A Study to Assess the Effectiveness of Structured Teaching Programme on Knowledge and Attitude Regarding Umbilical Cord Stem Cell Collection and Preservation Among the Staff Nurse in Selected Hospital at Anand District, Gujarat.

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Abstract— Umbilical cord blood (UCB) is a rich source of hematopoietic stem cells with significant therapeutic potential. Proper collection and preservation of UCB are crucial for its effective use in transplantation and regenerative medicine. Staff nurses, as frontline healthcare providers, play a vital role in this process. This study aimed to assess the impact of a structured teaching programme on the knowledge and attitude of staff nurses regarding UCB stem cell collection and preservation in selected hospitals in Anand District, Gujarat. The study aims to evaluate the effectiveness of a structured teaching program on the knowledge and attitude of staff nurses regarding umbilical cord stem cell collection and preservation in selected hospitals of Anand district, Gujarat. The objectives include assessing and comparing the pre-test and post-test knowledge of staff nurses and exploring the association between their knowledge and attitudes with selected demographic variables. The hypotheses suggest significant improvement in pre-test and post-test knowledge levels among the staff nurses following the structured teaching program. This evaluative study used a one-group pretest-posttest design to assess the effectiveness of a structured teaching program on the knowledge and attitude of 50 staff nurses regarding umbilical cord stem cell collection and preservation in selected hospitals of Anand district, Gujarat. Non-probability convenient sampling was employed, and data were collected using a structured questionnaire and a Likert scale for attitude measurement. Pretest and posttest assessments were conducted, with scores categorized into knowledge levels. The structured teaching program served as the intervention, and data analysis focused on comparing pretest and posttest results and identifying associations with demographic variables. Results The study assessed the effectiveness of a structured teaching program on knowledge and attitude regarding umbilical cord blood (UCB) stem cell collection and preservation among 50 participants. Pre-test and post-test evaluations revealed significant improvements in both knowledge and attitude. For knowledge, the pre-test mean score was 14.2 (47.33%), which increased to 22.5 (75%) in the post-test, with a mean percentage gain of 27.7%. A statistically significant improvement was indicated by a calculated t-value of 31.05 (p < 0.05). Similarly, in the grading of knowledge, the proportion of participants with good knowledge increased from 0% to 74% post-intervention. For attitude, the pre-test mean score was 53.36 (53.36%), which improved to 73.14 (73.14%) in the post-test, with a mean percentage gain of 19.78%. The t-value of 16.48 (p < 0.05) demonstrated a significant change. Positive attitudes increased from 4% to 76% post-intervention. Conclusion: The structured teaching program was highly effective in improving both knowledge and attitude regarding UCB stem cell collection and preservation. The significant increase in post-test scores for both domains supports the acceptance of research hypotheses H1 and H2. The findings highlight the importance of structured educational interventions in enhancing awareness and positive attitudes toward critical health-related practices.

Index Terms- Umbilical Cord Blood, Stem Cells, Staff Nurses, Knowledge, Attitude, Structured Teaching Programme, Anand District, Gujarat

I. INTRODUCTION

Background on Umbilical Cord Stem Cells: Begin by introducing the importance of umbilical cord blood (UCB) as a rich source of hematopoietic stem cells. Briefly discuss their therapeutic applications in conditions such as leukemia, lymphoma, and other blood disorders and regenerative medicine potential.

Role of Staff Nurses: Highlight the vital role of staff nurses in the accurate and efficient collection, handling, and preservation of UCB for clinical and

research purposes. Emphasize the need for standardized procedures and an understanding of the significance of each step.

Knowledge and Attitude: Explain that staff nurses' knowledge of the biology of UCB stem cells, collection techniques, preservation protocols, and legal and ethical considerations is crucial. Furthermore, their attitude towards UCB donation and preservation will impact the willingness of mothers to donate, highlighting the importance of positive attitudes.

Problem Statement: Identify the gap in knowledge regarding UCB stem cell collection and preservation among nurses in the specific study area. Mention potential lack of standardized training programs as a contributing factor. Relate this to the potential for missed opportunities in collecting and preserving this valuable resource.

Rationale for the Study: Justify the need for this study to evaluate the impact of an educational intervention to improve nurses' expertise in this area. State the potential benefits of the study outcomes for improved UCB collection practices and patient care.

II. OBJECTIVES OF STUDY

1. To assess the pretest knowledge regarding umbilical cord stem cell collection and preservation among staff nurse in selected hospital, Anand district, Gujarat.
2. To assess the posttest knowledge regarding umbilical cord stem cell collection and preservation among staff nurse in selected hospital, Anand district, Gujarat.
3. To compare the pre and post knowledge regarding umbilical cord stem cell collection and preservation among staff nurse in selected hospital, Anand district, Gujarat.
4. To find out the association between the knowledge and attitude with selected demographic variables among staff nurses regarding umbilical cord stem cell collection, preservation in selected hospital, Anand district, Gujarat.

III. HYPOTHESIS OF STUDY

H1: There will be significant pre-test knowledge among the staff nurses regarding umbilical cord stem cells collection and preservation at selected hospital, Anand district, Gujarat.

H2: There will be significant post-test knowledge among the staff nurses regarding umbilical cord stem cells collection and preservation at selected hospital, Anand district, Gujarat.

RESEARCH APPROACH
An evaluative research approach was adopted for this study, as it involves the assessment of knowledge and attitude before and after the intervention.

RESEARCH DESIGN: This study utilized a pre-experimental one-group pre-test post-test design, as depicted below:

Group	Pre-test (O_1)	Intervention (X)	Post-test (O_2)
Staff Nurses of Maternity Ward	Assessment of pre-test knowledge and attitude regarding umbilical stem cell collection and preservation	Structured teaching programme on umbilical stem cell collection and preservation	Assessment of post-test knowledge and attitude regarding umbilical stem cell collection and preservation

RESEARCH SETTING
The study was conducted in selected hospitals of Anand District, Gujarat. A total of five hospitals were shortlisted, and one was randomly selected for the pilot study using a lottery method. The selected hospitals were 20–50 bedded healthcare facilities.

VARIABLES
Dependent Variables: Knowledge and attitude of staff nurses regarding umbilical stem cell collection and preservation.
Independent Variable: Structured teaching programme.
Extraneous Variables: Educational status, income, and other demographic characteristics.
POPULATION: Target Population: Staff nurses working in maternity wards.

Accessible Population: Staff nurses from selected hospitals in Anand District.

SAMPLE AND SAMPLING TECHNIQUE

Sample Size: 50 staff nurses.

Sampling Technique: Non-probability convenience sampling was used to select participants from the hospitals.

CRITERIA FOR SAMPLE SELECTION

Inclusion Criteria:

Staff nurses working in gynecological departments in selected private hospitals in Anand District.

Nurses who were willing to participate in the study.

Nurses who were present during the data collection period.

Nurses proficient in reading and writing.

Certified nursing staff.

Exclusion Criteria:

Nurses with hearing or visual impairments.

Nurses already registered for cord blood stem cell therapy.

TOOL DEVELOPMENT AND DESCRIPTION

A structured questionnaire was developed to measure knowledge and attitude based on the study objectives and a review of relevant literature. The tool was validated and refined by subject experts.

Section A:

Demographic data, including age, religion, ward assignment, qualification, years of experience in OBG, and source of knowledge.

Section B:

A knowledge questionnaire with 30 multiple-choice questions (MCQs). Each correct answer was awarded 1 mark, while incorrect answers were scored as 0.

Scoring Criteria for Knowledge:

<50%: Poor Knowledge

51%-75%: Average Knowledge

>85%: Good Knowledge

Section C: An attitude scale based on the Likert format to assess perceptions regarding umbilical stem cell collection and preservation.

Scoring Criteria for Attitude:

Positive Attitude: 71-100

Negative Attitude: 22-70

CONTENT VALIDITY

The content validity of the tool was ensured through evaluation by three nursing experts and two obstetricians. Feedback was incorporated into the final tool.

RELIABILITY

Reliability was assessed using Split-half Method: Spearman-Brown formula for knowledge questionnaire (r = 0.83). Cronbach's Alpha: For attitude scale (r = 0.83). Both tools were found to be statistically reliable.

PILOT STUDY

A pilot study was conducted on 5 staff nurses at Spandan Hospital, Anand, to test the feasibility and reliability of the tools. Descriptive statistics were used for analysis, and no major modifications were required.

PROCEDURE FOR DATA COLLECTION

Formal permissions were obtained from relevant authorities. Data collection was conducted as follows:

Pre-test: Socio-demographic data, knowledge, and attitude were assessed on Day 1.

Intervention: A structured teaching programme on umbilical stem cell collection and preservation was conducted for 45 minutes to 1 hour.

Post-test: Knowledge and attitude were reassessed on Day 8 using the same tool.

DATA ANALYSIS PLAN

Data was analyzed using descriptive and inferential statistics:

- Descriptive Statistics: Frequency, percentage, mean, and standard deviation.
- Inferential Statistics:
- t-test for comparing pre-test and post-test scores.
- Correlation to analyze the relationship between knowledge and attitude.
- Chi-square test to assess associations with demographic variables.

RESULTS:

Table.1 Frequency and Percentage Wise Distribution of Samples Based on Demographic Data

Personal Data		(F)	(%)
	21 – 25 year	8	16%

Age of the staff nurse	26- 30 year	15	30%
	31 - 35 year	16	32%
	36 – 40 year	11	22%
Religion	Hindu	20	40%
	Christian	16	32%
	Muslim	8	16%
	Other, specify	6	12%
ward of hospital	General ward	10	20%
	Pediatric ward	10	20%
	Maternity ward	24	48%
	Emergency ward	6	12%
Qualification	ANM	16	32%
	GNM	18	36%
	B.Sc. nursing	12	24%
	M.Sc. nursing	4	8%
Year of experience	<1 year	18	36%
	1-5 year	16	32%
	5-10 years	7	14%
	>10 years	9	18%
Source of Knowledge	Mass media or internet	29	58%
	Health workers	10	20%
	Peer group	6	12%
	Thesis or conference	5	10%

presents the demographic distribution of the 50 staff nurses participating in the study. Most nurses (32%) were aged 31–35 years, with the majority identifying as Hindu (40%). Nearly half (48%) worked in maternity wards, and the predominant qualification was GNM (36%), followed by ANM (32%). Regarding experience, 36% had less than one year, and 32% had 1–5 years. In terms of prior knowledge about stem cell collection and preservation, 58% cited mass media or the internet as their source, followed by health workers (20%). This demographic profile provides insights into the participants' backgrounds, which may influence their knowledge and attitudes toward stem cell preservation.

Table:2: Area wise Mean, Mean Percentage, Percentage Gain, Mean Difference, Standard Deviation (SD) of Pre-Test and Post-Test Knowledge and attitude Scores of samples regarding umbilical cord blood stem cell collection and preservation.

Knowledge	Max .score	Mean Score	Mean percentage	S.D
Pretest	30	14.2	47.33%	1.88
Posttest	30	22.5	75%	1.89
Attitude				
Pretest	100	53.36	53.36	6.68
Posttest	100	73.14	73.14	5.93

The maximum score for knowledge was 30. In the pre-test, the mean score was 14.2 (47.33%) with a standard deviation (SD) of 1.88, indicating a moderate level of knowledge. After the structured teaching program, the mean score increased to 22.5 (75%) with an SD of 1.89, showing a significant improvement in knowledge. The table highlights the effectiveness of the intervention in enhancing the participants' knowledge.

The pre-test attitude score & SD of samples as per area was UCB stem cell collection and preservation 53.36(53.36%) respectively.

Post-test attitude score & SD of samples as per area was UCB stem cell collection and preservation 73.14 (73.14%) respectively.

Table: 3: Distribution of Samples according to grading of pre-test and post-test Knowledge score:

Knowledge	Poor (≤50%)		Average (51 – 75%)		Good (>75%)	
	No.	%	No.	%	No.	%
Pre-test	48	96%	2	4%	0	0%
Post-test	2	4%	11	22%	37	74%

the distribution of samples based on the grading of pre-test and post-test knowledge scores regarding umbilical cord blood stem cell collection and preservation. In the pre-test, 48 participants (96%) were categorized as having poor knowledge (≤50%), while only 2 participants (4%) demonstrated average knowledge (51–75%). No participants scored in the "Good" category (>75%). This indicates a significant knowledge gap before the intervention, emphasizing the need for the structured teaching program

TABLE: 4: Distribution of Positive and Negative Attitude based on Pre-Test and Post-Test Attitude scores of Samples:

Sr N	Attitude	Classification	Pre-test		Post-test	
			F	%	F	%
1.	Positive	71-100	02	4	38	76
2.	Negative	22-70	48	96	12	24
TOTAL			50	100	50	100

Table 4 illustrates the distribution of samples based on positive and negative attitudes regarding umbilical cord blood stem cell collection and preservation in the pre-test and post-test phases. During the pre-test, only 2 participants (4%) exhibited a positive attitude (71–100), while the majority, 48 participants (96%), demonstrated a negative attitude (22–70). In contrast, the post-test results show a significant improvement, with 38 participants (76%) achieving a positive attitude and only 12 participants (24%) retaining a negative attitude.

Table: 5: Mean Score, Mean Difference, SD &'t' Value of pre & Post -test Knowledge and attitude Score of samples.

Knowledge	Mean	Mean Difference	SD	Calculated 't' test
Pre-test	14.2	8.3	1.88	31.05
Post-test	22.5		1.89	
Attitude				
Pre-test	53.36	17.15	6.68	16.48
Pre-test	53.36		5.93	

Above table:5 shows that mean pre-test knowledge score was 14.2 while mean post-test knowledge score was 22.5 Hence the difference of mean between pre &post test knowledge score was 8.3 The Standard Deviation (SD) of pre-test and post-test was 1.88 and 1.89 respectively. The calculated 't' value is 31.05 at 49 degree of freedom with 0.05 level of significance.

The calculated 't' value was more than the table value. Hence the structured teaching programme was effective and null hypothesis H01 was rejected and the research hypothesis H1 was accepted. Thus the increase mean

Knowledge score in the post test phase indicates that the structured teaching programme was effective.

The mean Pre-test Attitude score was 53.36 while mean Post test Attitude score was 73.14 Hence the difference of mean between pre &post test Attitude score was 17.15 The Standard Deviation (SD) of Pre-test and Post-test was 6.38 and 5.93 respectively. The calculated' value is 16.48 at 49 degree of freedom with 0.05 level of significance.

Calculated 't' value was more than the table value. Hence the Planned Teaching Programme was effective and null hypothesis H02 was rejected and the research hypothesis H2 was accepted. Thus the increase mean attitude score in the post test phase indicates that the planned teaching programme was effective.

TABLE: 6: Association of Age of staff nurses Respondents with Knowledge Score.

Age of staff nurses	Knowledge			χ2 Value	Table value
	Good	Average	Poor		
21 - 25 year	4	1	3		
26 - 30 year	7	6	2		
31 - 35 year	8	6	20	7.14	12.59
36 - 40 year	8	3	0		
Total	27	16	7		
Hindu	11	7	2		
Christian	6	7	3		
Muslim	6	2	0	7.639	12.59
Other	4	0	2		
Total	27	16	7		
General ward	6	4	2		
Pediatric ward	7	4	2		
Maternity ward	10	6	2	0.29	12.59
Emergency ward	4	2	1		
Total	27	16	7		
ANM	6	5	3		
GNM	7	4	2		
Bsc.Nursing	8	5	1	0.963	
Msc.Nursing	5	2	1		
Total	27	16	7		12.59
<1 year	5	4	2		
1 – 5 year	8	5	2	1.108	12.59
5 – 10 year	7	4	2		

>10 year	7	3	1		
Total	27	16	7		
Mass, media /internet	21	11	6	7.08	12.59
Health worker	1	4	0		
Peer group	1	0	0		
Thesis conference	4	1	1		
Total	27	16	7		

The table presents the association between the demographic variables of staff nurses and their knowledge scores regarding a specific topic. The knowledge scores are categorized as Good, Average, and Poor. Among staff nurses aged 21-25 years, most demonstrated Good knowledge (4), while a few had Average (1) or Poor knowledge (3). Similarly, staff nurses aged 26-30 years showed better distribution in the Good and Average categories, whereas the 31-35 and 36-40 age groups had the highest concentration of Good scores (8 each). The association between age and knowledge scores yielded a χ^2 value of 7.14, which is below the tabulated value of 12.59, indicating no significant association.

For religion, Hindu respondents predominantly scored Good (11), while Christians and Muslims were distributed across all categories, with χ^2 = 7.639, also not significant. Regarding the ward of work, nurses from maternity and pediatric wards had higher scores in the Good category, while emergency ward nurses had relatively fewer Good scores. Qualifications such as B.Sc. Nursing and GNM were linked to higher Good scores compared to ANM and M.Sc. Nursing, though the association was not significant (χ^2 = 0.963). Similarly, years of experience and the source of knowledge showed variations in scores but failed to demonstrate a significant association. Mass media/internet was the most frequent source linked to Good knowledge scores (21), with a χ^2 value of 7.08, which also did not indicate significance.

Table:7 Combined Association of Demographic Variables with Attitude Scores of Respondents

Demographic	Classification	Attitude	Total	χ^2 Value	Table
Variables		Positive	Negative		value
Type of Ward	General Ward	9	3	12	2.247
	Pediatric Ward	8	4	12	
	Maternity Ward	16	1	17	
	Emergency Ward	6	2	8	
Qualification	ANM	8	2	10	2.145
	GNM	15	3	18	
	B.Sc. Nursing	11	5	14	
	M.Sc. Nursing	4	2	8	
Years of Experience	< 1 Year	10	3	13	1.72
	1-5 Years	16	4	20	
	5-10 Years	8	2	10	
	> 10 Years	4	3	7	
Source of Information	Mass Media/Internet	16	4	20	5.39
	Peer Group	11	5	16	
	Health Worker	8	0	8	
	Thesis/Conference	3	3	6	

The table highlights the combined association of various demographic variables with the attitude scores of respondents, classified as Positive or Negative. The attitude scores are analyzed against variables such as type of ward, qualification, years of experience, and source of information.

For the type of ward, maternity ward respondents had the highest proportion of positive attitudes (16), while general, pediatric, and emergency wards had lower frequencies. The χ^2 value (2.247) was less than the table value, indicating no significant association. Regarding qualifications, GNM nurses showed the highest positive attitude scores (15), followed by B.Sc. Nursing (11), ANM (8), and M.Sc. Nursing (4), with a χ^2 value of 2.145, also not significant.

In terms of experience, nurses with 1-5 years of experience had the highest positive attitude scores (16), followed by those with less than 1 year (10). However, the χ^2 value (1.72) indicated no significant association. The source of information revealed that respondents who gained knowledge from mass media/internet had the highest positive attitude scores (16), followed by peer

group (11) and health workers (8). Those who relied on thesis/conference showed the least positive attitude scores (3). The χ^2 value (5.39) for the source of information was still below the table value, indicating no significant association. Overall, while certain patterns are observed in the distribution of positive and negative attitudes across demographic variables, none of the associations are statistically significant.

CONCLUSION

Knowledge deficit exit under in all the areas of Umbilical stem cell collection and preservation. The Structured Teaching Programme was found to be effective in enhancing the knowledge and attitude of the samples regarding umbilical cord stem cell collection and preservation. Samples gained significant knowledge and enhanced the attitude of exposed to the Structure Teaching Programme. The Findings indicate that the planned teaching programme developed by the investigator was effective in enhancing the knowledge and attitude of the samples regarding umbilical cord stem cell collection and preservation. Thus the structured teaching programme can be used for the large population in different settings.

The investigator concluded that there was significance increase in the mean post-test score as compared to mean pre-test score of knowledge and attitude after administration of the structure teaching programme on Umbilical Cord Stem Cell Collection And Preservation. In knowledge and attitude the calculated 't' value was greater than the tabulated 't' value at 0.05 level of significance which was statistically significant. Thus, the null hypotheses were rejected and research hypotheses were accepted. So, investigator concluded that staff nurse in selected hospital at Anand districts gained significant increased in knowledge and attitude that the structured teaching programme was effective.

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