

Effectiveness of Structured Teaching Program on Knowledge regarding Pediatric Emergency Drugs and Calculation of Doses among Final Year B.Sc. (N) Students

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Abstract: *The safe administration of medication to children presents a number of problems that are not encountered when giving medication to adult patients. Children vary widely in age, weight, body surface area and the ability to absorb, metabolize and excrete medications. Nurses must be particularly alert when computing and administering drugs to infant and children. In children there is predominantly high likelihood of medication errors. Many factors contribute to this risk, including weight-based dosing; the need for stock medicine dilution; decreased communication abilities of children; an inability to self-administer medications; and the high vulnerability of young, critically ill children to injury from medications, particularly those with immature renal and hepatic systems.*
Objectives: *To assess the effectiveness of structured teaching program on knowledge regarding pediatric emergency drugs and the calculation of drug doses among final year B.Sc. (N) students and to find out the association between pre test and post test knowledge scores and the selected socio demographic variables.*
Methodology: *Pre experimental – One group pre test- post test design is adopted to assess effectiveness of structured teaching program on knowledge regarding pediatric emergency drugs and calculation of doses among final year B.Sc. (N) students. A sample size of 50 students of final year B.Sc. (N) students were selected by using simple random sampling technique by means of lottery method. Data was collected by using structured questionnaire to assess the knowledge.*
Results: *The results shows that there is a significant difference between pre test and post test knowledge scores and the post test mean was greater than the pre test mean of the students after structured teaching Program. The calculated 'Z' value is greater than the table value (at 0.05 level).*
Conclusion: *The study reveals that structured teaching Program was effective in enhancing the knowledge of pediatric emergency drugs among final year B.Sc. (N) students.*

Keywords: Pediatric emergency drugs, Calculation of drug dosages, knowledge of nursing students

1. Introduction

Children are more prone to illnesses and they often require medical as well as surgical treatment to be restored to life and health. The caregivers in the pediatric unit should be knowledgeable and competent in order to administer emergency drugs in the process of the revival of these children. Emergency drugs play the most important role when the airway, breathing, and circulation do not restore the child to life.

The safe administration of medication to children presents a number of problems that are not encountered when giving medication to adult patients. Children vary widely in age, weight, body surface area and the ability to absorb, metabolize and excrete medications. Nurses must be particularly alert when computing and administering drugs to infant and children.

In children there is predominantly high likelihood of medication errors. Many factors contribute to this risk, including weight-based dosing; the need for stock medicine dilution; decreased communication abilities of children; an inability to self-administer medications; and the high vulnerability of young, critically ill children to injury from medications, particularly those with immature renal and hepatic systems.

Several studies have documented that the need for weight-based dosing creates many opportunities for errors, including particularly dangerous 10-fold dosing errors. Potts and Phelan demonstrated deficiencies in the calculation and applied mathematics skills among pediatric healthcare personnel. Similarly, Rowe demonstrated drug dosage calculation errors during written calculation tests for pediatric residents. Ten-fold errors result from misplaced decimal points in drug dosing or stock medicine dilutions. The consequences of 10-fold errors may be particularly severe. For example, a case series of 22 10-fold errors involving 9-threatening, and 1 moderately toxic error. Five of these errors reached a patient. Similarly, Koren published a case series of 7 10-fold errors at 3 institutions, of which 1 resulted in death and 6 of 7 resulted in significant morbidity. Of concern, 1 was an outpatient overdose by parents caused by a language barrier. There have been several highly publicized deaths from 10-fold errors, including the routine postoperative death of a 9-month-old after a 10-fold morphine overdose.

Large overdoses can also result from the interchange of milligrams and micrograms as in the toxic ingestion of clonidine from a pharmacy-compounding error that resulted in a pediatric intensive care unit (PICU) hospitalization for a child. The illegibility of physicians' handwriting is often viewed with amusement. Although one study suggested that physician's handwriting is no more illegible than that of lawyers and businessmen; physician's illegibility can result in disastrous consequences.

Volume 11 Issue 3, March 2022

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Electronic prescribing systems are an excellent solution for handwriting issues, but few such systems are currently utilized in pediatric settings, in large part caused by the slow commercial development of pediatric prescribing systems, in comparison with adult systems which require an increased complexity of clinical decision support.

The emergency department may be particularly prone to errors because of the emergent nature of care, the frequent lack of medication history, and the complexity of patients. A retrospective chart review cohort study of 1532 children treated in the emergency department of a pediatric tertiary care hospital identified errors in 10.1% of the charts. Logistic regression revealed an increased risk for errors when a medication was ordered by a trainee doctor or administered by a student nurse (odds ratio 1.64, 95% CI 1.06-2.52) and in seriously ill patients (odds ratio 1.55, 95% CI 1.06-2.26).

Nurses enter the profession relatively earlier than other professionals. Soon after the final year of education in B.Sc. (N), the graduates have many lives placed into their hands including the little ones the children. Hence it is essential that the graduating nurses acquire adequate knowledge on pediatric emergency drugs and calculation of drug doses in order to avoid errors in medication administration among children especially in critical situations.

2. Statement of the Problem

“A study to assess the effectiveness of structured teaching program on knowledge regarding pediatric emergency drugs and calculation of doses among final year B.Sc. (N) students in selected nursing college, Bhopal.”

Objectives

- 1) To assess the knowledge of final year B.Sc. (N) students regarding pediatric emergency drugs and the calculation of drug doses.
- 2) To assess the effectiveness of structured teaching program on knowledge regarding pediatric emergency drugs and the calculation of drug doses among final year B.Sc. (N) students
- 3) To find out the association between pre test & post test knowledge scores and the selected socio demographic variables of final year B.Sc. (N) students.

3. Materials & Methods

Research Design: A pre experimental – one group pre test post test design was used to assess effectiveness of structured teaching program regarding knowledge regarding pediatric emergency drugs and calculation of doses among final year B.Sc. (N) students.

Setting: The study was conducted in R. D. Memorial College of Nursing, Bhopal, M.P.

Sample Size & Sampling technique: The sample consisted of 50 students of final year B.Sc. (N) who were selected by using the simple random sampling technique by means of lottery method. The data was collected from R. D. Memorial College of Nursing, Bhopal.

Tools & techniques: Data collection was collected by using the Self administered structured questionnaire to collect the baseline data on background variables and also to assess the knowledge regarding pediatric emergency drugs and calculation of doses. The reliability of tool was established by test retest method and ‘r’ was found to be 0.94. The pilot study was conducted in Batra Nursing College, Bhopal on 10 students of B.Sc. (N) to check feasibility and practicality of the tool.

Data analysis

Data was analyzed by using Descriptive Statistics such as frequency distribution, mean and Std Deviation and Inferential Statistics like ‘z’ test and Chi square.

4. Results

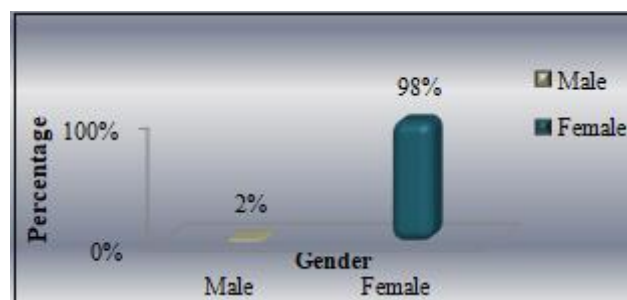


Figure 1: Distribution of final year B.Sc. (N) students according to their age

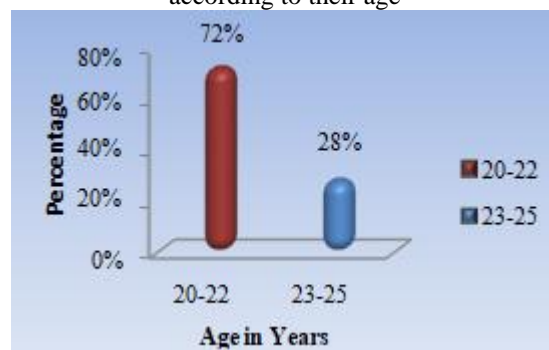


Figure 2: Distribution of final year B.Sc. (N) students based on gender

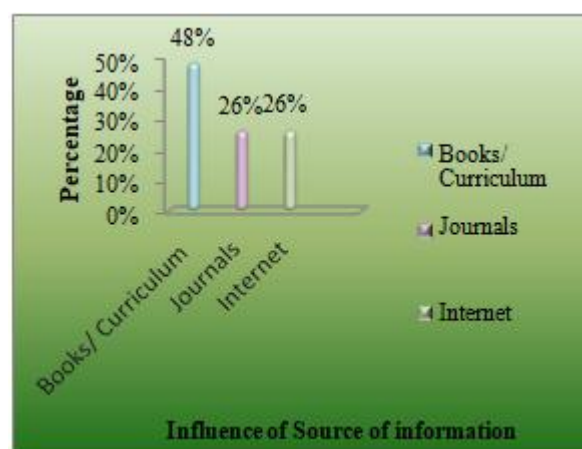


Figure 3: Distribution of final year B.Sc. (N) based on curriculum studied in 10+2

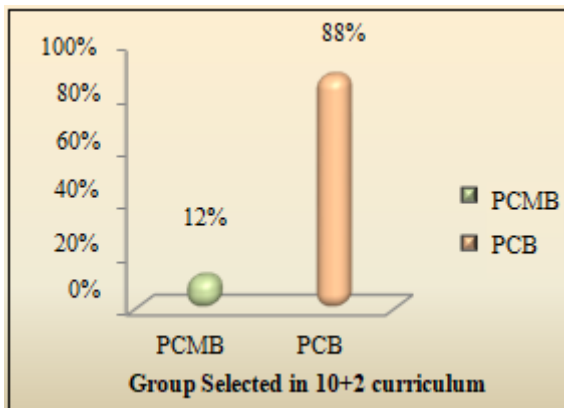


Figure 4: Distribution of final year B.Sc. (N) students based on source of information regarding pediatric drugs & calculation

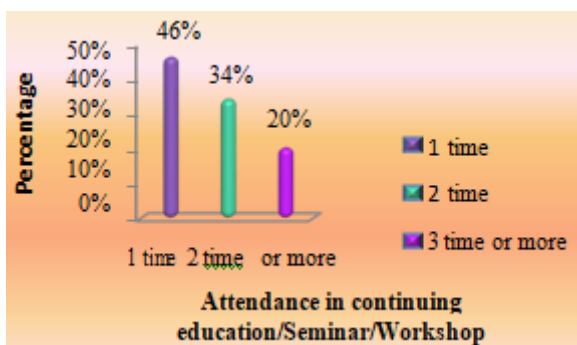


Figure 5: Distribution of final year B.Sc. (N) student based on any CNE, seminar or workshop attended regarding pediatric emergency drugs

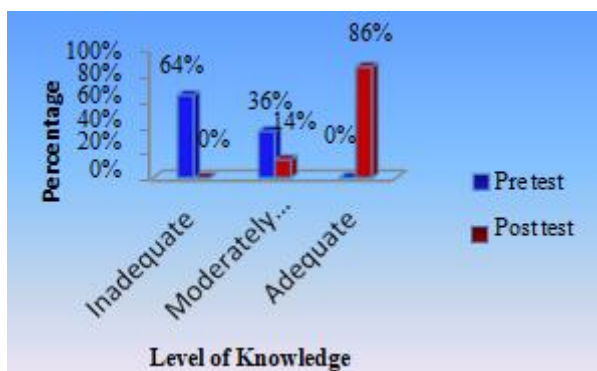


Figure 6: Distribution of final year B.Sc. (N) student based on their pre and post test level of knowledge regarding pediatric emergency drugs and calculation of drug doses

Table 1: Distribution of final year B.Sc. (N) students based on their age

Age (in Years)	(n=50)	
	(f)	(%)
a) 20-22	36	72
b) 23-25	14	28
Total	50	100

Table 2: Distribution of final year B.Sc. (N) students based on gender

Gender	(n=50)	
	(f)	(%)
a) Female	49	98
b) Male	1	2
Total	50	100

Table 3: Distribution of final year B.Sc. (N) students based on groups selected in 10+2 curriculum.

Group selected in 10+2 curriculum	(n=50)	
	(f)	(%)
a) PCMB	6	12
b) PCB	44	88
Total	50	100

Table 4: Distribution of final year B.Sc. (N) students based on source of information regarding pediatric drugs & calculation

Source of information regarding pediatric drug and calculation	(n=50)	
	(f)	(%)
a) Books/Curriculum	24	48
b) Journals	13	26
c) Internet	13	26
TOTAL	50	100

Table 5: Distribution of final year B.Sc. (N) students based on any CNE, seminar or workshop attended regarding pediatric emergency drugs

CNE/ Seminar/ Workshop attended	(n=50)	
	(f)	(%)
1 time	23	46
2 time	17	34
3 time or more	10	20
Total	50	100

Table 6: Distribution of final year B.Sc. (N) students based on their pre and post test level of knowledge regarding pediatric emergency drugs and the calculation of drug doses, (n=50)

Level of Knowledge	Pre-Test		Post-test	
	f	P (%)	f	P (%)
Inadequate	32	64	0	0
Moderately adequate	18	36	7	14
Adequate	0	0	43	86
Total	50	100	50	100

Table 7: Effectiveness of structured teaching program on knowledge regarding pediatric emergency drugs and the calculation of drug doses among final year B.Sc. (N) students (n=50)

Test	Mean	SD	'Z' Test	S
Pre- Test	16.44	2.96	19.08 (Cal)	0.47 44 (Tab)
Post- Test	27.32	2.65	Val)	Val)

S* = Significant. P = 0.05 level

5. Discussion

Sociodemographic Variables:

With regard to age, majority of the nursing students i.e. 36 (72%) belong to 20-22 years of age and 14 (28%) belong to 23-25 years of age. With regard to gender, majority, 49 (98%) were Females and 1 (2%) was male. Regarding their group selection in 10+2 curriculum, majority of them i.e. 44 (88%) have studied only Physics, Chemistry and Biology and 6 (12%) of them studied Physics, Chemistry, Math's, Biology. Regarding the source of information, 24 (48%) got information from Books / Curriculum, 13 (26%) gained from Journals and 13 (26%) gained from Internet.

Findings related to effectiveness of structured teaching program on knowledge regarding Pediatric Emergency Drugs and the Calculation of Drug Doses.

The findings of the study revealed that there is a significant difference between pre test and post test knowledge scores and the Post test mean was greater than the pre test mean of the students after structured teaching program. The mean pre test knowledge scores was 16.44 and the mean post test knowledge score was 27.32. The calculated 'Z' value is 19.08 which is greater than the table value 0.4744 (at 0.05 level). It is evident that the structured teaching program was effective in enhancing the knowledge of pediatric emergency drugs among final year B.Sc. (N) students. Hence, H₁ is accepted and H₀ is rejected.

The findings are consistent with the study conducted to assess the effectiveness of planned teaching program on knowledge of emergency drugs among staff nurses. In this study, one group pre-test post-test research design was used to assess the effectiveness of planned teaching program on knowledge of emergency drugs among staff nurses working in critical care units in the selected hospital. 30 staff nurses were selected by convenience sampling method. Structured knowledge questionnaire was used to assess the effectiveness of planned teaching on emergency drugs among the staff nurses. The finding of the study showed that the knowledge of staff nurses after pre-test was not satisfactory; the planned teaching program helped them to learn about emergency drugs. The posttest knowledge scores showed the significant increase in knowledge.

Association between pre-test and post-test knowledge scores and the selected socio-demographic variables

In association with pretest and posttest knowledge scores, there is no statistically significant association between knowledge scores of final year Basic B.Sc. (N) students and the socio-demographic variables at 0.05 level.

This is supported by a study on knowledge of nurses about pediatric medicine administration in congenital heart intensive care unit. Thirty nurses were purposely selected; a self-prepared validated questionnaire was used in the form of multiple choices to assess the knowledge about pediatric medication administration. Result: Study showed that nurses knowledge of pediatric medicine administration is above average (10.69/15). There was no statistically significant difference in the mean knowledge score and age, year of experience.

6. Recommendations for Further Research

- 1) The study can be replicated with a large sample to assess the effectiveness of structured teaching program regarding Pediatric Emergency Drugs among final year B.Sc. (N) students to generalize the findings of the study.
- 2) A comparative study can be conducted on knowledge and practice between final year B.Sc. (N) students and staff nurses regarding Pediatric Emergency Drugs and dosage calculation.
- 3) A study can be done to assess the skills of nursing students in administration of Pediatric Emergency Drugs

and the Calculation of Drug Doses.

- 4) A true experimental study can be conducted to assess the effectiveness of in service education regarding Pediatric Emergency Drugs among staff nurses.
- 5) An exploratory study can be conducted on incidence and prevalence of medication errors in drug administration in pediatric ward.
- 6) A study can be done on effectiveness skill training programme on safe administration of Pediatric emergency drugs and dosage calculation among third Year BSc Nursing Students.

7. Conclusion

The findings of the study reveal that there is a significant difference between pre test and post test knowledge scores and the post test mean was greater than the pre test mean of the students after structured teaching program. It is evident that the structured teaching Program was effective in enhancing the knowledge of pediatric emergency drugs among final year B.Sc. (N) students.

Conflict of Interest: There is no conflict of interest.

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