A Study to Assess the Effectiveness of Structured Teaching Programme on Knowledge Regarding Menstrual Blood Banking Among Nursing Students in Selected Nursing Colleges of the City: A Pre-Experimental Study

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***Abstract*—Menstrual blood banking refers to the collection, processing, cryopreservation, and long-term storage of stem cells derived from menstrual blood for potential future therapeutic use. These stem cells, known as menstrual blood–derived stem cells (MenSCs), are obtained through a safe, non-invasive, and ethically acceptable procedure, making menstrual blood banking a promising alternative to other stem cell sources. Unlike embryonic stem cells, menstrual blood stem cells do not involve ethical controversies, and unlike bone marrow stem cells, their collection does not require invasive procedures. Banking of menstrual blood allows women to preserve their own stem cells, which may be utilized in future regenerative therapies, personalized medicine, and treatment of various degenerative and chronic diseases. Menstruation is the visible manifestation of cyclic and periodic physiologic uterine bleeding as a result of shedding of the endometrial. The uterus experiences change in endometrial thickening, proliferation of the vascular system, secretions from the glands which happen in preparation for receiving a fertilized ovum. However, if the women fail to conceive, functionalize endometrial is shed off which is then visibly known as menstruation. Menstrual blood banking is an emerging concept in regenerative medicine; however, its utilization remains extremely limited due to poor awareness and inadequate education. Globally, although menstrual blood–derived stem cells have demonstrated significant therapeutic potential, studies report that less than 20% of eligible women are aware of menstrual blood banking, and actual utilization is below 5% worldwide. In India, menstrual blood banking services are currently available only in selected metropolitan cities such as Mumbai, Delhi, Chennai, Bengaluru, and Hyderabad, through private stem cell banks, yet awareness among women and health-care professionals remains minimal. Studies conducted among nursing and health science students in India reveal that only 6–9% have adequate knowledge about menstrual blood banking, despite being future health educators. This lack of knowledge acts as a major barrier to acceptance, counselling, and community dissemination of this innovative health practice. OBJECTIVES OF THE STUDY To find out the effectiveness of Structured teaching programme on knowledge regarding menstrual blood banking among nursing students in selected nursing colleges of the city. To assess the level of knowledge regarding menstrual blood banking among nursing students in selected nursing colleges of the city. To find out the association between the post-test knowledge score with selected demographic variables of nursing students in selected nursing colleges of the city METHODOLGY The present study was conducted with the primary objective to assess the effectiveness of a structure teaching programme on knowledge regarding menstrual blood banking among in selected nursing colleges of the city. Hence Quantitative research approach is used in this study.A pre-experimental one group pre-test post-test research design has been used to evaluate the effectiveness of structured teaching programme regarding the menstrual blood banking among nursing students in selected nursing colleges of the city.It includes the base line information of Nursing students i.e. Age (in year), gender, residence, religion(optional), educational qualification,**

previous information regarding menstrual blood banking, If yes then Source of Information on menstrual blood banking. The present study was conducted in a selected nursing college of the city. samples are nursing students in selected nursing colleges. The Spearman-Brown coefficient 0.90 is greater than 0.70, meaning the test has good internal consistency. This suggests the questionnaire is reliable for use in the main study. RESULT pre-test assessment of knowledge regarding menstrual blood banking among nursing students, 4% had poor knowledge, 33% had average knowledge, 47% had good knowledge and 16% had very good knowledge. None of the respondents had excellent knowledge. The minimum pre-test knowledge score was 5 and the maximum score was 24. The mean knowledge score was 13.95±4.25. post-test assessment of knowledge regarding menstrual blood banking among nursing students, none of the respondents had poor, average or good knowledge. About 26% had very good knowledge and 74% had excellent knowledge. The minimum post-test score was 20 and the maximum score was 30. The mean post-test knowledge score was 25.38±1.71. comparison of pre-test and post-test knowledge scores among nursing students. The mean pre-test score was 13.95±4.25 and the mean post-test score was 25.38±1.71. The calculated t value was 27.229 with 99 degrees of freedom, which is higher than the tabulated t value at 0.05 level of significance. The p value was less than the acceptable level of significance ($p<0.05$). Hence, it is interpreted that the structured teaching programme was effective in improving the knowledge regarding menstrual blood banking among nursing students.

I. INTRODUCTION

Menstrual blood banking refers to the collection, processing, cryopreservation, and long-term storage of stem cells derived from menstrual blood for potential future therapeutic use. These stem cells, known as menstrual blood–derived stem cells (MenSCs), are obtained through a safe, non-invasive, and ethically acceptable procedure, making menstrual blood banking a promising alternative to other stem cell sources. Unlike embryonic stem cells, menstrual blood stem cells do not involve ethical controversies, and unlike bone marrow stem cells, their collection does not require invasive procedures. Banking of menstrual blood allows women to preserve their own stem cells, which may be utilized in future regenerative therapies, personalized medicine, and treatment of various degenerative and chronic diseases Menstrual blood banking is a novel and underexplored area in regenerative medicine that has the potential to revolutionize stem cell therapy. Menstrual blood contains mesenchymal stem cells (MenSCs), which have been found to differentiate into various cell types, including neurons, cardiomyocytes, and osteocytes. These stem cells offer promising therapeutic applications for conditions such as neurodegenerative diseases, cardiovascular disorders, and autoimmune conditions Despite its potential, menstrual blood banking remains largely unknown to the general public and even healthcare professionals. Studies have shown that awareness levels about menstrual blood banking are significantly low, especially among nursing students, who play a crucial role in patient education and healthcare advocacy In (2023) conducted a cross-sectional study among adolescent schoolgirls in selected public schools of Mexico to assess the impact of menstrual health literacy on stress and self-efficacy. The study revealed that higher menstrual health knowledge was associated with reduced menstruation-related stress and improved self-confidence in managing menstruation, highlighting the importance of educational programmes in menstrual health awareness. Nursing education aims to equip students with up-to-date knowledge on healthcare innovations, and menstrual blood banking should be included in this curriculum. However, there is currently a lack of structured educational programmes addressing this topic. Research indicates that structured teaching programmes can significantly enhance knowledge retention and awareness among nursing students.

II. OBJECTIVES OF THE STUDY

- Primary objective:

1. To find out the effectiveness of Structured teaching programme on knowledge regarding menstrual blood banking among nursing students in selected nursing colleges of the city.

- Secondary objective:

1. To assess the level of knowledge regarding menstrual blood banking among nursing students in selected nursing colleges of the city.
2. To find out the association between the post-test knowledge score with selected demographic variables of nursing students in selected nursing colleges of the city

III. MATERIALS AND METHOD

The present study was conducted with the primary objective to assess the effectiveness of a structure teaching programme on knowledge regarding menstrual blood banking among in selected nursing colleges of the city. Hence Quantitative research approach is used in this study.A pre-experimental one group pre-test post-test research design has been used to evaluate the effectiveness of structured teaching programme regarding the menstrual blood banking among nursing students in selected nursing colleges of the city.It includes the base line information of Nursing students i.e. Age (in year), gender, residence, religion(optional), educational qualification, previous information regarding menstrual blood banking, If yes then Source of Information on menstrual blood banking. The present study was conducted in a selected nursing college of the city. samples are nursing students in selected nursing colleges.The Spearman-Brown coefficient 0.90 is greater than 0.70, meaning the test has good internal consistency. This suggests the questionnaire is reliable for use in the main study.In this study tool consists of self-structured questionnaire for assessing knowledge. Based on the objectives of the study, demographic data, structured knowledge questionnaire were prepared to evaluate the knowledge of the Nursing students. After extensive and systemic review of literature the investigator developed the tool. Consist of demographic variables of nursing students to be participated in the study e. g. Age, gender, residence, previous source on menstrual blood banking.The content validity of the tool was established in consultation with Guide and 12 experts in the field of obstetrics and gynecological nursing, gynecologist and statisticians, suggestion of the experts were considered and changes were made accordingly

IV. RESULT

Section A

Percentage wise distribution of nursing students according to their demographic characteristics.

Sr. No.	Variable	Groups	(f)	(%)
1	Age	20-24 years	76	76.00
		25-29 years	23	23.00
		30-35 years	01	01.00
		35 years & above	00	0.00
2	Gender	Male	07	7.00
		Female	93	93.00
		Other	00	0.00
3	Residence	Rural	35	35.00
		Urban	55	55.00
		Semi-urban	10	10.00
4	Religion	Hindu	56	56.00
		Muslim	06	6.00
		Buddhism	36	36.00
		Christian	02	2.00
		Other	00	0.00
5	Education	B.Sc. Nursing (7th Sem)	100	100
		P.B. B.Sc. Nursing	00	0.00
		Post Graduate	00	0.00
6	Previous information regarding menstrual blood banking	Yes	15	15.00
		No	85	85.00
7	If yes, then Source of Information on menstrual blood banking	Family & Friends	05	33.33
		Healthcare professional	01	6.67
		Internet/social media	05	33.33
		Class room teaching	04	26.67

Section-B

Assessment Of Level Pre-Test and Post-Test of the Knowledge Score Regarding Menstrual Blood Banking Among Nursing Students in Selected Nursing Colleges in the City.

Grade	Marks	Frequency	Percentage
Poor	0-6	04	4.00%
Average	7– 12	33	33.00%
Good	13 – 18	47	47.00%
Very Good	19 – 24	16	16.00%
Excellent	25 – 30	00	0.00%
Minimum Score		05	
Maximum Score		24	
Mean Knowledge Score		13.95 ±4.25	
Mean % Knowledge Score		46.50 ± 14.17	

Grade	Marks	Frequency	Percentage
Poor	0-6	00	0.00%
Average	7– 12	00	0.00%
Good	13 – 18	00	0.00%
Very Good	19 – 24	26	26.00%
Excellent	25 – 30	74	74.00%
Minimum Score		20	
Maximum Score		30	
Mean Knowledge Score		25.38 ±1.71	
Mean % Knowledge Score		84.60 ± 5.70	

Section-C

Assessment Of the Effectiveness of Structured Teaching Programme on Knowledge Score Regarding Menstrual Blood Banking Among Nursing Students in Selected Nursing Colleges of The City.

Significance of difference between knowledge scores pre-test and post-test

n=100

	Mean	SD	t-value (calculated)	Mean Difference	df	p-value	Remark
Pretest	13.95	4.25	27.229	11.43±4.198	99	< 0.019	Significant Association
Posttest	25.38	1.71					

Section-D

Association Between Post-Test Knowledge Scores Regarding Menstrual Blood Banking Among Nursing Students in Selected Colleges of The City with Their Demographic Variables

Association of post-test knowledge scores among nursing students in relation to their age in years.

Demographic Variable	Group	Poor	Average	Good	Very good	Excellent	χ^2 Value	p value
Age	20-24 years	0	0	0	22	54	1.580	0.045 S.p<0.05
	25-29 years	0	0	0	4	19		
	30-35 years	0	0	0	0	1		
	35 years & above	0	0	0	0	0		

Association of Post-Test Knowledge score among nursing students in relation to their gender

n=100

Demographic Variable	Group	Poor	Average	Good	Very good	Excellent	χ^2 Value	p value
Gender	Male	0	0	0	3	4	1.112	0.026 S.p<0.05

Association of Post-Test Knowledge score among nursing students in relation to their residence

n=100

Demographic Variable	Group	Poor	Average	Good	Very good	Excellent	χ^2 Value	p value
Religion	Hindu	0	0	0	9	26	1.231	0.540 N.S.>0.05
	Muslim	0	0	0	16	40		
	Buddhism	0	0	0	1	8		
	Christian	0	0	0	0	0		
	Other	0	0	0	0	0		

Association of Post-Test Knowledge score among nursing students in relation to their religion

n=100

Demographic Variable	Group	Poor	Average	Good	Very good	Excellent	χ^2 Value	p value

Residence	Hindu	0	0	0	17	39	2.227	0.694 N.S.>0.05
	Muslim	0	0	0	2	4		
	Buddhism	0	0	0	7	29		
	Christian	0	0	0	0	1		
	Other	0	0	0	0	1		

Association of Post-Test Knowledge score among nursing students in relation to their Previous information regarding menstrual blood banking

n=100

Demographic Variable	Group	Poor	Average	Good	Very good	Excellent	χ^2 Value	p value
Previous information regarding menstrual blood banking	Yes	0	0	0	2	13	1.472	0.225 N.S.>0.05
	No	0	0	0	24	61		

Association of Post-Test Knowledge score among nursing students in relation to If yes, then Source of Information on menstrual blood banking

n=100

Demographic Variable	Group	Poor	Average	Good	Very good	Excellent	χ^2 Value	p value
If yes, then Source of Information on menstrual blood banking	Family & Friends	0	0	0	4	1	2.424	0.658 NS p > 0.05
	Healthcare professional	0	0	0	0	1		
	Internet/social media	0	0	0	5	0		
	Class room teaching	0	0	0	1	3		

V.CONCLUSION

In the pre-test assessment of knowledge regarding menstrual blood banking among nursing students, 4% had poor knowledge, 33% had average knowledge, 47% had good knowledge and 16% had very good knowledge. None of the respondents had excellent knowledge. The minimum pre-test knowledge score was 5 and the maximum score was 24. The mean knowledge score was 13.95±4.25. In the post-test assessment of knowledge regarding menstrual blood banking among nursing students, none of the respondents had poor, average or good knowledge. About 26% had very good knowledge and 74% had excellent knowledge. The minimum post-test score was 20 and the maximum score was 30. The mean post-test knowledge score was 25.38±1.71. the comparison of pre-test and post-test knowledge scores among nursing students. The mean pre-test score was 13.95±4.25 and the mean post-test score was 25.38±1.71. The calculated t value was 27.229 with 99 degrees of freedom, which is higher than the tabulated t value at 0.05 level of significance. The p value was less than the acceptable level of significance ($p<0.05$). Hence, it is interpreted that the structured teaching programme was effective in improving the knowledge regarding menstrual blood banking among nursing students. the association between post-test knowledge scores and selected demographic variables of nursing students such as age in years, gender, religion, residence, previous information regarding menstrual blood banking and source of information. The findings revealed that there was no statistically significant association between post-test knowledge scores and any of the selected demographic variables as the calculated p values were greater than the level of significance ($p>0.05$).

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