A Pre-Experimental Study to Evaluate the Effectiveness of Structured Teaching Programme on Knowledge Regarding Management of Cold Chain System for Vaccine Among Basic B.Sc. Nursing 2ⁿᵈ Year Students at School & College of Nursing, Dhamtari, Chhattisgarh

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Abstract: **Introduction:** **Vaccine is an immune-biological-substance designed to produce specific protection against a given disease. It stimulates the production of protective antibody and other immune mechanisms. "Cold chain maintenance" is the system of storage and transport of vaccines at a low temperature from the manufacturer to the actual vaccine site. In general, all vaccines must be stored under the conditions recommended by the manufacturer in the literature accompanying the vaccines otherwise they become denatured and totally ineffective.** **Objectives:** **To determine the pre-test and post-test score on knowledge regarding management of cold chain system for vaccine among basic B.sc nursing 2nd year students at School & College of Nursing Dhamtari. C.G. To evaluate the effectiveness of structured teaching programme score on knowledge regarding management of cold chain system for vaccine among basic B.sc nursing 2nd year students School & College of Nursing Dhamtari. C.G. Methods:** **A pre-experimental, one group pretest posttest design was adopted; purposive sampling technique was used to select 60 subjects based on certain pre-determined criteria. The data generated by using investigator developed structured questionnaire, content validity of investigator developed tool was obtained from experts of related departments. Out of the 60 students, overall score on knowledge during pretest In pretest, maximum 50(83.33%) student knowledge was average followed 5(8.33%) is good, 5(8.33%) is need improvement and 0% is excellent. In posttest, maximum 36(60%) subjects are having good knowledge 14 (23.33%) are having average knowledge and 10(16.67%) a subject having excellent knowledge. Increase the knowledge level reveals that the structured teaching programme was effective. Conclusion:** **This study reveals that Significant difference found between the pre-test (38.9) and post-test (62.3) percentage of gain knowledge was 34.1. So, the structured teaching programme was effective.**

Keywords: **Cold chain, management system, vaccine.**

1. Introduction

Vaccine is an immune-biological- substance designed to produce specific protection against a given disease. It stimulates the production of protective antibody and other immune mechanisms. "Cold chain maintenance" is the system of storage and transport of vaccines at a low temperature from the manufacturer to the actual vaccine site. In general, all vaccines must be stored under the conditions recommended by the manufacturer in the literature accompanying the vaccines otherwise they become denatured and totally ineffective.6

Cold chain maintenance is necessary because vaccines failure may occur due to failure to store and transport under strict temperature control. This is of concern in view of the fairly frequent reports of vaccine preventable disease occurrence in population thought to have well immunized. Among the vaccine polio is the most sensitive to heat, requiring storage at minute's 2 degree centigrade. Vaccines which must be stored in the freezer comportment are polio and measles. Vaccines which must be stored in the cold part but never allowed to freeze are Typhoid, Diphtheria, Pertusis, Tetanus Toxoids, BCG and diluents

The cold chain in other words the manufacturing company and storing the vaccines at a temperature suggested by it, right from manufacture of the vaccine to the health workers at grass route level contribute significantly in cold chain of vaccines. The term C4- complete care cold chain is also in vague in the maintenance of cold. Cold chain for vaccine is a system for storing transporting vaccines at a very low temperature to maintain their effectiveness before use, because vaccines are sensitive to biological, substances their exposition to high temperature directly affects the quality of vaccines and safety of immunization. The goal of the study was to assess the safety of cold chain system.

The cold chain refers to the people, equipments, and procedure designed to maintain appropriate temperature for

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vaccines from the time they leave the manufacture through transportation and storage until the point of use linked with information about dispatch time and reaching time of vaccines, health workers are responsible to maintain the temperature of vaccines at peripheral level. If vaccines are exposed to too much heat, cold, it can be damaged and lose its potency. If that happens all the effort to give the vaccines to the child is lost.29

The researchers want to study about the topic cold chain to create awareness regarding cold chain management system and to develop adequate knowledge and also improve the working standard of health setting. To creating awareness among students those carrying this vaccine about the importance of management of cold chain are very much essential for the nursing students who work with vaccines.

2. Methods

A pre-experimental, one group pretest posttest design was adopted; purposive sampling technique was used to select 60 subjects based on certain pre-determined criteria. The data generated by using investigator developed structured questionnaire, content validity of investigator developed tool was obtained from experts of related departments.

The reliability of the tool was determined by using Split Half method and reliability was found to be 0.93. The student's knowledge was assessed by using investigator developed questionnaire. Pilot study was conducted on 6 students with constructed tool.

3. Results

The data collected from the study subjects were analyzed and interpreted in terms of the objectives and hypothesis of the study. The descriptive and inferential statistics were used for data analysis; the level of significance was at 0.05%.

In pre-test, maximum 50(83.33%) subjects are having average knowledge 5(8.33%) are having good knowledge and 5(8.33%) a subject having need for improvement.

In post test, maximum 36(60%) subjects are having good knowledge 14 (23.33%) are having average knowledge and 10(16.67%) a subject having excellent knowledge.

4. Hypothesis

In paired 't' test, the calculated value for paired 't' test is 14.64 and tabulated value for degree of freedom 59 at p value 0.01 is 2.66. As calculated value is greater than tabulated value, so structured teaching programme is significant. Research hypothesis H1 is accepted.

H1: In paired 't' test, the calculated value is greater than tabulated value. So, research hypothesis H1 is accepted.

The chi square test was done to find out the association between the pre-test and post test score on knowledge and their demographic variables. No significant association was found between the pre-test and post-test score on knowledge when compared with the demographic variables age, gender, types of family, educational status of father, educational status of mother, occupational status of father, occupational status of mother, income of family, source of information. Hence

hypothesis H2 is rejected. But significant association was found between the source of information. Hence hypothesis H2 is accepted.

Over all analysis of pre-test and post test score on knowledge regarding management of cold chain system for vaccines among basic B.sc nursing 2nd year students.

Table 1
Area wise analysis of differentiation of pretest and posttest score on knowledge

S.NO.	SCORING CRITERIA	PRE TEST		POST TEST	
		FREQUENCY	PERCENTAGE	FREQUENCY	PERCENTAGE
1	Need for improvement	5	8.33%	--	--
2	Average	50	83.33%	14	23.33%
3	Good	5	8.33%	36	60%
4	Excellent	--	--	10	16.67%

5. Discussion

In area 1: Questionnaire related to General knowledge regarding cold chain system for vaccines is analyzed after pretest and posttest respectively, mean score of differentiation between pretest mean5.87 mean % 48.92, standard deviation 2.06 and posttest mean 8.25, in mean% 68.75, standard deviation in 2.06 difference in mean% 19.83. So, the structured teaching programme was effective.

In area 2: Questionnaire related to General knowledge regarding equipments of cold chain system for vaccines. is analyzed after pretest mean2.08 mean % 29.71, standard deviation 1.14 and posttest mean 4.27, in mean% 61., standard deviation in 1.46 difference in mean% 31.29. So, the structured teaching programme was effective.

In area 3: Questionnaire related to Knowledge regarding refrigerator and monitoring devices used in cold chain system is analyzed after pretest mean 4.67 mean % 38.92, standard deviation 1.85 and posttest mean 7.55, in mean% 62.92., standard deviation in 1.76 difference in mean% 24. So, the structured teaching programme was effective.

In area 4: Questionnaire related to Knowledge regarding general instruction and inventory is analyzed after pre-test mean 2.97 mean % 33, standard deviation 1.3 and posttest mean 4.88, in mean% 52.22., standard deviation in 1.73 difference in mean% 21.22. So, the structured teaching programme was effective.

6. Conclusion

From the findings, it can be concluded that highest percentage of the students were in the age group of 19 yrs, majority of them were females, Hindu, belongs to nuclear family and father educational status is graduation and above and mothers' educational status is higher secondary. Highest of father's occupational status were farmers, and mothers are house wife's. Maximum were in the family income of Rs. 15000/month. Highest percentage of the students were having source of information through Teachers.

Prior to implementation of Structured teaching programme the students had average knowledge whereas, after

implementation of Structured teaching programme the students had good knowledge with the difference of 34.1% of mean percentage.

Significant difference found between the pretest and posttest knowledge score (P<0.05) *In pretest:* No significant association was found the age, sex, religion, types of family educational status of father, educational status of mother, occupational status of father, occupational status of mother, and monthly income, hence hypothesis H2 is rejected. But significant association was found between the source of information hence hypothesis H2 is accepted. *In posttest:* No significant association was found the, sex, types of family, educational status of father, educational status of mother, occupational status of father, occupational status of mother, and monthly income, hence hypothesis H2 is rejected. But significant association was found between age and religion hence hypothesis H2 is accepted.

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