WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

A Pre-Experimental Study to Assess the Effectiveness of Structured Teaching Programme on Knowledge and Attitude Regarding Umbilical Cord Blood Banking Among Staff Nurses Working in Selected Hospitals of District Patiala, Punjab.

Jagrity Sharma

Adarsh College of Nursing

INTRODUCTION-

Blood plays an important role in regulating the body's system and maintaining homeostasis. Other functions include supplying oxygen and nutrients to tissues, removing waste. In placental mammals, the umbilical cord (also called the navel string, birth cord or funiculus umbilicalis) is a conduit between the developing embryo or fetus and the placenta. Cord contains two arteries and one vein buried within Wharton's jelly. The umbilical vein supplies the fetus with oxygenated, nutrient rich blood from the placenta. Conversely, the fetal heart pumps low oxygen containing blood, nutrient- depleted blood through the umbilical arteries back to the placenta. The third trimester of pregnancy is the time to learn about cord blood banking. The blood that remain in the umbilical cord after birth is rich in newborn stem cells and additional stem cells can be found in the tissue of the umbilical cord and placenta.

Stem cells are the master cells which act as the basic building blocks of our body. Just like seed of plant that gives rise to branches, leaves and fruit. These stem cells have the potential to develop into specialized cell such as blood cells, muscle cells, brain cells, etc. of our body.

Today, stem cells have the ability to treat over 80+ blood related medical condition such as thalassemia, lymphoma, leukaemia, multiple myeloma, neuroblastoma etc. over 500 clinical trials for condition such as autism, cerebral palsy, stroke, diabetes is currently underway increasing the scope of future treatment.

OBJECTIVES

1 To assess the socio-demographic variables.

2 To assess the pre-test knowledge score regarding umbilical cord banking among staff nurses working in selected hospitals of district Patiala, Punjab.

3 To assess the pre-test attitude score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

4 To develop and implement structured teaching programme regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

5 To assess the post-test knowledge score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

6 To assess the post-test attitude score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

7 To assess the effectiveness of structured teaching programme on knowledge score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

8 To assess the effectiveness of structured teaching programme on attitude score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

9 To find out association of pre-test knowledge score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab, with their selected socio-demographic variables.

10 To find out association of pre-test attitude score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab, with their selected socio-demographic variables.

RESEARCH APPROACH & RESEARCH DESIGN

Research design is overall plan for collecting and analyzing data. Keeping in view the objective of the study, the quantitative approach with pre experimental one group pre test-post test design was selected for study. The sample size of the study comprises of 40 staff nurses. In this study, purposive sampling technique was used.

DESCRIPTION OF TOOL

Research tool was consist of three parts-

SECTION I- It consist of selected socio demographic variables of staff nurses. It includes age, gender, qualification, experience area of working, and source of information.

SECTION II- It consists of self structured knowledge questionnaire which compromised 30 multiple choice questions with single correct answer. Every correct answer was accorded a score of one (1) and incorrect/ unanswered question was accorded zero(0). The maximum score on knowledge questionnaire was thirty (30). The range for assessment of knowledge is categorized as follows:

N=40

LEVEL OF KNOWLEDGE	**SCORE RANGE**	**%age**
GOOD	25-30	81%-100%
AVERAGE	16 – 24	51%-80%
BELOW POOR	0 – 15	0% – 50%

Maximum score=30 Minimum score=0

SECTION III- Likert scale to assess the attitude of staff nurses regarding umbilical cord blood banking.

N=40

LEVEL OF ATTITUDE	**SCORE RANGE**	**%age**
FAIR	75-61	81%-100%
MODERATLY FAIR	60-38	51%-80%
UNFAIR	37-15	0% – 50%

Maximum score=75 Minimum score=15

ETHICAL CONSIDERATION

Prior to the study, ethical clearance was obtained from the concerned authorities to conduct the study in selected hospitals of Patiala, Punjab and also the research ethical committee of Adarsh College of Nursing, Patiala.

Informed consent was taken from study subjects.

Anonymity and confidentiality of the study participants was maintained.

Section -A

Frequency and percentage distribution of subjects according to their selected socio-Demographic variables.

OBJECTIVE 1- To assess the socio-demographic variables

N=40

	Socio Demographic Variables	**f (%age)**
1.	**Age (in years)**	
a)	Below 25	05 (12.5%)
b)	25≥35	09 (22.5%)
c)	35≥45	17 (42.5%)
d)	45 and above	09 (22.5%)

2.	**Gender**	
a)	Female	33 (82.5%)
b)	Male	7 (17.5%)
3.	**Professional Qualification**	
a)	GNM	10 (25%)
b)	Post Basic B.Sc. (N)	22 (55%)
c)	Basic B.Sc. (N)	8 (20 %)
d)	M.Sc. (N)	0 (0%)
4.	**Area of Posting**	
a)	NICU / PICU	9 (22.5%)
b)	Pediatric OPD	12 (30%)
c)	Gynae OPD	19 (47.5%)
5.	**Experience (in years)**	
a)	Below 5 years	16 (40%)
b)	5 ≥ 10 years	13 (32.5%)
c)	10 ≥ 15 years	11 (27.5%)
d)	Above 15 years	00 (0%)
6.	**Source of Information**	
a)	Mass Media	13 (32.5%)
b)	Co Workers	20 (50%)
c)	In Service Education	7 (17.5%)

Table No 1.1: Frequency Distribution of Socio Demographic variables

Table no. 1.1 indicates that according to age, maximum 17 (42.5%) of staff nurses belongs to age group 35≥45years, followed by 09 (22.5%) nursing students belongs to age group of 25≥35 years and45 years and above, whereas 05 (12.5%) of nursing students belongs to age group below 25years and above respectively.

Regarding gender, higher number staff nurses 33(82.5%) were females and only 7(17.5%) were males.

According to the professional Qualification number 22 (55%) are post basic B.Sc. (N), followed by 10 (25%) were GNM, and only 08 (20%) were basic B.Sc. respectively none of staff nurse is M.Sc. Nursing.

Area of posting in Gynae OPD number of staff nurses 19(47.5%), in pediatric ward 12 (30%) number of staff nurses and 9(22.5%) in NICU/PICU respectively.

Considering experience, maximum number 16 (40%) having experience below 5 years,13 (32.5%) having experience 5≥10 years, 11 (27.5%) having experience 10≥15 years, respectively.

Regarding source of information, maximum 20 (50%) is from co workers, followed by 16(40%) from mass media, , 04 (10%) from in service education , respectively.

Section -B

Analysis related to the pre-interventional level of knowledge regarding umbilical cord blood banking among staff nurses.

Objective 2 To assess the pre-test knowledge score regarding umbilical cord banking among staff nurses working in selected hospitals of district Patiala, Punjab.

Level of pre test knowledge score

N=40

LEVEL OF KNOWLEDGE	SCORE	Frequency (f)	Percentage (%)
GOOD	25 – 30	03	7.5%

AVERAGE	16 – 24	25	62.5%
BELOW AVERAGE	0 – 15	12	30%

Maximum score = 30 **Minimum score = 00**

Table No. 1.2: Table Showing pre-test knowledge scores

Figure 1.1: Bar Graph showing pre-test knowledge scores.

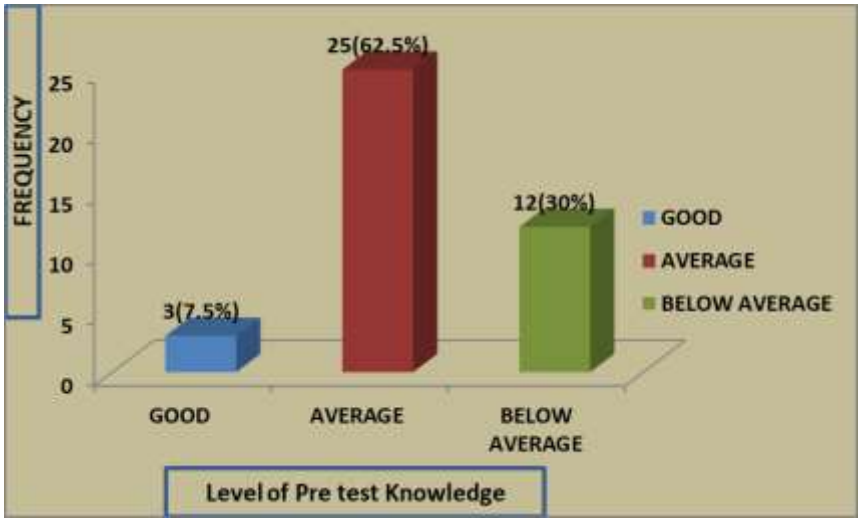

Table No.1.2 and Figure 1.1, depicts that out of 40staff nurses, maximum 25 (62.5%) had average knowledge scores, followed by 12(30%) had below average scores and 03 (7.5%) of them had good knowledge scores in pre-test regarding umbilical cord blood banking.

N=40								
Descriptive Statistics	**Mean**	**Median score**	**Mode**	**S.D**	**Maximum**	**Minimum**	**Range**	**Mean %**
Pre-test Knowledge	**17.28**	**17.00**	**17**	**4.946**	**27**	**08**	**19**	**57.6%**

Maximum score = 30 **Minimum score = 00**

Table No. 1.3: Table Showing Mean, Median, Mode, S.D of pre-test knowledge score

Figure 1.2: Bar graph showing mean, SD of pre-test knowledge score.

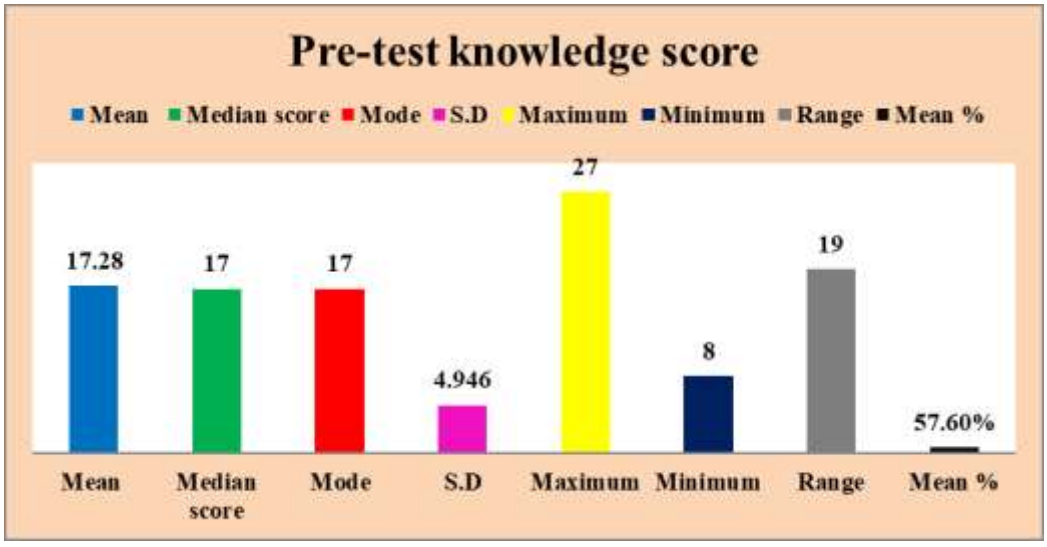

Table No.1.3 and Figure 1.2 depicts the mean, median, range, and SD of the pre-test knowledge score of staff nurses regarding umbilical cord blood banking. The mean pre-test knowledge score was 17.28 , standard deviation was 4.946 with median 17, mode 17 and rage 19. Maximum scores obtained were 27 and minimum score obtained were 8 out of total possible score of 30. Pre- test mean percentage of knowledge score was 57.60%.

Section -C

Analysis related to the pre-interventional level of attitude regarding umbilical cord blood banking among staff nurses.

Objective 3 To assess the pre-test attitude score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

Level of pre test attitude score

N=40

LEVEL OF ATTITUDE	SCORE	Frequency (f)	Percentage (%)
FAIR	61 - 75	04	10%
MODERATELY FAIR	38 – 60	30	75%
UNFAIR	15 – 37	6	15%

Maximum score = 75 **Minimum score = 15**

Table No. 1.4: Table Showing pre-test attitude scores

Figure 1.3: Bar Graph showing pre-test attitude scores.

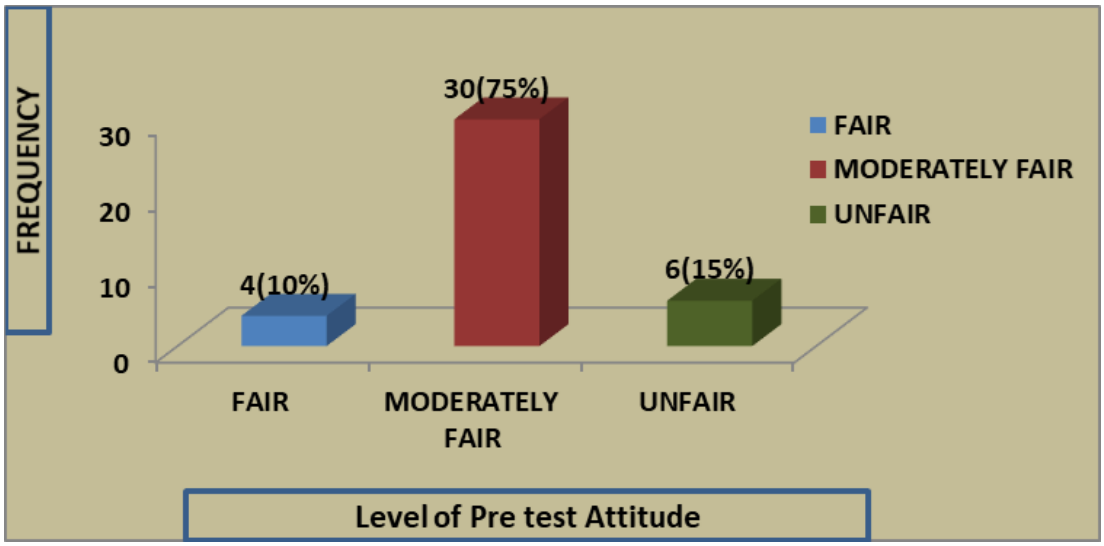

Table No.1.4 and Figure 1.3, depicts that out of 40staff nurses, maximum 30 (75%) had moderately fair attitude scores, followed by 06(15%) had unfair attitude scores and 04 (10%) of them had fair attitude scores in pre-test regarding umbilical cord blood banking.

N= 40								
Descriptive Statistics	**Mean**	**Median score**	**Mode**	**S.D**	**Maximum**	**Minimum**	**Range**	**Mean %**
Pre-test Attitude	39.40	34.00	30	11.762	67	25	42	52.53%

Maximum score = 75, **Minimum score = 15**

Table No. 1.5: Table Showing Mean, Median, Mode, S.D of pre-test attitude score

Figure 1.4: Bar graph showing mean, SD of pre-test attitude score.

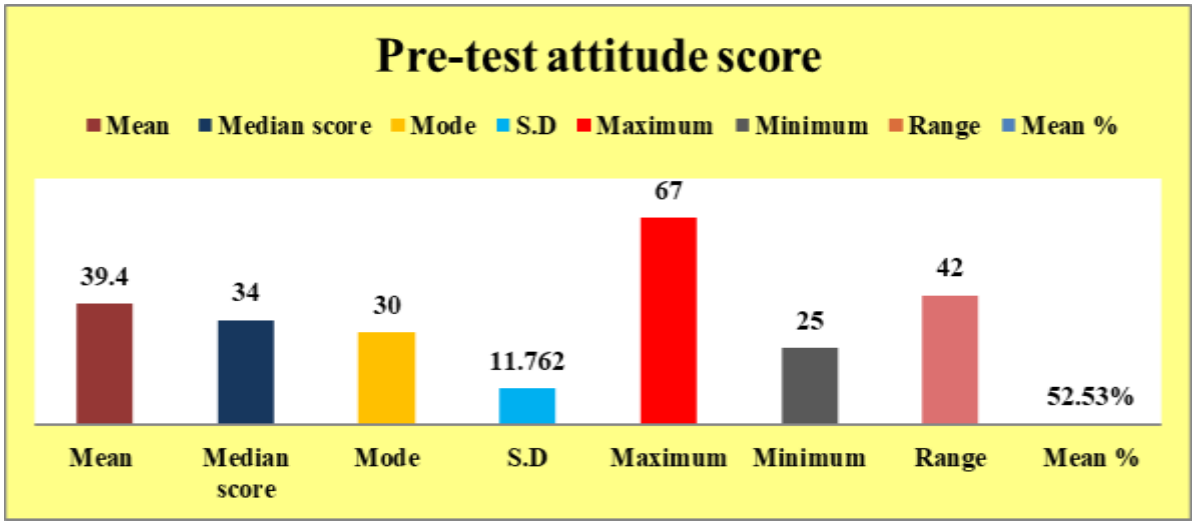

Table No.1.5 and Figure 1.4,depicts the mean, median, range, and SD of the pre-test attitude score of staff nurses regarding umbilical cord blood banking. The mean pre-test knowledge score was 39.4 , standard deviation was 11.762 with median 34, mode 30 and rage 42. Maximum scores obtained were 67 and minimum score obtained were 25 out of total possible score of 75. Pre- test mean percentage of attitude score was 52.53%.

Section -D

Analysis related to the post- interventional level of knowledge regarding umbilical cord blood banking among staff nurses.

Objective 5 To assess the post-test knowledge score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

Level of post test knowledge score

N=40

LEVEL OF KNOWLEDGE	SCORE	Frequency (f)	Percentage(%)
GOOD	25 - 30	34	85%
AVERAGE	16-24	06	15%
BELOW AVERAGE	0-15	00	0%

Maximum score = 30, **Minimum score = 00**

Table No. 1.6: Table Showing post-test knowledge scores

Figure 1.5 : Bar Graph showing post-test knowledge scores.

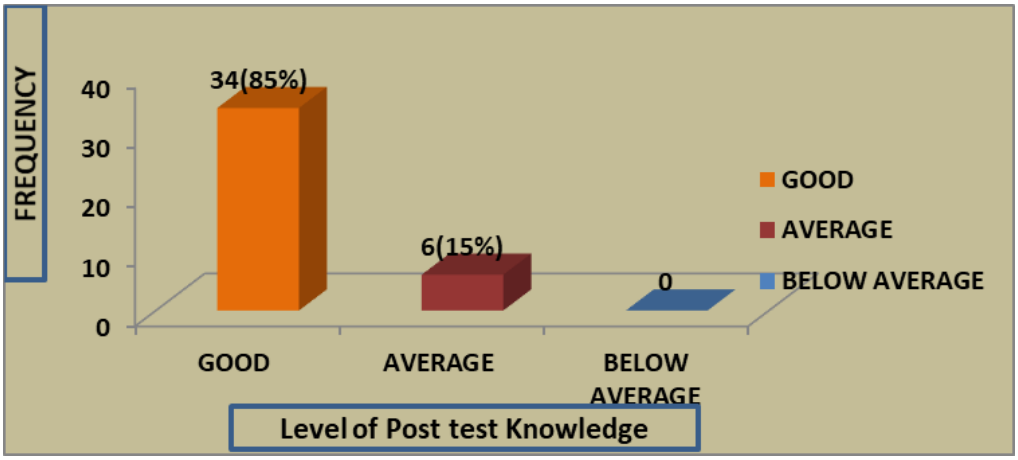

Table No.1.6 and Figure 1.5, depicts that out of 40 staff nurses, maximum 34(85%) had good knowledge scores, followed by 6(15%) had average scores in post-test regarding umbilical cord blood banking.

N=40

Descriptive Statistics	Mean	Median score	Mode	S.D	Maximum	Minimum	Range	Mean %
Post-test knowledge	25.88	26.00	26	1.742	29	20	09	86.26%

Table No. 1.7: Table Showing Mean, Median, Mode, S.D of post-test knowledge score

Figure 1.6: Bar Graph showing mean and SD of post-test knowledge scores.

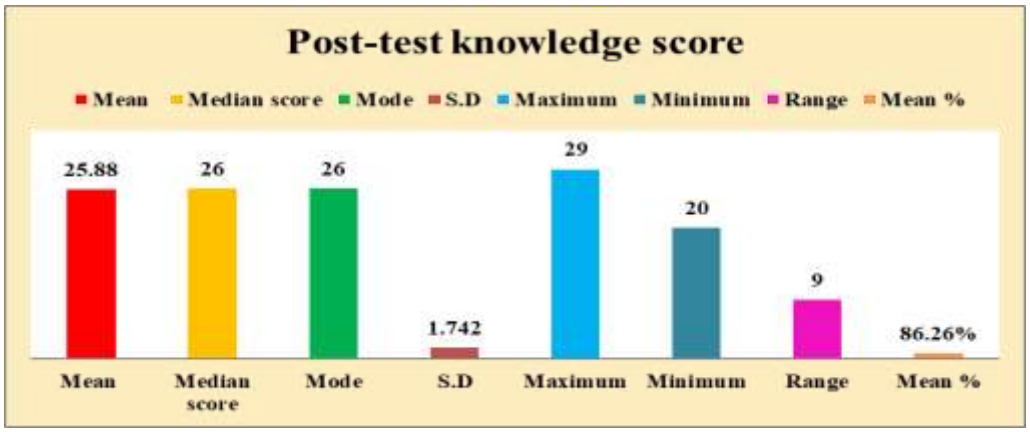

Table No.1.7 and Figure 1.6, depicts the mean, median, range, and SD of the post-test knowledge score of staff nurses regarding umbilical cord blood banking. The mean post-test knowledge score was 25.88, standard deviation was 1.742 with median 26, mode 26 and range9. Maximum scores obtained were 29 and minimum score obtained were 20 out of total possible score of 30. Post- test mean percentage of knowledge score was 86.26%.

SECTION E

Analysis related to the post- interventional level of attitude regarding umbilical cord blood banking among staff nurses.

Objective 6-To assess the post-test attitude score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

Level of post test attitude score

N=40

LEVEL OF ATTITUDE	SCORE	Frequency (f)	Percentage (%)
FAIR	12 - 15	24	60%
MODERATELY FAIR	8 – 11	16	40%
UNFAIR	0 – 7	00	0%

Maximum score = 75, **Minimum score = 15**

Table No. 1.8: Table Showing post-test attitude scores

Figure 1.7: Bar Graph showing post-test attitude scores.

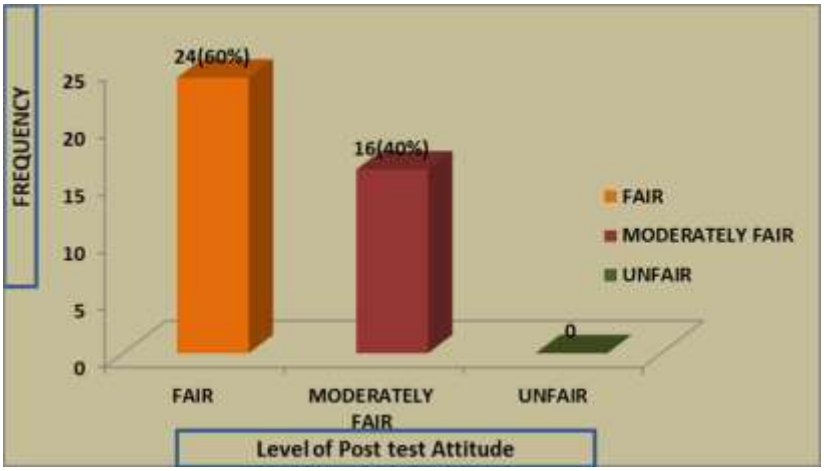

Table No.1.8 and Figure 1.7, depicts that out of 40staff nurses, maximum 24(60%) had fair attitude scores, followed by 16(40%) had moderately fair attitude scores in post-test regarding umbilical cord blood banking.

N=40

Descriptive Statistics	Mean	Median score	Mode	S.D	Maximum	Minimum	Range	Mean %
Post-test attitude	65.98	66.50	67	4.129	72	57	15	87.97%

Table No. 1.9: Table Showing Mean, Median, Mode, S.D of post-test attitude score

Figure 1.8: Bar Graph showing mean and SD of post-test attitude scores.

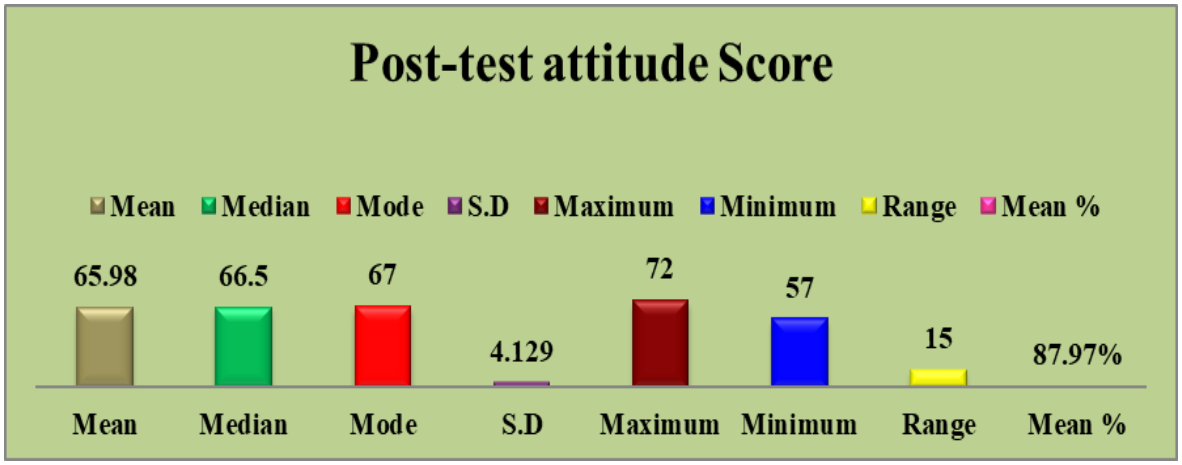

Table No.1.9 and Figure 1.8,depicts the mean, median, range, and SD of the post-test attitude score of staff nurses regarding umbilical cord blood banking. The mean post-test attitude score was 65.98 , standard deviation was 4.129 with median 66.5, mode 67 and range 15. Maximum scores obtained were 72 and minimum score obtained were 57 out of total possible score of 75. Post- test mean percentage of attitude score was 87.97%.

SECTION F

Analysis related to the effectiveness of Structured Teaching Programme regarding umbilical cord blood banking among staff nurses by means of 't' test.

Objective 7-To assess the effectiveness of structured teaching programme on knowledge score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

Comparison of pre test and post test KNOWLEDGE

N=40

LEVEL OF KNOWLEDGE	SCORE	PRE TEST f (%)	POST TEST f (%)
GOOD	25 - 30	03 (7.5%)	34 (85%)
AVERAGE	16 – 24	25 (62.5%)	6 (15%)
BELOW AVERAGE	0 – 15	12 (30%)	0 (0%)

Maximum score = 30, **Minimum score = 00**

Table No. 1.10: Table Showing Comparison of pre test and post test KNOWLEDGE

Figure 1.9: Bar Graph showing Comparison of pre test and post test KNOWLEDGE

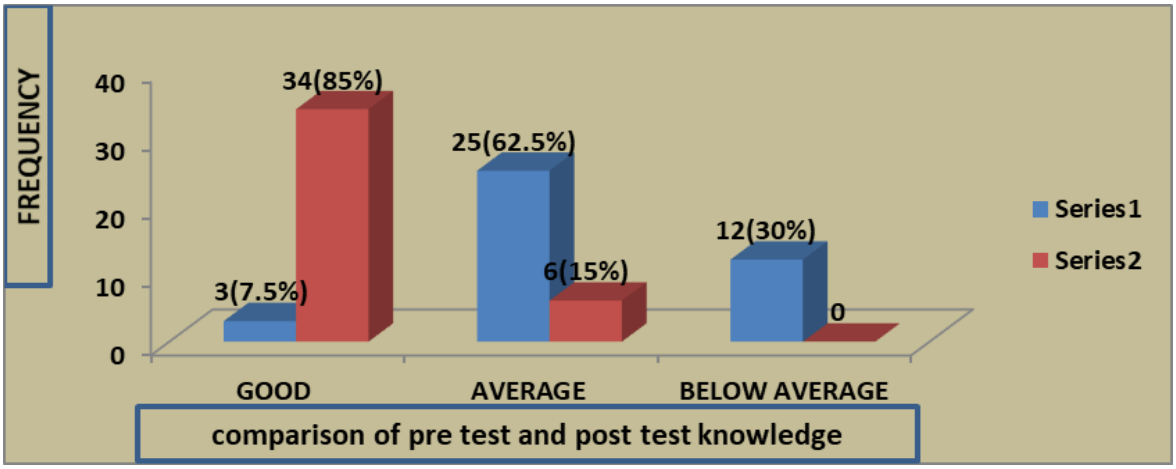

Table No.1.10 and Figure 1.9, depict that the knowledge score of staff nurses was higher (good) 34 (85%) in post- test as compared to the pre- test 3(7.5%) and none of them had below average knowledge in post- test Hence, it can be concluded that the staff nurses obtained high score in post test knowledge after structured teaching programme regarding umbilical cord blood banking.

Objective 8-To assess the effectiveness of structured teaching programme on attitude score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab.

Comparison of pre test and post test ATTITUDE

N=40

ATTITUDE	SCORE	PRE TEST f (%)	POST TEST f (%)
GOOD	61 - 75	04 (10%)	24 (60%)
FAIR	38 -60	30 (75%)	16 (40%)
UNFAIR	15 -37	6 (15%)	0 (0%)

Maximum score = 75, **Minimum score = 15**

Table No. 1.11: Table Showing Comparison of pre test and post test ATTITUDE

Figure 1.10: Bar Graph showing Comparison of pre test and post test ATTITUDE

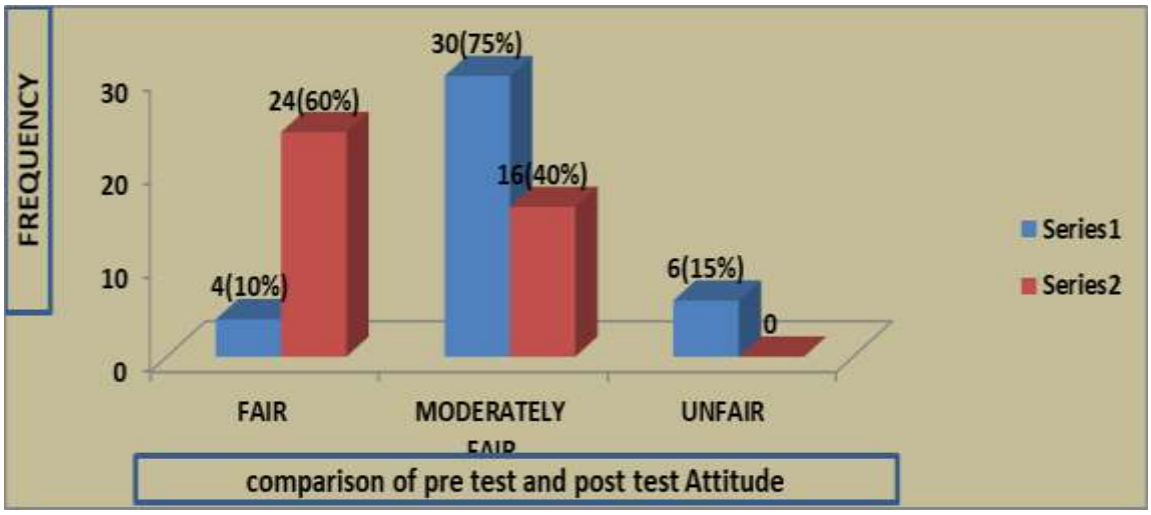

Table No.1.11 and Figure 1.10, depict that the attitude score of staff nurses was higher (fair) 24 (60%) in post- test as compared to the pre- test 4(10%) and none of them had unfair attitude in post- test

Hence, it can be concluded that the staff nurses obtained high score in post test attitude after structured teaching programme regarding umbilical cord blood banking.

Effectiveness of KNOWLEDGE by Paired 't' test.

N=40

Paired T test	Mean	SD	't' value	P value	Table value at 0.05	Result
Pre-test knowledge	17.28	4.946	10.776	0.000*	2.021	Significant
Post-test knowledge	25.88	1.742				

Maximum=30 *Significance Level 0.05 Minimum =0

Table No. 1.12: Table Showing Effectiveness of KNOWLEDGE by Paired 't' test.

Table No. 1.12shows significant difference between the pre-test and post-test knowledge score regarding umbilical cord blood banking among staff nurses. The data further represent that obtained 't' value 10.776 at (39df) is significantly higher than the table value. Hence the research hypothesis: **H_1 is accepted and null hypothesis is rejected**. The data supports that structured teaching programme were effective in enhancing the knowledge score regarding umbilical cord blood banking.

Effectiveness of ATTITUDE by Paired 't' test.

N=40

Paired T test	Mean	SD	't' value	P value	Table value at 0.05	Result
Pre-test Attitude	39.40	11.762	13.356	0.000*	2.021	Significant
Post-test Attitude	65.98	4.129				

Maximum=75 *Significance Level 0.05 Minimum =15

Table No. 1.13: Table Showing Effectiveness of ATTITUDE by paired 't' test.

Table No. 1.13shows significant difference between the pre-test and post-test attitude score regarding umbilical cord blood banking among staff nurses. The data further represent that obtained 't' value 13.356 at (39df) is significantly higher than the table value. Hence the research hypothesis: **H_1 is accepted and null hypothesis is rejected**. The data supports that structured teaching programme were effective in enhancing the attitude score regarding umbilical cord blood banking.

SECTION- G

Analysis related to association between knowledge score and attitude score of regardingumbilical cord blood banking among staff nurses with their selected socio-demo-graphic variables by means of Chi Square.

OBJECTIVE 9-To find out association of pre-test knowledge score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab, with their selected socio-demographic variables.

	SOCIO DEMOGRAPHIC VARIABLES	Level of Knowledge						
		GOOD	AVERAGE	BELOW AVERAGE	Chi Test	DF	P Value	Table value
1.	**Age (in years)**				2.565	6	0.861^{NS}	12.592
a)	Below 25	1	3	1				
b)	25≤35	0	6	3				
c)	35≤45	1	10	6				
d)	Above 45	1	6	2				
2.	**Gender**				2.066	2	0.356^{NS}	5.991
a)	Female	3	19	11				
b)	Male	0	6	1				
3.	**Professional Qualification**				3.160	4	0.531^{NS}	9.488
a)	GNM	0	6	4				
b)	Post Basic B.Sc. (N)	3	13	6				
c)	Basic B.Sc. (N)	0	6	2				
d)	M.Sc. (N)	0	0	0				

4.	**Area of Posting**							
a)	NICU / PICU	0	5	4	4.597	4	0.331^{NS}	9.488
b)	Pediatrics OPD	0	8	4				
c)	Gynae OPD	3	15	4				
5.	**Experience (in years)**							
a)	Upto 5 years	0	10	6	10.127	4	0.038^{*}	9.488
b)	$5 \leq 10$ years	0	8	5				
c)	$10 \leq 15$ years	3	7	1				
d)	Above 15 years	0	0	0				
6.	**Source of Information**							
a)	Mass Media	1	1	11	5.451	4	0.216^{NS}	9.488
b)	Co Workers	2	8	10				
c)	In Service Education	0	3	4				

*** = Significant** **^{NS} = Non Significant**

Table No. 1.14 Table shows association of pre-test knowledge score with selected socio-demographic variables

Table No. 1.14, represents the association of the pre test knowledge score regarding umbilical cord blood banking among staff nurses in selected hospitals with their selected socio demographical variables. It was obtained, the chi square value for age ($\chi 2$=2.565, df=6),gender ($\chi 2$= 2.066, df= 2), professional qualification ($\chi 2$=3.160, df=4), area of posting ($\chi 2$=4.597, df=4), source of information ($\chi 2$= 5.451, df=4),. is less than table value, which indicates that there was non significant association between the knowledge score of staff nurses with their socio demographic variables, except experience ($\chi 2$= 10.127, df=4) which has chi square value more than table value which indicates that there were significant association between the knowledge score of staff nurses with their work experience.

Hence it reveals that each demographic variables has p>0.05, which suggests statistically non significant association of knowledge score among staff nurses with their age,gender, professional qualification, area of posting, source of information and has significant association only with their working experience hence **$H_2$is accepted**.

OBJECTIVE 10-To find out association of pre-test attitude score regarding umbilical cord blood banking among staff nurses working in selected hospitals of district Patiala, Punjab, with their selected socio-demographic variables.

	SOCIO DEMOGRAPHIC VARIABLES	**Level of Attitude**						
		Fair	**Moderately fair**	**Unfair**	**Chi Test**	**DF**	**P Value**	**Table value**
1.	**Age (in years)**				8.561	6	0.715^{NS}	12.592
e)	Below 25	0	1	4				
f)	25≤35	0	3	6				
g)	35≤45	1	9	7				
h)	Above 45	2	1	6				
2.	**Gender**				0.786	2	0.917^{NS}	5.991
c)	Female	3	11	19				
d)	Male	0	3	4				
3.	**Professional Qualification**				4.219	4	0.339^{NS}	9.488
e)	GNM	2	4	4				
f)	Post Basic B.Sc. (N)	1	8	13				

g)	Basic B.Sc. (N)	0	2	6				
h)	M.Sc. (N)	0	0	0				
4.	**Area of Posting**							
d)	NICU / PICU	1	3	5	5.142	4	0.034^{NS}	9.488
e)	Pediatrics OPD	0	7	5				
f)	Gynae OPD	2	4	13				
5.	**Experience (in years)**							
e)	Upto 5 years	2	7	7				
f)	5≤10 years	1	3	9	3.152	4	0.148^{NS}	9.488
g)	10 ≤ 15 years	0	4	7				
h)	Above 15 years	0	0	0				
6.	**Source of Information**							
d)	Mass Media	0	2	11				
e)	Co Workers	0	8	12	22.404	4	0.663^{*}	9.488
f)	In Service Education	3	4	0				

*** = Significant** **^{NS} = Non Significant**

Table No. 1.15 Table shows association of pre-test attitude score with selected socio-demographic variables

Table No. 1.15, represents the association of the pre test attitude score regarding umbilical cord blood banking among staff nurses in selected hospitals with their selected socio demographical variables. It was obtained, the chi square value for age ($\chi2$=8.561, df=6),gender ($\chi2$= 0.786, df= 2), professional qualification ($\chi2$=4.219, df=4), area of posting ($\chi2$=5.142, df=4),experience($\chi2$= 3.152, df=4),. is less than table value, which indicates that there was non significant association between the attitude score of staff nurses with their socio demographic variables, except source of information ($\chi2$= 22.404, df=4) which has chi square value more than table value which indicates that there were significant association between the attitude score of staff nurses with their source of information.

Hence it reveals that each demographic variables has p>0.05, which suggests statistically non significant association of knowledge score among staff nurses with their age, gender, professional qualification, area of posting, working experience and significant association with their source of information only and **H_2 is accepted.**

RECOMMENDATIONS

Based on the study, the following recommendations are put forward for the future research

1. A study can be conducted to assess practice of staff nurses working in pediatrics, Obstetrics and Gynaecology units regarding the umbilical cord blood storing.

2. A study can be replicated with a large number of samples in different setting for better generalization.

3. A comparative study can be conducted to compare knowledge regarding the umbilical cord blood banking among staff nurses working in government and private hospitals.

REFRENCE

1) "umbilical- search online etymology dictionary". www.etymonline.com. Archived from the original on 4 march 2016. Retrieved 27 march 2018.

2) Stem Cell Banking in Mumbai, India | Ree Labs [Internet]. [cited 2020 Jun 21]. Available from:https://gpatindia.com/stem-cells-definition-types-of-stem-cells-self-renewal-potency-stem-cell-studies-stem-cell-therapy-and-mcqs-for-neet-gpat-csir-net-jrf/

3) Cord blood banking marketing before medicine? ABC news " bcnews.go.com.2010-05-06. Retrived 2015-03-09

4) "cord blood banking for potential future transplantation" Pediatrics.aappublications.org.retrived 2015-03-09

5) R. Gracy, Mrs. B. Kokilamma , Dr. P. Sudharani And Dr. M. Sreelatha IOSR Journal of Nursing and Health Science (IOSR-JNHS)www.iosrjournals.org(Sep.-Oct .2018).