

A Study to Assess the Effectiveness of Structured Teaching Program on Knowledge Regarding Cord Blood Banking among Final Year Students in Selected College at Aluva

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Abstract

The present study was conducted to assess the effectiveness of a structured teaching program (STP) on knowledge regarding cord blood banking among final-year students in selected colleges at Aluva. The objectives were to assess the existing knowledge on cord blood banking, evaluate the effectiveness of the STP, and determine the association between post-test knowledge and selected demographic variables.

Pre-Experimental **one**-group pre-test post-test design was adopted. The study was conducted among 40 final-year students from Union Christian College, Aluva, selected through non-probability convenience sampling. Data were collected on 24th and 25th June 2025 using a structured knowledge questionnaire developed by the investigator. The collected data were analyzed using descriptive and inferential statistics.

The findings revealed that none of the students had excellent knowledge in the pre-test; 40% had mild knowledge and 60% had moderate knowledge. The mean post-test score was significantly higher than the mean pre-test score, indicating that the structured teaching program was effective in improving the students' knowledge regarding cord blood banking. There was no significant association between post-test knowledge

scores and selected demographic variables.

The study concludes that structured teaching programs are effective educational strategies to enhance awareness among nursing students on emerging healthcare topics like cord blood banking.

“Education is the most powerful which you can use to change the world.”-Nelson Mandela

Key words: Cord blood banking; Structured teaching program; Final year students

Chapter-1 Introduction

Background of the Study

Practice, are expected to in recent decades, advancements in medical science have significantly transformed the landscape of healthcare, opening new avenues for the treatment and prevention of numerous diseases. Among these, the field of regenerative medicine has shown remarkable potential, particularly through the use of stem cells. Stem cell therapy is now recognized as a powerful tool in the treatment of various life-threatening and genetic conditions. One major source of these stem cells is umbilical cord blood, which is rich in hematopoietic stem cells.

Cord blood banking refers to the process of collecting and preserving this valuable biological resource for potential future medical use. Despite its increasing medical significance, awareness and understanding of cord blood banking remain limited, especially among students in health-related fields. Final-year students, who are on the verge of entering clinical possess a comprehensive understanding of such emerging healthcare practices. Their ability to educate and guide patients accurately depends on their own level of knowledge. Structured teaching programs (STPs) have proven effective in enhancing student knowledge on specialized topics that are not always thoroughly covered in traditional curricula. Therefore, evaluating the effectiveness of a structured teaching intervention specifically designed to increase knowledge about cord blood banking is both timely and essential. This study will be conducted among final-year students from selected colleges in Aluva, aiming to assess their existing knowledge and the impact of a structured teaching program.

Need of the study

In the modern healthcare system, there is an increasing demand for professionals who are not only skilled but also well-informed about the latest developments in medical science. Students in their final year of professional education are at a crucial stage where they transition from theoretical learning to practical application. At this point, their understanding of new and emerging healthcare practices can significantly impact their ability to provide quality care and patient education. Despite the growing importance of regenerative medicine and stem cell therapy, there exists a considerable gap in awareness and knowledge about the options available for stem cell preservation, especially through cord blood. Research and anecdotal evidence suggest that many healthcare students receive limited exposure to this topic during their formal education. Addressing this gap through a structured teaching approach can empower students with the information necessary to support patient decisions and enhance healthcare outcomes. This study will provide insight

into how educational interventions can be utilized to strengthen student knowledge in this vital area.

Problem Statement

“A study to assess the effectiveness of structured teaching program on knowledge regarding cord blood banking among final year students in selected college at Aluva.”

Objectives

- To assess the level of knowledge regarding cord blood banking among final year students
- To prepare and implement structured teaching program on cord blood banking
- To evaluate the effectiveness of structured teaching program on the knowledge level of final year students
- To find out the association between pretest knowledge scores and selected demographic variables

Purposes

The purpose of this study is to evaluate the effectiveness of a structured teaching program in enhancing the knowledge of final-year students regarding cord blood banking

Operational Definitions

- **Effectiveness:** In this study it refers to the degree to which the structured teaching program improves the knowledge of students measured by structured questionnaire.
- **Structured Teaching Program (STP):** In this study it refers to a systematically designed educational session or module, including visual aids, discussions, and written material, aimed at improving student understanding of cord blood banking.
- **Knowledge:** In this study it refers to the level of understanding possessed by the students regarding the concept, purpose, procedures, benefits, risks, and ethical issues related to cord blood banking assessed through a structured teaching program.
- **Cord Blood Banking:** In this study it refers to a medical process that involves collecting, processing, and storing umbilical cord blood for future therapeutic use,

primarily due to its richness in stem cell.

- **Final Year Students:** In this study it refers to individuals enrolled in the final academic year of undergraduate programs in nursing, medical, or allied health sciences in selected college in Aluva.

Hypothesis

(H1): There will be a significant improvement in the post test knowledge levels regarding cord blood banking among final-year students after the implementation of the structured teaching program.

(H2): There is significant association between pretest knowledge score and demographic variables.

Null Hypothesis

(H01): The structured teaching program will not result in significant improvement in knowledge regarding cord blood banking among final year students with demographic variables.

(H02): There is no significant association between pretest knowledge score and demographic variables.

Limitations

- The study is limited to final year students in selected colleges at Aluva
- The study is confined to a specific geographic location
- The data collected are self-reported and may be subject to bias

Delimitations

- Final year students studying in selected

This process not only informs the formulation of research questions and objectives but also provides a strong foundation for justifying the need for the present study.

In the current study, the review of literature focuses on cord blood banking and the effectiveness of structured teaching programs in improving knowledge among students. The available literature is systematically organized under the following headings:

- Literature related to knowledge on cord blood banking
- Literature related to structured teaching programs
- Literature related to student knowledge and

colleges at Aluva

- Students who were available and willing to participate during the period of data collection
- Assessment limited to knowledge only, not to attitude or practice regarding cord blood banking.
- The effectiveness was measured immediately after the structured teaching programme without long term follow up

Summary

This chapter introduced the topic of research and its relevance in current medical and educational context. It detailed the title need and purpose of the study along with the research problem, objectives and operational definition. The chapter also present the hypothesis, limitations, and a brief summary to set the stages for subsequent chapters.

Chapter 2

Review Of Literature

“A literature review is a critical summary of what the scientific literature says about your specific topic or question.” – University of California Libraries

A literature review plays a vital role in any research project by critically examining and synthesizing existing studies relevant to the topic of interest. It allows the researcher to understand what has already been explored, identify gaps in knowledge and recognize patterns and themes within the current body of evidence.

awareness

Literature Related to Knowledge on Cord Blood Banking

- A descriptive survey was conducted by Sharma (2018) to assess awareness and perception regarding cord blood banking among 100 nursing students. The sample was selected through stratified random sampling. A structured questionnaire with a 3-point Likert scale was used to evaluate knowledge. The results showed that 65% of participants had inadequate knowledge. The study concluded that there is a need for educational interventions.

- A cross-sectional study was conducted by Kumar et al. (2020) to assess knowledge of final year students in South India. The sample size was 150 and selected using convenience sampling technique. A structured questionnaire and a 5-point Likert scale were used. The results showed that structured teaching programs could be effective in improving knowledge.
 - A descriptive study was conducted by Rao and Devi (2019) to examine awareness of cord blood banking among 120 nursing students using purposive sampling. A structured questionnaire was used. The findings showed that only 25% had good knowledge. The study concluded that cord blood banking information should be included in the nursing curriculum.
 - A descriptive study was conducted by Mishra and Gupta (2017) among 200 residents in urban India using simple random sampling. A structured interview schedule was used. The study found that only 35% had basic awareness, with many misconceptions. The study concluded that mass awareness and educational interventions are needed.
- A survey was conducted by Thomas and Abraham (2021) among 100 paramedical students using simple random sampling and a structured questionnaire. The study found that 68% had inadequate knowledge. The conclusion stressed the need for structured educational sessions.
- Literature Related to Structured Teaching program quasi experimental study was conducted by Rani (2019) among 80 B.Sc. nursing students selected through purposive sampling. Pre- and post-test scores using a structured questionnaire showed significant improvement in knowledge. The study concluded that structured teaching was effective.
 - An evaluative study was conducted by Anita and Joseph (2021) among 120 paramedical students using systematic random sampling. MCQs and a knowledge rating scale were used. Post-test scores were significantly higher ($p < 0.001$), confirming that structured teaching positively impacts knowledge retention.
 - A pre-experimental one-group pre-test post-test study was done by Fernandes et al. (2016) among 60 nursing students using convenient sampling. A structured

questionnaire showed significant improvement post-intervention. The study concluded that structured teaching is effective.

- A pre-experimental study was conducted by Bose and Das (2017) among 100 nursing students. A structured knowledge questionnaire showed that mean post-test scores were significantly higher than pre-test scores. The study recommended integrating structured sessions in curriculum.
- A quasi-experimental study was conducted by Reddy et al. (2020) among 90 midwifery students selected by purposive sampling. A structured tool showed that knowledge levels significantly increased post-teaching. The study confirmed effectiveness of structured educational interventions.

Literature Related to Structured Teaching Programs

- A quasi-experimental study was conducted by Rani in 2019 to evaluate the effectiveness of a structured teaching program among B.Sc. nursing students. The sample size was 80, selected using purposive sampling technique. A structured questionnaire was used to assess the knowledge of students before and after the intervention. The results showed a significant improvement in post-test knowledge scores, and the study concluded that structured teaching is effective in enhancing awareness.
- An evaluative study was conducted by Anita and Joseph in 2021 to assess the impact of a structured teaching program among paramedical students. A total of 120 students were selected using systematic random sampling. Multiple-choice questions and a knowledge rating scale were used to collect data. Post-test scores were significantly higher than pre-test scores ($p < 0.001$), and the study concluded that structured teaching positively influences knowledge retention.
- A pre-experimental one-group pre-test post-test study was carried out by Fernandes et al. in 2016 to assess the effectiveness of an educational program among nursing students. The sample consisted of 60 students selected through convenient sampling. A structured questionnaire was

used to collect data. Results showed a significant increase in knowledge scores after the intervention, and the study concluded that structured teaching is an effective method of enhancing knowledge.

- A pre-experimental study was conducted by Bose and Das in 2017 to implement a structured teaching session among nursing students. The sample size was 100, selected through non-probability sampling. A structured knowledge questionnaire was used, and findings indicated that mean post-test scores were significantly higher than the pre-test scores. The study recommended incorporating structured teaching sessions into the nursing curriculum.
- A quasi-experimental study was done by Reddy et al. in 2020 to assess the effectiveness of a structured teaching program among midwifery students. A total of 90 students were selected through purposive sampling technique. A structured tool was used to measure knowledge levels before and after the intervention. The results showed a significant improvement in knowledge scores, concluding that structured educational interventions are effective.

Literature Related to Student Knowledge and Awareness

- A descriptive study was conducted by Garg and Sinha (2015) among 110 nursing students to assess knowledge and attitude regarding stem cell and cord blood banking using convenience sampling. A structured questionnaire showed limited knowledge and neutral attitude. Awareness programs were recommended.
- A descriptive cross-sectional study was conducted by Patel and Mehta (2018) among 100 medical students using convenience sampling. A self-structured tool showed only 30% had good knowledge. The study concluded that formal education is lacking.
- A descriptive study was done by Dinesh and Kaur (2021) among 90 pharmacy students selected by simple random sampling. A structured questionnaire showed poor knowledge levels. Structured teaching was recommended.
- A descriptive study by Ravi and Kumari

(2019) involved 130 allied health students using a self-administered questionnaire. Findings showed 60% had moderate knowledge with misconceptions. Structured education was supported.

- A survey was conducted by Joseph and Mary (2022) among 150 final-year nursing students using stratified sampling. A structured checklist revealed knowledge gaps in benefits and procedures. The study recommended curriculum integration.
- A pre-experimental study was done by Nair and Roshni (2020) among 75 nursing students using purposive sampling. A structured questionnaire administered pre and post showed significantly higher post-test scores.

The study concluded that teaching modules are effective.

- A study by Singh et al. (2018) used educational videos with 100 nursing students selected by random sampling. A structured questionnaire showed improved knowledge post-intervention. Non-traditional methods were found effective in improving knowledge.

Chapter 3 Methodology

Research approach

Quantitative Approach was adopted for this study, as it involves objective measurement and statistical analysis of numerical data obtained through structured questionnaire.

Research design

The study utilized a pre-experimental one group pre-test post-test design. This design helps in measuring the knowledge before and after the administration of the structured teaching program without a control group.

Assumptions of the study

The study is based on the following assumptions:

- Final year students may have limited knowledge regarding cord blood banking.
- A structured teaching program will improve their knowledge.
- Knowledge can be measured effectively using a structured questionnaire.

Hypothesis Research hypothesis

(H1): There will be a significant improvement in the post-test knowledge levels regarding cord blood banking among final-year students after the implementation of the structured teaching program.

(H2): There is significant association between pretest knowledge score and demographic variables.

Null hypothesis

(H01): The structured teaching program will not result in a significant improvement in knowledge regarding cord blood banking among final year students with demographic variables.

(H02): There is no significant association between pretest knowledge score and demographic variables.

Variables

- Independent Variable: Structured teaching program on cord blood banking.
- Dependent Variable: Knowledge score of final year students.
- Demographic Variables: Age, Sex, religion, Socioeconomic background, Area of residence, fathers' occupation, mothers' occupation, previous knowledge

Attribute Variable

In the present study the attribute variables were the socio personal characteristics of the

final year student such as age, sex, religion,

Inclusion Criteria

- 1.Final year students: Students who are in their final year of study in a relevant program (e.g., nursing, medical, or allied health sciences).
- 2.Currently enrolled: Students who are currently enrolled in an institution located in Aluva.
- 3.Willingness to participate: Students who are willing to participate in the study and provide informed consent.

Exclusion Criteria

- 1.Students who have prior knowledge: knowledge or experience with cord blood sampling.
- 2.Students absent during sessions: Students

socio economic status, area of residence, fathers' occupation, mother's occupation and previous knowledge and blood banking

Outcome variables

Outcome variables are usually dependent variables which are observed and measured by changing the independent variables. The outcome variable of present study includes knowledge score obtained by the students through structured knowledge questionnaire (knowledge score regarding cord blood banking)

Setting

The study was conducted in selected colleges at Aluva, where final year students were available and accessible during the period of data collection.

Population: The target population included final year students from selected colleges at Aluva.

Sample size: The sample consisted of 40 final year students who met the inclusion criteria.

Sampling technique: A purposive sampling technique was used to select participants who were available, willing to participate, and met the inclusion criteria.

Sampling criteria

- who are absent during the structured teaching program sessions.
- 3.Students who do not complete assessments: Students who do not complete both pretest and post-test assessments.
- 4.Students who withdraw consent: Students who withdraw their consent to participate in the study.

Data collection tool

A structured knowledge questionnaire was developed to assess the knowledge level of students regarding cord blood banking. The technique used was a paper-based self-report questionnaire.

Description of the tool

The tool consisted of two parts:

- Part I: Demographic Data – Age, Sex, Religion, Socio-economic background, Area of residence, Previous knowledge
- Part II: Structured Knowledge Questionnaire – 30 multiple-choice questions covering

definition, benefits, procedure, ethical considerations, and applications of cord blood banking.

Score interpretation: the score ranged from 0-30, Each correct response was awarded one mark. The total score was 30.

scoring	interpretation
<10	Poor
10-15	Average
15-25	Good
25-30	Very good

Content validity of the tool

The tool was submitted to five experts in the fields of nursing education, obstetrics, and neonatology to ensure content validity. Suggestions and feedback were incorporated. The tool was found to be valid.

Plan for data collection

1. Permission was obtained from the institutional authorities.
2. Informed consent was taken from the participants.
3. A pre-test was administered using the structured questionnaire.
4. A structured teaching program on cord blood banking was delivered through lecture and visual aids
5. A Post-test using the same questionnaire was conducted days after the intervention

Plan for data analysis

Data analysis was performed using descriptive and inferential statistics:

- Descriptive statistics: Frequency, percentage, mean, and standard deviation to describe demographic variables and knowledge scores.
- Inferential statistics:
 - Paired t-test to assess the effectiveness of the structured teaching program
 - Chi-square test to find the association between demographic variables and knowledge scores.

Summary

This chapter dealt with systematic procedures and technique used to conduct research, including research design, data collection method, sampling strategy and data analysis methods. It ensures the researches rigorous, reliable and valid, establishing credibility and generalizability of the findings.

Chapter 4**Analysis and Interpretation Of Data**

The analysis refers to the computation of certain measures along with searching for relationship that exist among data groups. This chapter present the analysis and interpretation of the study conducted to assess the effectiveness of structured teaching program on knowledge regarding cord blood banking among final year students. The data was analyzed and interpreted in the light of objectives and hypothesis of the study. To interpret the data and in an intelligible form, the collected data was compiled and master sheet was prepared

The main objectives of the study were to:

- To assess the level of knowledge regarding cord blood sampling among final year students
- To prepare and implement Structured Teaching Program
- To evaluate the effectiveness of Structured Teaching Program and knowledge level of final year students

- To find out the association between pre-test level score with demographic variables such as previous knowledge, age, sex, socio economic background, area of residence,

- religion, occupation of father and occupation of mother.

Hypothesis Research hypothesis

(H1): There will be a significant improvement in the Post-test knowledge levels regarding cord blood banking among final-year students after the implementation of the structured teaching program.

(H2): There is significant association between pretest knowledge score and demographic variables

demographic variables

Organization of the findings of study:

Section A: Demographic variable data

Section B: Pre-test Knowledge of students regarding cord blood banking

Section C: Post-test knowledge of students regarding cord blood banking.

Null hypothesis

(H01): The structured teaching program will not result in a significant improvement in knowledge regarding cord blood sampling among final year students with demographic variables.

Section D: Effectiveness of structured teaching program

Section E: Association between pretest level score with demographic variables

Section A: Demographic variable data

(H02): There is no significant association between pretest knowledge score and

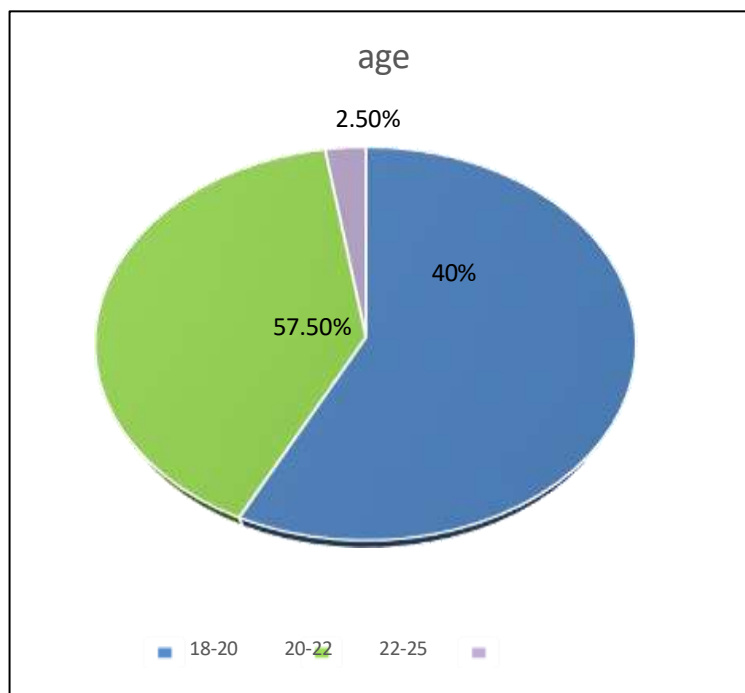


Fig 4.1 Frequency and percentage distribution of samples based on age

From table 4.1 and fig 4.1 it's clear that 57.50% students are the age of 18-20, 40% students are of 20-22, 2.50% students are of 22-25.

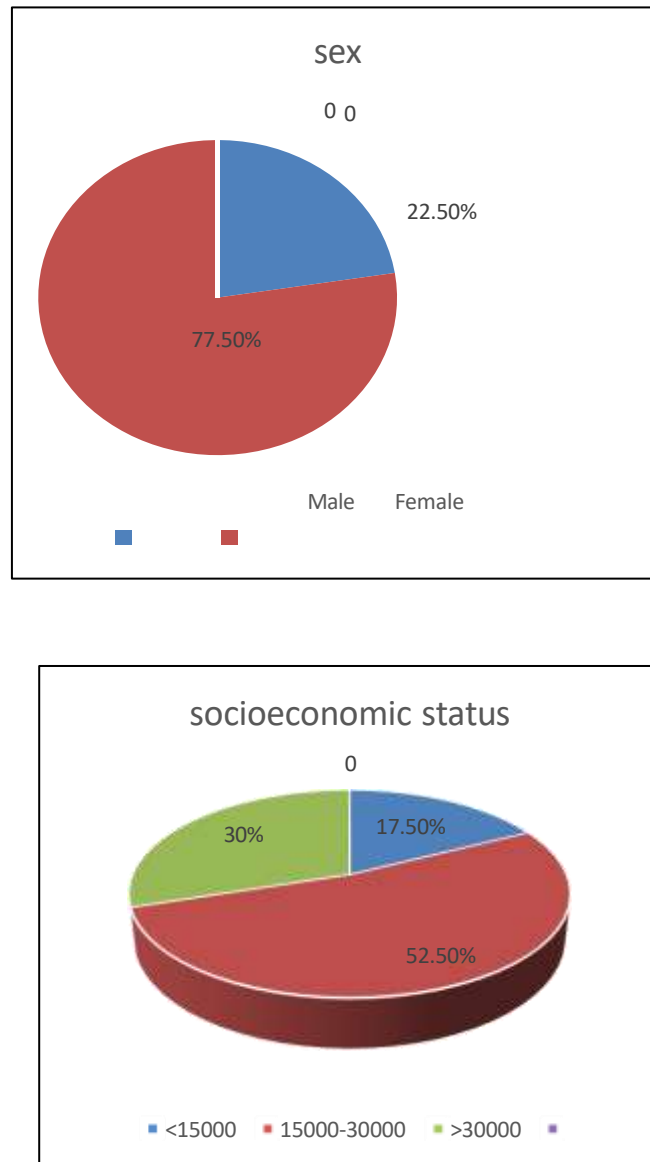


Fig 4.2 frequency and percentage distribution of samples based on sex From table 4.2 and fig 4.2 its clear that in students 77.50% are female and 22.50% are male.

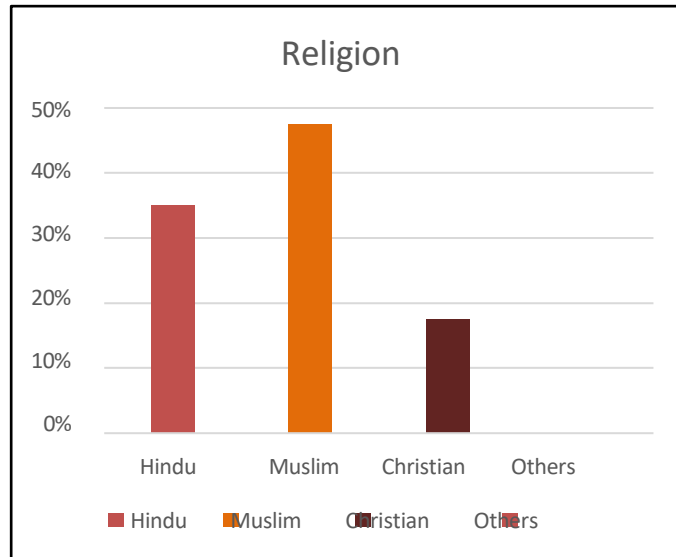


Fig 4.3 frequency and percentage distribution of samples based on religion
From fig 4.3 its clear that 35% of students were Hindu, 47.50 % of students Muslim,17.50% of students were Christian

distribution of samples based on socioeconomic status

From table 4.4 and fig 4.4 it is clear that 17.50% of student’s socioeconomic status is <15000, 52.50% is 15000-30000 and 30% is >30000.

Fig 4.4 frequency and percentage

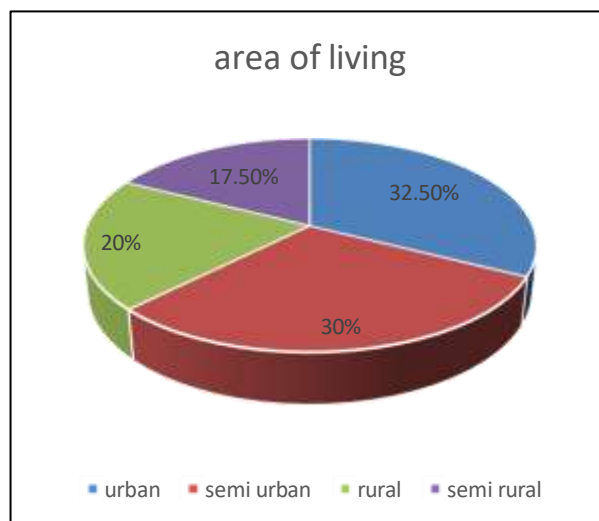


Fig 4.5 frequency and percentage distribution of samples based on area of living
From fig 4.5 its clear that 32.50% of student’s area of living is at urban,30% at

semi urban,20% at rural and 17.50% at semi-rural areas.

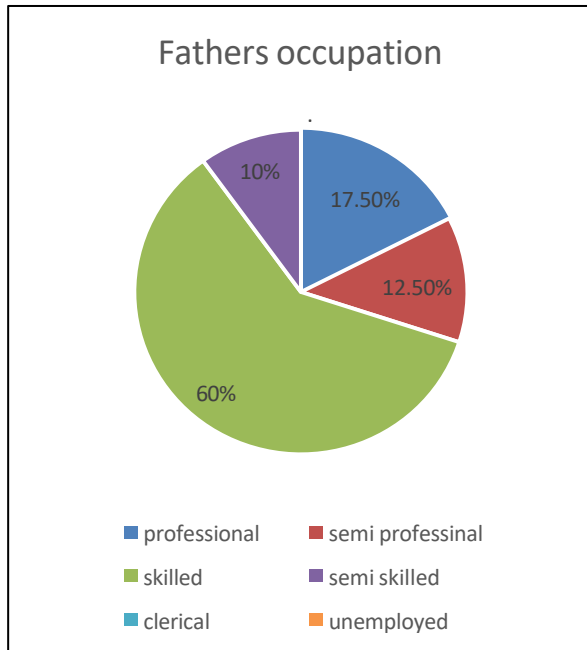
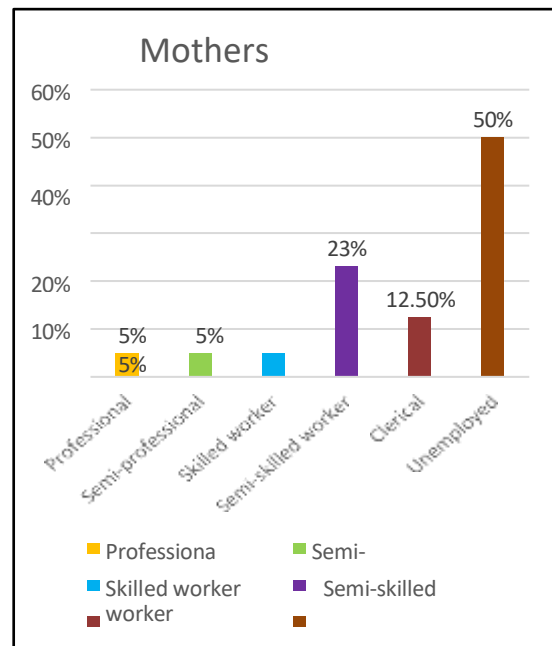


Fig 4.6 frequency and percentage distribution of samples based on fathers' occupation

From fig 4.6 its clear that 17.50% is professional,12.50%is semiprofessional, 60% is skilled professional,10% is semi-skilled, and there is no clerical and unemployed

Fig4.7 frequency and percentage Distribution of samples



basedon mothers' occupation

From fig 4.7 its clear that 5% of mother'soccupation is professional,5% is semi professionnal,5% is skilled worker,23% is semi- skilled worker,12.50% is clerical and 50% is unemployed.

Fig 4.8 frequency and percentage distribution of samples based on Previous knowledge



From fig 4.8 its clear that 5% of students have previous knowledge regarding cord blood banking and 95% of students didn't have previous knowledge.

SECTION 2: Pretest Knowledge of Students Regarding Cord Blood Banking

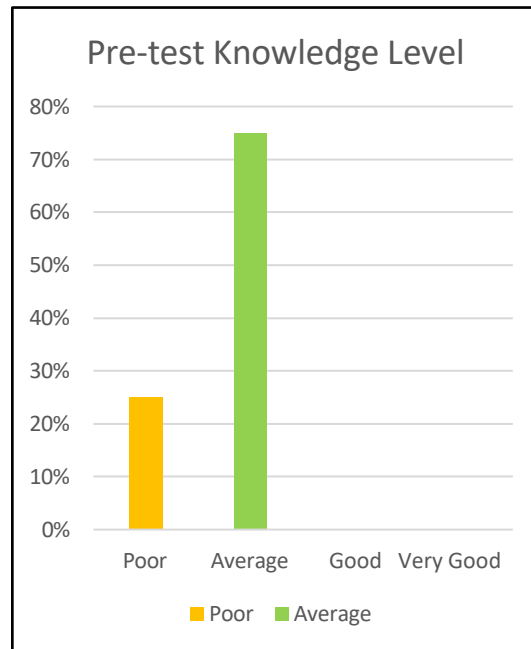


Fig 4.9 Frequency andpercentage distribution of pretest knowledge of students regarding cord blood banking Interpretation:

The pretest findings revealed that 25% of students had poor knowledge and 75%had average knowledge, while none had good knowledge regarding cord blood banking. This indicates that before the intervention,

the majority of students had only average awareness.

SECTION-3: Post-test knowledge of students regarding cord blood banking Table4.10: Frequency and percentage distribution of posttest knowledge levels

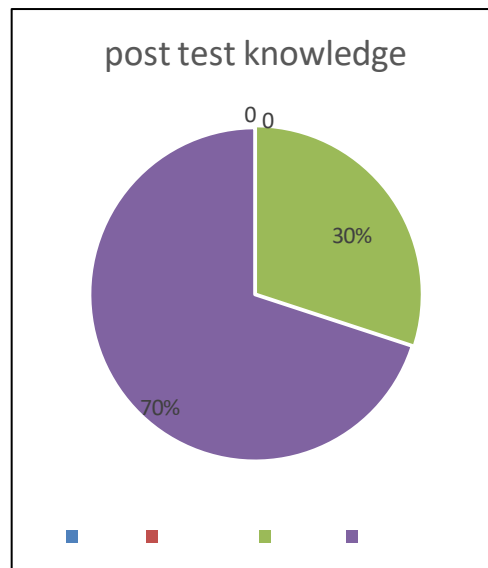


Fig 4.10: Frequency and percentage distribution of post-test knowledge of students regarding cord blood banking

Interpretation:
After Structured teaching program, 30% of students had good knowledge and 70% had very good knowledge. None remained in the

poor and average category, showing a significant improvement in knowledge level.

Table 4.1. comparison between mean median and standard deviation of pretest and posttest knowledge

Knowledge level	mean	Median	Standard deviation
Pre test	1.60	2.00	0.496
Post test	2.68	3.00	0.158

Interpretation

Table 4.1 shows the mean knowledge score increased notably from 1.60 in the pre-test to 2.98 in the post test indicating a substantial gain in students’ knowledge following the structured teaching program. Similarly, the median value rose from 2.00 to 3.00, reflecting that more than half of the participants achieved higher knowledge levels after the intervention. The standard deviation decreased from 0.496 to 0.158, showing a reduction in the variability of post

test scores. This suggest that students’ knowledge became more consistent and uniform after the educational intervention. Overall, the results clearly demonstrate that the structured teaching program was effective in improving both the level and consistency of students’ knowledge regarding cord blood banking.

Section 4: To Assess the Effectiveness of STP using Statistical Tests

Table 4.2: Comparison of pretest and posttest knowledge scores.
N=40

Wilcoxon Test: W = 0.00, p < 0.001
Interpretation

The results showed that the mean posttest knowledge score (25.7) was significantly higher than the mean pretest score (10.7). The calculated t value (-28.9, p < 0.001) and Wilcoxon test (p < 0.001) confirmed that the difference was highly significant. This indicates that the structured teaching program was highly effective in improving the knowledge of final year students

Test	Mean	Median	SD	t-value	df	p value
Pre test	10.7	11	1.97	-28.9	39	<0.001
Post test	25.7	26	2.14			

S* - Significant Interpretation:

The chi-square analysis revealed that there was a significant association between pretest knowledge scores and sex of the students (p < 0.05). No significant association was found with other demographic variables such as age, religion, socioeconomic status, area of living, father’s occupation, mother’s occupation, or previous knowledge.

Summary of findings

- In the pre-test, 25% had poor knowledge and 75% had average knowledge; none had good knowledge while no significant association was found

regarding cord blood banking. So, we accept research hypothesis and reject null hypothesis

Section 5: To find out the association between pretest knowledge scores and selected demographic variables

The association between pretest knowledge scores and demographic variables was analyzed using Chi-square test.

Table 4.3: Association between pretest knowledge and demographic variables (N=40)

S l . N o	Variable	χ ² val ue	D f	p- val ue	Result
1	Age	0.768	2	0.681	NS
2	Sex	4.04	1	0.044	S*
3	Religion	4.41	2	0.110	NS
4	Socio economic	2.05	2	0.358	NS
5	Area of living	2.88	3	0.411	NS

6	Father’s occupation	4.15	3	0.246	NS
7	Mother’s occupation	5.63	6	>0.05	NS
8	Previous knowledge	1.40	1	>0.05	NS

knowledge. In the post-test, 30% had good knowledge, 70% had very good knowledge; none remained with mild knowledge.

- The mean post-test knowledge score (2.68) was significantly higher than the pretest score (1.60), with p < 0.001.
- The structured teaching program was found to be highly effective in improving students’ knowledge

A significant association was observed between pretest knowledge scores and sex

with other demographic variables.

Chapter 5**Discussion, Summary and Conclusion**

This chapters presents the summary, conclusion, limitations and its possible implications in nursing. the recommendations for further research about the topic are also included.

Objectives of the study were to

- To assess the level of knowledge regarding cord blood sampling among final year students
- To prepare and implement Structured Teaching Program
- To evaluate the effectiveness of Structured Teaching Program and knowledge level of final year students
- To find out the association between pre- test level score with demographic variables such as previous knowledge, age, sex, socio economic background, area of residence, religion, occupation of father and occupation of mother.

Section A: Discussion on Demographic Variables

The demographic data of the study revealed that the majority of participants (57.5%) belonged to the age group of 18 –20 years, and 40% were aged 20 –22 years, which reflects that the participants were young adults in their final year of study. Most of the respondents (77.5%) were females, which is expected, as nursing is a female-dominated profession. Regarding religion, 47.5% were Muslims, 35% were Hindus, and 17.5% were Christians, indicating diversity in the student population. With respect to socioeconomic status, 52.5% of the students belonged to families earning ₹15,000 – ₹30,000 per month, and 30% had income above

₹30,000, suggesting a middle-class background. In terms of area of residence, 32.5% were from urban areas, 30% from semi-urban, 20% from rural, and 17.5% from semi-rural areas. Regarding occupation, 60% of fathers were skilled workers and 50% of mothers were unemployed, which reflects a typical socioeconomic pattern of the region. It was also found that only 5% of students had any previous knowledge regarding cord blood banking, indicating a significant gap in awareness. This highlights the importance of

Introduction

incorporating structured educational programs in the curriculum. Similar findings were observed by Sharma (2018) and Rao & Devi (2019), who also reported that the majority of nursing students had minimal prior exposure to cord blood banking concepts.

Section B: Discussion on Pre-Test Knowledge of Students Regarding Cord Blood Banking

The pre-test results showed that 25% of students had poor knowledge and 75% had average knowledge, while none demonstrated good or very good knowledge levels. The mean pre-test score was 1.60 with a standard deviation of 0.496, which indicates a low baseline level of understanding regarding cord blood banking. These findings clearly show that before the implementation of the structured teaching program, students lacked adequate knowledge about the definition, collection process, preservation, and uses of cord blood.

The results are consistent with those of Thomas & Abraham (2021), who reported that 68% of nursing students had insufficient awareness of cord blood banking. Patel & Mehta (2018) also found similar results, with 70% of nursing students showing inadequate baseline knowledge. Thus, the pre-test findings of the present study confirm the need for a planned educational intervention to enhance the students' understanding of this important topic.

Section C: Discussion on Post-Test Knowledge of Students Regarding Cord Blood Banking

In the post-test, a marked improvement was noted — 30% of students had good knowledge, and 70% had very good knowledge, while none remained in the poor or average category. The mean post- test score was 2.98 with a standard deviation of 0.158, showing a significant increase in overall knowledge. The improvement from pre-test to post-test scores suggests that the structured teaching program was highly effective in improving knowledge among final-year students. These findings are similar to those reported by Rani (2019) and Anita & Joseph (2021), who observed that

structured teaching significantly enhanced post-test scores among nursing and paramedical students ($p < 0.001$). The post-test findings further confirm that when educational content is presented in a structured and interactive format, students develop better understanding and retention of new information.

Section D: Discussion on Effectiveness of the Structured Teaching Program

The effectiveness of the structured teaching program was determined by comparing pre-test and post-test knowledge scores. The mean pre-test score (10.7) increased to 25.7 in the post-test, with a mean difference of 15.0. The calculated t-value was -28.9 with a p-value of <0.001 , which was highly significant. This clearly shows that the structured teaching program produced a statistically significant improvement in knowledge regarding cord blood banking among final-year students. Similar results were observed by Fernandes et al. (2016) and Bose & Das (2017), who found that structured teaching programs improved students' post-test knowledge levels significantly. Reddy et al. (2020) and Nair & Roshni (2020) also reported similar improvements, confirming that structured educational interventions are effective in bridging knowledge gaps on specialized health topics. Therefore, the findings of the present study support the hypothesis that structured teaching programs are effective in improving knowledge among students on specific health-related concepts such as cord blood banking.

Section E: Discussion on Association Between Pre-Test Knowledge and Selected Demographic Variables.

The chi-square test was used to determine the association between pre-test knowledge and selected demographic variables. The results revealed that there was a significant association between pre-test knowledge and sex ($p < 0.05$), whereas other demographic variables such as age, religion, socioeconomic status, area of residence, father's occupation, mother's occupation, and previous knowledge showed no significant association. This

suggests that the knowledge level was not influenced by most demographic factors except for sex. These findings are in agreement with Kumari (2016), who also reported a significant association between gender and baseline knowledge. However, they contrast with Meera & Joseph (2019), who found significant association with age and area of residence. The difference may be attributed to variations in sample size, population, and teaching exposure.

Discussion

The overall findings of the present study demonstrate that the structured teaching program (STP) was highly effective in improving the knowledge regarding cord blood banking among final year students in selected colleges at Aluva. Before the intervention, the majority of students possessed only average knowledge, while none had good or very good knowledge. After the implementation of the STP, all students showed marked improvement—70% achieved very good knowledge and 30% achieved good knowledge levels. The statistical evidence ($t = -28.9$, $p < 0.001$) confirms that the observed improvement was not by chance, but a direct result of the structured teaching intervention. These findings provide strong support for the view that well-planned educational interventions are powerful tools for bridging gaps in professional knowledge. The structured teaching program offered students organized, concise, and relevant information about the definition, collection, preservation, benefits, and ethical considerations of cord blood banking, which enabled them to understand the concept clearly and retain it effectively. The results of this study are in accordance with several previous studies. Anitha (2017) and Rani (2019) reported that structured teaching programs significantly improved knowledge among nursing students on various maternal and child health topics. Similarly, Bose and Das (2017) found that STPs helped increase both awareness and positive attitudes toward cord blood donation. The present findings reaffirm that interactive and visual teaching methods—when delivered in a structured sequence—lead to better comprehension and long-term retention compared to

conventional lecture-based approaches. The remarkable gain in post-test scores in this study may also be attributed to the teaching learning strategies employed. The use of visual aids, group discussions, and interactive question-answer sessions created an environment that promoted active participation and interest. This underemphasized healthcare topics. These results are not only relevant for nursing education but also have broader implications for public health and clinical practice. As awareness among healthcare students increases, they can play an active role in counseling, motivating, and guiding families regarding the importance of umbilical cord blood collection and storage. With nurses being front-line caregivers, improving their knowledge through structured education will ultimately contribute to better implementation of cord blood banking services, early referrals, and informed patient decision making. In conclusion, the present study clearly establishes that the structured teaching program was highly effective in enhancing the knowledge of final-year students regarding cord blood banking. The intervention successfully achieved its objectives and validated the hypothesis. The findings underscore the urgent need to integrate structured teaching sessions and innovative learning modules into the regular curriculum so that nursing graduates are well prepared to educate the community and support advancements in maternal and neonatal health

Conclusion

The study concluded that:

- Final year nursing students had limited baseline knowledge on cord blood banking.
- The structured teaching program significantly improved knowledge levels.
- Knowledge was influenced by prior exposure and environment, not by age, sex, or religion.
- Structured educational interventions are essential for preparing nursing students to educate and counsel patients effectively.

Nursing implications

The findings of this study have significant implications for nursing education, practice, and administration. By understanding the

effectiveness of structured teaching programs, nursing professionals and educators can enhance knowledge, skills, and patient care practices related to emerging healthcare topics such as cord blood banking.

Nursing education

- Incorporate structured teaching programs into nursing curricula to cover topics like cord blood banking.
- Use interactive teaching methods for better learning outcomes.

Nursing practice

- Nurses with adequate knowledge can effectively counsel expectant parents.
- Improved knowledge supports evidence-based practice and informed decisions.

Nursing administration

- Administrators should organize workshops and continuing education programs.
- Policies should support inclusion of emerging topics in institutional training.

Nursing research

- Future research should assess long-term knowledge retention, attitudes, and practices.
- Studies on digital platforms and innovative teaching methods can enhance outcomes.

Limitations of the study

- Limited to final year students in selected colleges at Aluva.
 - Restricted to one geographic location.
 - Data were self-reported and subject to bias.
 - Small sample size limits generalizability.
 - Knowledge assessed immediately after intervention, not long-term.
- Focused only on knowledge, not attitude or practice

Recommendations

1. Implement structured teaching programs in multiple colleges.
2. Conduct refresher courses periodically to

reinforce knowledge.

3. Integrate cord blood banking topics into the nursing curriculum.
4. Future studies should include attitudes and practices, not just knowledge.
Use digital platforms and interactive sessions for better engagement.

References

1. Implement structured teaching programs in multiple colleges.
2. Conduct refresher courses periodically to reinforce knowledge.
3. Integrate cord blood banking topics into the nursing curriculum.
blood stem cells: estimation of optimal storage inventory size. *Transfusion*, 50(6), 1248–1255.
6. Ballen KK, Verter F, Kurtzberg J. (2015). Umbilical cord blood donation: public or private? *British Journal of Haematology*, 169(3), 293–304.
7. Gluckman E, Rocha V. (2009). History of the clinical use of umbilical cord blood hematopoietic cells. *Cytotherapy*, 11(2), 219–227.
8. World Health Organization. (2013). *WHO Recommendations on Postnatal Care of the Mother and Newborn*. Geneva: WHO.
- 10 Polit DF, Beck CT. (2021). *Nursing Research: Generating and Assessing Evidence for Nursing Practice*. 11th ed. Philadelphia: Wolters Kluwer
11. Sharma P. Awareness and perception regarding cord blood banking among nursing students. 2018.
12. Kumar A, Rajan P, Thomas S. Knowledge of final year students in South India regarding cord blood banking. 2020.
13. Rao S, Devi L. Awareness of cord blood banking among nursing students. 2019.
14. Mishra R, Gupta M. Awareness of cord blood banking among urban residents in India. 2017.
15. Thomas J, Abraham K. Knowledge of cord blood banking among paramedical students. 2021.
16. Rani G. Effectiveness of structured teaching program on knowledge among B.Sc. nursing students. 2019
17. Anita D, Joseph P. Impact of structured teaching program among paramedical students. 2021.
18. Fernandes R, Pinto M, D'Souza J. Effectiveness of educational program among nursing students. 2016.
19. Bose S, Das R. Effectiveness of structured teaching among nursing students. 2017.
20. Reddy K, Varghese A, Latha P. Structured teaching program on knowledge among midwifery students. 2020.
21. Garg S, Sinha R. Knowledge and attitude regarding stem cell and cord blood banking among nursing students. 2015.
22. Patel H, Mehta K. Knowledge on stem cell and cord blood banking among medical students. 2018.
23. Dinesh A, Kaur G. Knowledge regarding cord blood banking among pharmacy students. 2021.
24. Ravi V, Kumari P. Knowledge regarding cord blood banking among allied health students. 2019.
25. Joseph A, Mary T. Knowledge of cord blood banking among final-year nursing students. 2022.
26. Nair R, Roshni M. Effectiveness of teaching modules on cord blood banking among nursing students. 2020.
27. Singh P, Kumar A, Thomas L. Use of educational videos to improve knowledge regarding cord blood banking among nursing students. 2018.
28. Ballen KK, Gluckman E, Broxmeyer HE. Umbilical cord blood transplantation: the first 25 years and beyond. *Blood*. 2013 Jul;122(4):491–8.
29. Kurtzberg J, Prasad VK, Carter SL, Wagner JE, Baxter-Lowe LA, Wall DA, et al. Hematopoietic stem/progenitor cells, generation of induced pluripotent stem cells, and isolation of endothelial progenitors from umbilical cord blood. *Current Protocols in Stem Cell Biology*, 16(1).
5. Nagler A, Or R, Slavin S. (2012). Cord blood stem cells and their clinical applications. *Transfusion Medicine Reviews*, 26(4), 272–283.
- Querol S, Gomez SG, Kwon M, Antin JH. (2010). Banking cord

Results of the Cord Blood Transplantation Study (COBLT): clinical outcomes of

30.Garg S, Sinha R. Knowledge and attitude regarding stem cell and cord blood banking among nursing students. 2015.

cell and cord blood banking among Madkaikar M, Italia K, Sawant P. Stem cell transplantation in India: current status and future prospects. *Indian J Med Res.* 2012;136(5):769–82.

31.Gupta A, Tandon N, Bhargava S. Awareness and attitude towards umbilical cord blood stem cell banking among medical

unrelated donor

students in India. *Int J Reprod Contracept Obstet Gynecol.* 2017;6(7):2833–7.

32.Nagpal J, Choudhury P, Sinha S, Bhargava VL. Knowledge and awareness about cord blood banking and stem cell therapy among health professionals in India. *Indian Pediatr.* 2015;52(5):389–94.

33.Polit DF, Beck CT. *Nursing research: generating and assessing evidence for nursing practice.* 10th ed. Philadelphia: Wolters Kluwer; 2017.