, SD, inferential statistics including 't' test, Chi square test and presented in the form of tables and bar diagrams [10].

DISCUSSION

This research attempts to discuss the findings of the study as per objectives. These are discussed under the following headings.

1. Descriptive demographic characteristics of GNM intern students.
2. Assessment of knowledge of GNM intern students regarding care of neonate with hyperbilirubinemia before administration of information booklet.
3. Area wise comparison of mean, SD, mean percentage of pre-test knowledge score of GNM intern students on care of neonate with hyperbilirubinemia.
4. Assessment of the effectiveness of information booklet on knowledge of GNM intern students regarding care of neonate with hyperbilirubinemia after implementation of information of information booklet.
5. Area wise comparison of mean, SD, mean percentage of pre-test and post-test knowledge score of GNM intern students regarding care of neonate with hyperbilirubinemia.
6. Item wise comparison if pre-test and post-test knowledge score of GNM intern students regarding care of neonate with hyperbilirubinemia.
7. Comparison of pre-test and post-test KS of GNM intern students with their demographic variables.
8. Testing of hypothesis.

Descriptive Demographic Characteristics of GNM Intern Students

Percentage wise distribution of GNM intern students according to their age group depicts that, highest percentage (78%) of students were in 20–22 years age group, whereas 20 and 2% of the students were in age group of 22–29 and 20 years respectively [12].

Percentage wise distribution of GNM intern students according to their gender shows that highest percentage 100% of GNM intern students were of female gender [13, 14].

Percentage wise distribution of GNM intern students of according to their marital status reveals that highest percentage (90%) of GNM intern students are unmarried, whereas only 10% of GNM intern students are married [15, 16].

Percentage wise distribution of GNM intern students according to their religion reveals that highest percentage 98% of GNM intern students were Hindus and 4% of GNM intern students were Christians. It reveals that majority of them were Hindus. No one of the GNM intern students were Muslims or of any other religion [17, 18].

Percentage wise distribution of GNM intern students according to previous source of knowledge shows that highest (46%) of GNM intern students got knowledge form books and journals, whereas 22 and 14% of the GNM intern students got knowledge from mass media and workshops and seminars respectively. However, only 14% of GNM intern students got previous source of knowledge from clinical experience [19, 20].

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Assessment of Knowledge of GNM Intern Students Regarding Care of Neonate with Hyperbilirubinemia before Administration of Information Booklet

Area wise analysis of mean, SD, and mean percentage of pre-test KS of GNM intern students regarding care of neonate with hyperbilirubinemia shows that during pre-test, the highest mean score (12.22±2.00) which is 61.1% of the total score was obtained for the area of "management, complication and prevention of neonatal hyperbilirubinemia". The second highest shows that during pre-test mean score (9.68±1.34) which is 69.14% of the total score was obtained for the area of "concept and types of neonatal hyperbilirubinemia". The mean score (4.22±1.22) which is 70.33% of the total score was obtained for the area of "causes and diagnosis" of neonatal hyperbilirubinemia reveals poor knowledge. It is also observed that overall mean score was (26.12±2.584) which is 52.24% of the total score reveals that the GNM intern students under this study had average knowledge on care of neonate with hyperilirubinemia [21, 22].

Area wise Comparison of Mean, SD, Mean Percentage of Pre-Test Knowledge Score of GNM Intern Student on Care of Neonate with Hyperbilirubinemia

Area wise comparison of mean, SD, Mean percentage of pre-test and post-test knowledge score shows that, during post-test the highest mean score was 18.58±1.568 which was 92.9% of the maximum score was obtained for the area of management, complication and prevention of neonatal hyperbilirubinemia and highest pre-test score 61.01% in the area of management, complication and prevention of neonatal hyperbilirubinemia. The lowest mean percentage is 86% of total score in post-test which was obtained for the area "cause and diagnosis of neonatal hyperbilirubinemia" whereas the lowest mean percentage is 61.1% of the total score was in the area "management, complication and prevention of neonatal hyperbilirubinemia" during pre-test [23, 24].

Further, pre-test mean score was (26.12±2.58) which is 37% of maximum score and average knowledge whereas it was 92.5% during post-test showing a difference of 40.26% of effectiveness and having a very good knowledge. It was observed that difference between the pre and post-test area wise mean score values vary from 15.67 to 31.8%. Hence, it can be interpreted that information booklet programme was effective in both area wise and overall [25, 26].

Item wise Analysis of Correct Responses to Various Items during Pre and Post-Test

Concept of Neonatal Hyperbilirubinemia

Item wise comparison of pre and post-test correct responses regarding concept of care of neonate with hyperbilirubinemia among GNM intern students shows that, during pre-test the highest percentage (96%) of GNM intern students correctly responded to the item "jaundice is otherwise known as icterus", 94% of them correctly responded to the item "Neonatal hyperbilirubinemia means yellowish discoloration of skin with high level bilirubin", 76% of GNM intern students correctly responded to the item "Physiological jaundice in term babies disappears after 1 week", 74% of mothers correctly responded to the item "Bilirubin is a waste product released due to the breakdown of red blood cells and also total serum bilirubin level usually exceeds and 15 mg/dl in pathological jaundice".

66% of GNM intern students correctly responded to the item "Neonatal period ranges from 0–28 days and also the percentage of neonatal hyperbilirubinemia observed in preterm babies are 80%", 64% of students correctly responded to the item "Physiological jaundice appears in term babies between 30 and 72 h and also physiological jaundice disappears in preterm babies at 14th day", 62% of students correctly responded to the item "serum bilirubin does not exceed 15 mg/dl in physiological jaundice", 60% of students correctly responded to the item "In hyperbilirubinemia, the bilirubin becomes visible on sclera at the blood level of 5–6 mg/dl", 58% of students correctly responded to the item "Pathological jaundice appears in term neonate within 24 h", 56% of students correctly responded to the item "The percentage of newborn baby develops pathological jaundice is 5%". However during post-test, all the GNM intern students (100%) correctly responded to both the items "Total serum bilirubin level usually exceeds and 15 mg/dl in pathological jaundice and Jaundice is otherwise known as icterus", 98% of

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students correctly responded to six items such as "question no. 1, 2, 3, 7, 9 and 10, 94% of students correctly responded to both the items "The percentage of neonatal hyperbilirubinemia observed in preterm babies is 80%" and "Physiological jaundice appears in term babies between 30 and 72 h". "Physiological jaundice in term babies disappears after 1 week", 92% of students correctly responded to both the items "Pathological jaundice appears in term neonate within 24 h" and 86% of students correctly responded to the item "In hyperbilirubinemia, the bilirubin becomes visible on sclera at the blood level of 5–6 mg/dl", 78% of students correctly responded to the item "unconjugated bilirubin binds albumin", and it also the lowest percentage (74%) of students correctly responded to any item [27, 28].

Further, effectiveness of information booklet shows highest percentage (42%) of correct response gained for the item "The Percentage of newborn baby develop pathological jaundice is 5%", and lowest percentage (4%) of effectiveness was for both the items "Neonatal hyperbilirubinemia means yellowish discoloration of skin with high level bilirubin" and "Jaundice is otherwise known as icterus" [29, 30].

In rest of the items, the effectiveness is 42 to 16% respectively which reveals that structured teaching programme was effective in this area.

Cause and Diagnosis of Neonatal Hyperbilirubinemia

Item wise comparison of pre and post-test correct responses regarding care of neonate with hyperbilirubinemia among GNM intern students in area cause and diagnosis shows that, during pre-test, the highest percentage (88%) of students correctly responded to the item "Common sign and symptoms of neonatal hyperbilirubinemia include yellow skin and sclera", 76% of students correctly responded to both the items "Neonatal hyperbilirubinemia may occur due to deficiency of G-6PD" and "Extent of jaundice in Grade-1 shows face and neck only, 68% of students correctly responded to the item". Most important cause of jaundice presenting in the first 24 h of life is due to haemolysis, 58% of students correctly responded to the item "Onset of neonatal hyperbilirubinemia, after 72 h is mostly due to sepsis neonatrum" and "the lowest percentage 56% of mothers correctly responded to the item". Major contributor for development of physiological jaundice is immature hepatic enzymes [31, 32].

During post-test, the highest percentage (100%) of students correctly responded to the item "Neonatal hyperbilirubinemia may occur due to deficiency of G-6PD". 98% of students correctly responded to the item "Common sign and symptoms of neonatal hyperbilirubinemia include yellow skin and sclera", 96% of students correctly responded to the item "Extent of jaundice in Grade-1 shows face and neck only", 82% of students correctly responded to the item "Onset of neonatal hyperbilirubinemia, after 72 h is mostly due to sepsis neonatrum". 80% of students correctly responded to the item "Most important cause of jaundice presenting in the first 24 h of life is due to haemolysis" and the lowest percentage (64%) of students correctly responded to the item "Major contributor for development of physiological jaundice is immature hepatic enzymes" [33, 34].

It reveals that it reveals that information booklet programme was effective in this area.

Complication, Management and Prevention of Neonatal Hyperbilirubinemia

Item wise comparison of pre-test and post-test correct responses of students regarding care of neonate with hyperbilirubinemia in the area complication, management and prevention shows that during pre-test, highest (80%) of students correctly responded on the item "Long term problem occurs due to photo therapy is retinal damage", 78% of students correctly responded on the item "Exchange blood transfusion is indicated to newborn, if the Cord blood bilirubin >5 mg/dl", 76% of students correctly responded on both the items "full form of CFL is Compact fluorescent lamp" and "Complication arises in high level of serum bilirubin is kernicterus", "74% of students correctly responded on the item "Phototherapy is started at Serum bilirubin level approaches 15 mg/dl", "(70%) of students correctly responded on the item "During phototherapy neonate should be turn every 2 h", 68% of students

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correctly responded on the item "Administration of medication at the time of exchange blood transfusion procedure to prevent tetany is Calcium gluconate", 64% of students correctly responded on the item "Configurational isomer means Z-isomer converted to E-isomer", 62% of students correctly responded on three items such as "The meaning of conventional phototherapy is baby laid under fluorescent lamp", "The meaning of photo oxidation is bilirubin excreted in urine" and "Neonate should be monitored every hourly, if the bilirubin level in the blood is above 30 mg/dl", 58% of students correctly responded on the item "Complication of EBT (exchange blood transfusion) is cardiac failure", 52% of students correctly responded on the item "Most appropriate for treating hyperbilirubinemia of 18 mg/dl is phototherapy", 50% of correctly responded on both the items "The shape of photo light is U-shaped" and "Drug used to improve excretion of bilirubin is phenobarbitone" [35, 36].

48% of the students correctly responded on the item "During EBT amount of blood used in each push and pull is 5–10 ml blood. Lowest percentage (38%) of students correctly responded on the items "Most common deficiency occurring in premature newborn during phototherapy is calcium" [37, 38].

However in the post-test, highest percentage (100%) of students correctly responded on five items such as "Wave length of blue light is 420–480 nm", "During phototherapy neonate should be turn every 2 h", "The distance between newborn's skin and light source during phototherapy is 45 cm", "Administration of medication at the time of exchange blood transfusion procedure to prevent tetany is Calcium gluconate" and "Complication that arises in high level of serum bilirubin is kernicterus". 98% of students correctly responded on both items "Long term problem occurs due to photo therapy is retinal damage" and "Configurational isomer means Z-isomer converted to E-isomer". 96% of students correctly responded on the four items, which were: "Percentage of insensible water looses increased in pre-mature baby undergoing phototherapy those under radiant warmers is 80–90%", "Drug used to improve excretion of bilirubin is phenobarbitone", "During EBT, amount of blood used in each push and pull is 5–10 ml" and "Complication of EBT (exchange blood transfusion) is cardiac failure". 94% of students correctly responded on the item "The meaning of conventional phototherapy is baby laid under fluorescent lamp". 92% of students correctly responded on the three items which were: "The meaning of photo oxidation is bilirubin excreted in urine", "full form of CFL is Compact fluorescent lamp" and "Most common deficiency occurring in pre-mature newborn during phototherapy is of calcium". 90% of students correctly responded to item "Phototherapy is started as serum bilirubin level approaches 15 mg/dl". (86%) "Exchange blood transfusion is indicated to newborn, if the Cord blood bilirubin >5 mg/dl" and lowest percentage (68%) of students correctly responded on item "Most appropriate for treating hyperbilirubinemia of 18 mg/dl is phototherapy" [39, 40].

Further effectiveness of information booklet shows highest percentage (54%) of correct response gained for both items: "Most common deficiency occurring in pre-mature newborn during phototherapy is of calcium" and "The distance between newborn skin and light source during phototherapy is 45 cm". Lowest percentage (8%) of effectiveness shows for the item "Exchange blood transfusion is indicated to newborn, if the Cord blood bilirubin >5 mg/dl or more". In the rest of the item varies from 48 and 14% reveals that information booklet was effective in all above area [41, 42].

Assessment of Effectiveness of Information Booklet with Demographic Variable of GNM Intern Students

Comparison of mean, SD and mean percentage of pre- and post-test KS of the GNM intern students regarding care of neonate with hyperbilirubinemia according to their age shows that during post-test, the highest mean score (40±0) which is 100% of the total score was obtained by the students in the age group of 20. The lowest mean score (36.97±2.01) which is 90.62% of total score was obtained for 20–22 years of age group, whereas lowest score (45%) during pre-test was obtained by the students in the age group of 20 years. However difference in mean percentage varies from 24.67 to 55%. It seems that the information booklet programme was effective for all age groups [43, 44].

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Comparison of mean, SD and mean percentage of pre and post-test KS of the students regarding care of neonate with hyperbilirubinemia according to their marital status shows that during post-test, the highest mean score (37.6±2.19) which is 94% of the total score was obtained by the students who got married. The lowest mean score (36.93±2.12) which is 92.3% of total score was obtained for the students who are unmarried which was highest (65.7%) during pre-test. However difference in mean percentage varies from 26.2 to 32.5%. It seems that the information booklet was effective for all students who are married or unmarried [45, 46].

Comparison of mean, SD and mean percentage of pre and post-test KS of the students regarding care of neonate with hyperbilirubinemia according to their religion shows that during post-test, the highest mean score (37.06±2.11) which is 92.65% of the total score was obtained by the students who are belong to Hindu religion. The lowest mean score (35.5±2.12) which is 88.75% of total score was obtained for the students who belongs to Christianity religion, which was also lowest (61.25%) during pre-test. However difference in mean percentage varies from 27.2 to 27.5%. It seems that the structured teaching programme was effective for all students who belong to any religion However difference in mean percentage varies from 26.2 to 32.5%. It seems that the information booklet was effective for all students who are married or unmarried [47, 48].

Comparison of mean, SD and mean percentage of pre- and post-test KS of the students regarding care of neonate with hyperbilirubinemia according to their religion shows that during post-test, the highest mean score (37.06±2.11) which is 92.65% of the total score was obtained by the students who are belongs to Hindu religion. The lowest mean score (35.5±2.12) which is (88.75%) of total score was obtained for the students who are belongs to Christianity religion. which was also lowest (61.25%) during pre-test. However difference in mean percentage varies from 27.2 to 27.5%. It seems that the structured teaching programme was effective for all students who are belongs to any religion [49, 50].

Comparison of mean, SD and mean percentage of pre and post-test KS of the students regarding care of neonate with hyperbilirubinemia according to their previous source of knowledge shows that during post-test, the highest mean score (38.28±2.05) which is 95.7% of the total score was obtained by the students who got knowledge from clinical experience. The lowest mean score (36.60±2.06) which is 91.5% of total score was obtained for the students who got knowledge from books and journals having not formal educational status which was also lowest (64.22%) during pre-test. However difference in mean percentage varies from 25.82 to 28.65%. It seems that the information booklet was effective for all students who are also lowest (64.22%) during pre-test. However difference in mean percentage varies from 25.82 to 28.65%. It seems that the information booklet was effective for all students [51, 52].

TESTING OF HYPOTHESIS

Difference between Pre-Test and Post-Test Knowledge Scores

Paired ‘t’ test was calculated to assess the significant difference between pre and post-test knowledge score which shows that significant difference was found in all areas like concept and types of neonatal hyperbilirubinemia, cause and diagnosis and complication, management and prevention of neonatal hyperbilirubinemia ($p<0.01$). Thus the difference in mean score value related to the above mentioned areas were true difference. As the calculated value is higher than the tabulated value, null hypothesis was rejected and statistical hypothesis was accepted [53, 54].

Association of Demographic Variables of the GNM Intern Students with Their Post Test Knowledge Score

Chi-square (X^2) was calculated to assess the significant association between selected demographic variables of GNM intern students with their pre-test knowledge score regarding care of neonate with hyperbilirubinemia which reveals that, no significant association was found between pre-test KS when compared to age, marital status, religion and previous source of knowledge. The calculated value is less than the table value. Hence it can be interpreted that, the difference in mean score related to their demographic variables were not true difference and only by chance. So, the null hypothesis was

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accepted. Thus it can be interpreted that information booklet is effective for all the staff nurses irrespective of the demographic variables [55, 56].

SUMMARY

An experimental approach with one group pre-test and post-test design study was conducted on 50 GNM intern students to assess the effectiveness of information booklet regarding care of neonate with hyperbilirubinemia in school of nursing Berhampur, Orissa. Data were collected from 23.04.2016 to 05.05.2016. Staff nurses were selected by simple random sampling technique. Based on the finding of the study, it can be summarized as follows:

- Highest percentage (78%) of GNM intern students belongs to the age group of 20–22 years.
- GNM students according to their gender show that 100% were of female gender.
- Majority (90%) of GNM intern students were unmarried.
- Highest percentage (98%) of GNM intern students were belongs to Hindu religion.
- Highest percentage (46%) of GNM intern students got previous source of knowledge from books and journals.
- Prior to implementation of information booklet the students had average knowledge had good knowledge (70%) on care of neonate with hyperbilirubinemia.
- The total mean score during post-test (37±2.21) which is 92.5% reveals very good knowledge and effectiveness was found to be 40.26%.
- Highest post mean score of 94.57% of the maximum score was obtained by GNM intern students for the area "concept and types of neonatal hyperbilirubinemia", and lowest mean score of 86% of total score was obtained for the area "cause and diagnosis of neonatal hyperbilirubinemia".
- Highly significant difference was found between pre-test and post-test knowledge score ($p<0.01$).
- No significant association was found between pre-test KS when compared to age, marital status, religion and previous source of knowledge ($p<0.05$).

CONCLUSION

From the finding of the present study it can be concluded that, highest percentage (78%) of GNM intern students were in the age group of 20–22 years. GNM students according to their gender show that 100% were of female gender. Majority 90% of GNM intern students were unmarried. High percentage (98%) of GNM intern students belongs to Hindu religion [57, 58]. Highest percentage (46%) of GNM intern students got previous source of knowledge from books and journals [59–61]. Prior to implementation of information booklet, the students had average knowledge had good knowledge (70%) on care of neonate with hyperbilirubinemia; whereas after implementation of information booklet, the difference in mean percentage was 40.26% and it shows the effectiveness of information booklet [62–64].

LIMITATIONS OF THE STUDY

There were some limitations of the present study:

- The study was confined to small group (50) of the GNM intern students. This limits the generalization of the findings to the sample only.
- There were limitations due to the class schedule of students.
- The tool was used to measure only the cognitive aspect of GNM intern students on care of neonate with hyperbilirubinemia.
- The sample size is so small that it may not be a true representative of the population.
- The relevant study was scanty as very few nursing studies were conducted on selected neonatal emergencies and their management.

NURSING IMPLICATIONS

The finding of the study have implications on the field of nursing education, nursing practice, nursing practice, nursing administration and nursing research.

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Nursing Education

- Education is the key component to update and improve the knowledge of an individual. In the present scenario, knowledge on care of neonate with hyperbilirubinemia is much deficient among the nursing students as this body of knowledge is not fully developed and is still on the path of expansion and discoveries. Hence, there is a need to include these components into present curriculum.
- It is the duty of school of nursing faculties to educate their client. Hence, to excel in this strategy, nurses need to be well equipped with enormous amount of knowledge that will convince clients approaching them.
- The findings of the study can help in the seminar, work shop programme to improve the knowledge of students on care of neonate with hyperbilirubinemia [65, 66].

Nursing Administration

- Students nurse administrators are key persons to plan organize and conduct education programmes in school. Nurse administrators' support should be necessary to conduct and evaluate health education programmes. They can help to improve the knowledge of the students by providing various teaching programmes with the help of various AV aids.
- Student nurse administrators are in a key position to organize, implement and evaluate educative programmes which will in turn help to improve the knowledge as well as to meet the future needs and accelerate of neonatal services.
- The findings of the study can be implicated in nursing administration by improving quality of care and appropriate management of neonatal hyperbilirubinemia in hospital setting.
- Nursing students manage neonatal hyperbilirubinemia during their clinical posting and field visit [67, 68].

Nursing Practice

- Student nurses are the key personnel to the health team, who play a vital role in the promotion and maintenance of health. They can provide adequate teaching to both parents and family members so that they will come to about advantages of the vast developing field of care of neonate with hyperbilirubinemia. Hence the student nurses have adequate knowledge about neonatal emergency to improve the standards of neonatal care [69, 70].

The Major Role and Responsibilities can be summarized as:

- Student nurses will give care for newborn babies, almost always in a medical or hospital setting.
- Identifying the problems of sick neonates.
- They provide complete care for babies. They attend deliveries, weigh and measure neonates, bathe and monitor their health status.
- They provide "top to tail" care for a baby.
- Provide appropriate information regarding the topic neonatal hyperbilirubinemia.
- They work with a health team of other health care professionals to provide the necessary medical care to infants.
- The student nurses care for the infants and mother, often teaching parents how to care for a newborn baby.
- The finding of the study can be implicated in nursing services to improve the quality of nursing care on neonatal hyperbilirubinemia.

Nursing Research

- The main goal of the nursing research is to improve the knowledge of staff nurses through the implementation of evidence based practice. The study provides a baseline data for conducting other research studies.
- The study will be a motivation for the budding researchers to conduct similar studies on large scale. The study will be a reference for the research scholars.

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- Further research works can be conducted with every medical condition to identify most effective knowledge imparting strategies.
- The study result can help for further research study on management of neonatal emergencies.

RECOMMENDATION

On the basis of the findings and experiences gained during the study periods, the following recommendations are suggested as below:

- Similar studies can be conducted on a large sample for drawing better conclusion and generation findings.
- Experimental study could be taken to assess the effectiveness of video assisted teaching module on knowledge and practice of GNM interns.
- Students regarding care of neonates with hyperbilirubinemia.
- Continuous supportive supervision is required for health care provider to implement what they have learned.
- A study could be taken on knowledge of student nurses on management of other neonatal emergencies and their management.
- A comparative study can be conducted on professional education and knowledge of student nurses on management of care of neonate with hyperbilirubinemia.

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