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Research Article

Effectiveness of Educational Programme on Knowledge of Staff Nurses regarding Stem Cell Transplantation at Sher-e-Kashmir Institute of Medical Sciences Soura Srinagar, Kashmir

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ABSTRACT

Introduction: The discovery of stem cells has led to revolution in modern medicine. Stem cell research has been broadly explored worldwide to enhance human health in medical setting. The study was conducted with an aim to improve the knowledge of staff nurses regarding stem cell transplantation. Stem cell transplantation is a greater positive impact on the treatment of life threatening diseases. Stem cell transplantation is a life saving procedure for several malignant and non-malignant life-threatening diseases, more than 50,000 stem cell transplantations are being performed annually worldwide.

Methodology: A pre-experimental one-group pre-test and post-test design was used to conduct the study. 50 study subjects working in selected areas of SKIMS (Clinical hematology, medical oncology and pediatric medicine) were selected by purposive sampling technique. Data was collected by administering self-structured knowledge questionnaire.

Results: Majority of the study subjects 21(42%) belonged to the age group of 31-40 years, 40(80%) were females, 37(74%) of study subjects had B.Sc Nursing degree, maximum 37(74%) study subjects had 1-10 years of working experience, 44(88%) had text books as previous source of information.

Conclusion: The findings of the study concluded that study subjects were having inadequate knowledge regarding stem cell transplantation. The educational programme was found effective in increasing the knowledge score of study subjects. The recommendations made were to replicate the study on large sample.

Keywords: Stem Cell Transplantation, Effectiveness, Educational Programme, Knowledge, Staff Nurses

Introduction

"Good health is not only about being well. It is about being happy from a physical, mental and spiritual point of view. The study and the research of the human body and related health issues help understand how human functions and apply knowledge to improve health and prevent and cure diseases.[2] The human body is made up of many types of interconnected cells that form tissues and the organ system in turn. They ensure homeostasis and function in the human body. The human body is made up of more than 200 kinds of mature cells: each with its unique function. Stem cells differ from our mature functional cells, which have the amazing ability to do much more on their own, but also to create new tissue as they divide and grow. The stem cells are primitive cells capable of self-replication and differentiated into myeloid or lymphoid stem cells. Stem cells have the sense of capacity to divides indefinitely and have the potential to give rise to specialized cells. stem cell transplantation is a greater positive impact on the treatment of life threatening diseases. Stem cell transplantation is a lifesaving procedure for several malignant and nonmalignant life-threatening diseases, more than 40,000 stem cell transplantations are being performed annually worldwide. stem cell transplantation is a useful treatment for so many conditions, such as aplastic anaemia, malignant disorders, especially myelodysplastic syndrome, leukaemia; certain types of acute leukemia, chronic and pre-leukemia states, lymphoma, multiple myeloma, neuroblastoma and selected solid tumors (breast cancer, ovarian cancer, testicular cancer, poor germ cell tumors). Non-malignant haematological disorders such as thalassemia and sickle cell anaemia, immunodeficiency diseases and wiskott-Aldrich syndrome.[3]

Stem cell transplant is the process in which a patient receives healthy stem cells to replace their cancerous stem cells. The healthy stem cells may come from the blood, bone marrow of the patient, related or unrelated donor. A stem cell transplant may be autologous (using a patient's stem cells), allogeneic (using stem cells from a related or unrelated donor), syngeneic (using stem cells donated by an identical twin), or umbilical cord blood of newborns and introduce into the human body to treat various disorders.

In India first allogeneic bone marrow transplant was done at Tata Memorial Hospital on 20 March 1983.[4] The first successful unrelated donor transplant was done in 1973 in New york. 1908: Russian histologist Alexander Maksimov described the term stem cell.1956: Edward Donnall Thomas injected bone marrow stem cells into a 3-year-old child with leukemia, the stem cells were harvested from identical healthy twins.[5]

Hematopoietic stem cell transplantation (HSCT) is a potentially curative treatment for patients with blood disorders and genetic diseases. Approximately 70% of the HSCTs currently performed in the United States use stem cells from an unrelated donor who donated voluntarily. Stem cell transplantation appears to be a promising method for the treatment of patients with neurodegenerative conditions, spinal cord injury, and stroke.[6] Multiple myeloma accounts for approximately 10% of hematologic cancers and 1% of all cancers in general. More than 30 years after its Introduction, Autologous Stem Cell Transplantation (ASCT) remains the standard of care for young patients with newly diagnosed multiple myeloma.[7] Sher-i-Kashmir Institute of Medical Sciences Srinagar Kashmir (SKIMS SOURA) started stem cell transplantation in December 2010 and to date 70 autologous Stem cell transplants have been performed successfully and also two[2] allogeneic stem cell transplants have been done in November 2020 and February 2021 respectively by Clinical Hematology and Medical oncology department. In November 2020, The Department of Clinical Hematology at SKIMS Soura had performed a matching sibling allogenic stem cell transplant for a patient suffering from severe aplastic anemia. In February, 2018, The Department of Medical Oncology, SKIMS Srinagar conducted the first pediatric autologous stem cell transplant of a five year old child suffering from neuroblastoma.

It is estimated that about 12000 new thalassemic cases are born annually in India, of which 30% (3600) might have suitable donors available for hematopoietic stem cell transplant.[8] In India, in September 2006 data from six transplant centers was collected and it was found that total of 1540 allogeneic and autologous bone marrow transplantations have been performed.

In West Bengal, thalassemia major is highly prevalent. There are 26000 thalassemia major patients with an annual increase of 2500 cases. According to WHO, more than 50000 stem cell transplants are carried out annually worldwide and increasing every year.In Europe, more than 40000 stem cell transplants are performed annually till 2016, out of which 15765 (43%) are allogeneic and 20704 (57%) were autologous.[9]

Kingdom of Saudi Arabia (KSA) emerged as the first country in the Arab world to record more than 10,000 stem cell donors, a unique medical feat that will encourage people to donate stem cells and promote stem cell transplantationin the Kingdom to help people suffering from incurable diseases.[10] In 2003, the King Faisal Specialist Hospital and Research Center (KFSH-RC) began performing transplants using Cord Blood (CB). A public bank was created in 2006 at KFSH-RC, which now stores over 4600 units. In 2013,

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transplanted 121 locally stored units to 108 patients; 103 children and 5 adults.[11,12] KFSH-RC has conducted 5020 stem cell transplantation cases since the hospital started this type of transplantation, including 323 in 2015, which includes 176 adults and 147 children. Saudi Arabia emerged as the first country in 2015 from the Arab world to record more than 10,000 stem cell donors, a unique medical feat that will encourage people to donate stem cells and promote stem cell transplantation in the Kingdom to help people suffering from incurable diseases.[13]

Objectives of the Study:

1. To assess the pretest knowledge score of staff nurses regarding stem cell transplantation.
2. To assess the post-test knowledge score of staff nurses regarding stem cell transplantation.
3. To evaluate the effectiveness of educational programme on knowledge of staff nurses regarding stem cell transplantation by comparing pretest and post-test knowledge scores.
4. To find the association of pretest knowledge score of staff nurses regarding stem cell transplantation with their selected demographic variables (gender, age, professional qualification, working experience and previous source of information on stem cell transplantation) at 0.05 level of significance.

Methodology

Research methodology indicates the general pattern of organizing the procedure for gathering valid and reliable data for investigation. In this study, a quantitative research approach was adopted. Knowledge assessed by self-structured questionnaire regarding stem cell transplantation.

Research Design

In this study, a pre-experimental one group pre-test post-test design was used to assess the effectiveness of educational programme on knowledge of staff nurses regarding stem cell transplantation. This study was conducted at SKIMS Soura Srinagar Kashmir. The study subjects were 50 staff nurses, selected through purposive sampling technique

Inclusion Criteria

1. Staff nurses who were:
2. Directly involved in patient care.
3. Available during the period of data collection.

Exclusion Criteria

1. Staff nurses who were not:
2. Directly involved in patient care.
3. Available during the period of data collection.

Development of the Tool

Developed educational Programme (intervention and Power Point presentation) containing literature related to sources, collection, indications, types, histocompatibility testing, procedure, nursing management and complications related to stem cell transplantation. After content validity and modification of the tool, a structured knowledge questionnaire about the stem cell transplantation was developed.

Split Half method, Karl Pearson's coefficient correlation used to calculate reliability. Reliability was found r=0.75 which reveals tools was reliable for the study. A structured questionnaire consists of 48 multiple choice questions with four options, each multiple-choice questions had one correct answer and three wrong distracters.

Scoring criteria, 1 (one) mark for correct answer and 0 (zero) for the wrong answer. Categorization of score done, rating (0-16) poor, (17-32) average, and (33-48) consider good.

Results

The results were drawn from the data collected by the application of various tests be it descriptive or inferential statistics. The first and foremost thing in this research study was to analyse the demographic variables.

Thus the characteristics of the study subjects in terms of their demographic variables which included age, gender, professional qualification, working experience and previous source of information on stem cell transplantation. Each demographic variable was divided into various categories as mentioned below:

Table 1.Description of Demographic Variables

n=50

Demographic Variables	Freq. (f)	Pct%
Age		
21-30	18	36%
31-40	21	42%
41-50	5	10%
>50	6	12%
Gender		
Male	10	20%
Female	40	80%
Professional Qualification		
GNM	6	12%
Bsc Nursing	37	74%
MSc Nursing	7	14%

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Experience in Years		
1-10 years	37	74%
11-20 years	7	14%
21-30 years	6	12%
Previous Source of Information		
Textbooks	44	88%
Health professional	3	6%
Mass media	3	6%

The tabulated data presented in Table 1, revealed that higher number of the study subjects (42%) were in the age group of 31-40 years, 36% were in the age group of 21-30 years, 12% were in the age group of above 51 years and 10% were in the age group of 41-50 years. It also depicted that the majority of the study subjects (80%) were females and 20% were males. The data also unveiled that majority (74%) of study subjects were B.Sc Nursing, 14% were M.Sc Nursing and 12% were GNM.

Moreover it is due this tabulated data that we came to know that majority (74%) of study subjects had 1-10 years of experience, 14% study subjects had experience 11-20 years and 12% study subjects had 21-30 years of experience. It also highlighted that majority (88%) of the study subjects had text book as their previous source of information and equal number 6% of study subjects had received information from health care professionals and mass media regarding stem cell transplantation respectively.

Table 2.Frequency and Percentage Distribution of Study Subjects According to their Pre-test Knowledge Score

n=50

Knowledge Score	Pre-test	
	Frequency	Percentage%
Good 33-48	09	18%
Average 17-32	31	62%
Poor 0-16	10	20%

The data presented in the Table 2, revealed that maximum (62%) of study subjects had average knowledge, 20% study subjects had poor knowledge and 18% had good knowledge regarding stem cell transplantation.

Table 3.Frequency and Percentage Distribution of Study Subjects According to their Post-test Knowledge Score

n=50

Knowledge Score	Post-test	
	Frequency	Percent
Good 33-48	33	66%
Average 17-32	13	26%
Poor 0-16	4	8%

The data presented in the Table 3, unveiled that maximum (66%) study subjects had good knowledge, 26% study subjects had average knowledge and 48% study subjects had poor knowledge regarding stem cell transplantation.

Table 4.Distribution of Study Subjects According to their Pre-test and Post-test Knowledge Score

n=50

Knowledge score	Pre-test		Post-test	
	Freq. (f)	Pct%	Freq. (f)	Pct%
Good 33-48	9	18%	33	66%
Average 17-32	31	62%	13	26%
Poor 0-16	10	20%	4	8%

The data presented in Table 4, showed that in pre-test, 20% study subjects had poor Knowledge while in post-test test 8% had poor Knowledge. 62% in pretest had average knowledge and in post test 26% study subjects had average knowledge. 18% had good Knowledge in pre-test where as in post test 66% study subjects had good Knowledge. This showed that post test knowledge score had increased.

Table 5.Comparison between Pre-test and Post-test Knowledge Score and Significance of Difference between the Mean Pre-test and Post test Knowledge Score

n=50

Knowledge Assessment	Mean±SD	Mean%	Range	Mean Diff.	Paired T-test	P-value
Pre-test Knowledge	19.2±9.06	51%	37-7	13.84	34-.06	<0.001
Post-test Knowledge	33.04±9.14	81%	45-13			

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The data in the Table 5, depicted that the mean post test knowledge score of study subjects (33.04±9.14) was significantly higher than that of the mean pre-test knowledge score (19.2±9.06) at p<0.05 level of significance. This indicated that the educational programme was significantly effective in improving the knowledge of study subjects regarding stem cell transplantation.

Table 6.Association of Pre-test Knowledge Score of Study Subjects regarding Stem Cell Transplantation with their Selected Demographic Variables

n=50

Variables	Category	Poor 0-16	Average 17-32	Good 33-48	Chi-Square	DF	P-value	Remark
Age in years	21-30	3	11	4	4.50	6	0.609	NS
	31-40	5	13	3				
	41-50	2	3	0				
	>51	0	4	2				
Gender	Male	1	6	3	1.633	2	0.442	NS
	Female	9	25	6				
Professional qualification	Gnm	2	4	0	3.07	4	0.546	NS
	Bsc Nursing	6	24	7				
	Msc Nursing	2	3	2				
years of working experience	1-10 Years	8	22	7	3.72	4	0.444	NS
	11-20 Years	2	5	0				
	21-30 Years	0	4	2				
Previous source of information.	Text Book	8	28	8	1.966	4	0..742	NS
	Health Professional	1	2	0				
	Mass Media	1	1	1				

NS- Non Significant

The data presented in the Table 6, revealed that there was no significant association between the pre-test knowledge score of study subjects and the selected demographic variables like gender, age, professional qualification, working experience and previous source of information regarding stem cell transplantation. Hence the researcher failed to reject the null hypothesis, which states that there is no significant association between the pretest knowledge score with their selected demographic variables such as age, gender, professional qualification, working experience and previous source of information regarding stem cell transplantation.

Discussion

The findings of the study revealed that majority of the study subjects 21 (42%) belonged to the age group of 31-40 years, 18 (36%) study subjects belonged to the age group of 21-30 years, 5(10%) study subjects belonged to the age group of 41-50 years and 6 (12%) of the study subjects belonged to the age group of above 51 years. Majority of study subjects 40 (80%)were females and 10 (20%) study subjects were males. Regarding the professional education of study subjects, majority 37 (74%) study subjects had B.Sc Nursing degree, 7 (14%) study subjects had M.Sc Nursing, 6 (12%) of study subjects had GNM. The sample survey revealed that majority i.e., 37 (74%) study subjects had 1-10 years of working experience. 7 (14%) study subjects had 11-20 years of working experience and 6 (12%) study subjects had 21-30 years of working experience. Majority of study subjects 44 (88%) had text books as previous source of information, equal number i.e. 3 (6%) of study subjects had health professionals and mass media as their previous source of information regarding stem cell transplantation. The findings of the present study were supported by a similar study conducted by Hanglem R, Devi LD (2020)[14] to assess the effectiveness of structured teaching programme on knowledge regarding cord blood stem cell therapy and banking among 50 staff nurses in Sagar Hospital at Banglore, India.The results of their study revealed that majority of the study subjects 26 (52%) belongs to the age group of 21-25 years, 19 (38%) belongs to the age group of 26-30 years and 5 (10%) belongs to the age group of 31 and above, majority 39 (78%) study subjects were females and 11 (22%) study

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subjects were males. Regarding the professional education of study subjects, majority 35 (70%) study subjects had GNM, 8 (16%) had B.Sc nursing and 7 (14%) study subjects had completed Post-Basic B.Sc.Majority 33 (66%) study subjects had 0-5 years experience, 17 (34%) had 6-10 year's experience and none of respondents had above 10 years of experience. Majority 41 (82%) of study subjects had previous knowledge on cord blood stem cell therapy and banking and 9 (18%) study subjects had no previous knowledge on cord blood stem cell therapy and banking.

Our study has brought these findings to fire that in pre-test maximum number of the study subjects 31 (62%) had average knowledge, 10 (20%) study subjects had poor knowledge and 9 (18%) had good knowledge regarding stem cell transplantation.

In a similar study conducted by Singh T, Pakhide V, Verma M. (2021)[15] at Bhopal, Madhya Pradesh, India, to determine the effect of an educational package among 60 staff nurses' regarding hematopoietic stem cell transplantation. The findings showed that in pre-test, maximum study subjects had 67% poor knowledge, 28% study subjects had average knowledge and 5% had good knowledge regarding stem cell transplantation.

The findings of the present study revealed that in post-test, majority of study subjects i.e., 33 (66%) had good knowledge, 13 (26%) study subjects had average knowledge, 4 (8%) of study subjects had poor knowledge regarding stem cell transplantation. This reflects the success of imparting knowledge regarding stem cell transplantation among study subjects.

The findings of the study are supported by pre-experimental study conducted by Singh T, Pakhide V, Verma M. (2021)[15] to assess the effectiveness of educational package on knowledge regarding stem cell transplantation among 60 staff nurses working in selected hospital Bhopal, Madhya Pradesh, showed that majority 70% had good knowledge, 30% study subjects had average knowledge and no one had poor knowledge.

The findings of the study showed that the mean post-test knowledge score of study subjects (33.04) was significantly higher than that of the mean pre-test knowledge score (19.2). The mean difference between pre-test and post-test knowledge score was 13.84 ($p<0.001$) which indicated that structured teaching programme was effective in enhancing the knowledge of staff nurses regardingstem cell transplantation.

The findings of the above study are supported by a pre-experimental study conducted by Singh T, Pakhide V, Verma M. (2021)[15] at Bhopal, Madhya Pradesh, among 60 staff nurses to assess the effectiveness of educational package on knowledge regarding stem cell transplantation.

The findings findings of the study revealed that the mean post-test knowledge score (27.0) was significantly greater than the pre-test mean knowledge score (15.5) with mean difference of 11.5 ($p<0.001$) which showed the effectiveness of intervention (educational programme) regarding stem cell transplantation.

The findings are further supported by a pre-experimental study conducted by Dayanand M S, Kudari A (2021)[18] at Uttar pradesh, India among 40 staff nurses to evaluate the effectiveness of integrated teaching strategy on knowledge regarding stem cell transplantation. The results depicted that the mean pre-test knowledge score was (11.6) whereas the mean post-test knowledge score was (22.37) and mean difference was 10.77 ($p<0.001$). The study concluded that an integrated teaching strategy was effective in enhancing the knowledge of study subjects regarding stem cell transplantation.

The study further moved ahead so that to find the association of the pre-test knowledge score of staff nurses regarding stem cell transplantation with their selected demographic variables (age, gender, professional qualification, working experience and previous source of information on stem cell transplantation). This study revealed that there was no significant association between pre-test knowledge score and selected demographic variables like age, gender, professional qualification, working experience and previous source of information regarding stem cell transplantation. The findings are also supported by a similar study conducted by Dayanand M S, Kudari A (2021).[18] Who revealed that there was no significant association of pretest knowledge scores with selected demographic variables such as gender, age and experience, at $p< 0.05$ level of significance.

Conclusion

Stem Cell Transplantation (SCT) is a potentially curative treatment for patients with blood disorders and genetic diseases. Stem Cell Transplantation (SCT) is a life-saving procedure for several malignant and non-malignant life threatening diseases. Nursing care of the patient undergoing a stem cell transplant is complex and demands a high level of skill. Health care provider including nurses should have sound knowledge and understanding about stem cell transplantation.

The following conclusions were drawn on the basis of the findings of the study:

- Pre-test findings showed that the study subjects did not possess adequate knowledge regarding stem cell transplantation, so there was need to educate them
- The educational programme (intervention) was found effective in improving the knowledge score of study subjects regarding stem cell transplantation, that was evident from post-test knowledge scores

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- No significant association was found between the pre-test knowledge scores of study subjects with their selected demographic variables. (age, gender, professional qualification, working experience and previous source of information regarding stem cell transplantation)
- The educational programme (intervention) proved to be an effective teaching method for providing information. It was very much appreciated, encouraging as well as satisfying, to note that after the administration of educational programme (intervention), the post-test score showed an increase in knowledge in all the areas of learning
- This study was based on the fact that "improving the professional competencies of the staff nurses by educating them about the current innovations was very essential". This study could be considered as a part of continuing professional development of the staff nurses. Educational programme (intervention) regarding stem cell transplantation served that purpose and was effective in increasing the knowledge of study subjects

The nurse plays an important role in the informed consent process, supporting the medical staff's explanations and plans to ensure, as much as possible, that the patient is making an informed decision regarding HCT. Nurses play a key role in providing health care to patients and being close to the patients they can conduct projects and research studies in the hospitals. This type of studies emphasize the significance of the short term courses or in-service education for nurses in advanced knowledge on stem cell transplantation and making use of facilities available in the management of the patient in day to day activities.

Recommendations

Based on the findings of the study, the following recommendations were made:

- A similar study may be replicated using a large sample and different demographic variables, so that findings can be generalized
- A comparative study can be conducted to compare knowledge regarding stem cell transplantation among staff nurses working in government and private hospitals
- A similar study can be done by using different methods of teaching like lecture cum demonstration method and video assisted teaching programme etc
- A study can be conducted to check the attitude of staff nurses regarding stem cell transplantation
- A similar study can be conducted on the knon effects of stem cell transplantation on the health of patients can be conducted

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Conflict of Interest: None

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