

Assess the level of knowledge and attitude toward hematopoietic stem cell donation and donor registration among undergraduate B.Sc. Nursing 1st year students

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ABSTRACT

Introduction. Blood disorders like thalassemia and leukaemia can be life threatening. For many patients, hematopoietic stem cell transplantation (HSCT) is the only effective treatment. Since fewer than 30% of patients find a matching donor within their family, most depend on unrelated volunteer donors. However, donor registries face a shortage of volunteers due to misconceptions, fear of the procedure, and lack of awareness. Therefore, assessing and improving public knowledge and attitudes toward stem cell donation is essential to increase donor participation and save lives. This study aims to assess the level of knowledge and attitude towards hematopoietic stem cell donation and donor registration among undergraduate B.Sc. Nursing 1st year students of SGT University

Method: Chi-Square was used to associate the level of knowledge score of nursing students with selected demographic variables. Design: A quantitative approach using a non-experimental, descriptive survey design among nursing students in SGT University Gurugram, Haryana, has been adopted.

Tools and techniques: Socio-demographic profile for baseline data and the tool was developed by Cicek and Dinc (2020) is used to assess the knowledge of university students regarding hematopoietic stem cell donation. Likert Scale is used to assess attitude regarding hematopoietic stem cell donation, what is the perception of nursing students in hematopoietic stem cell donation, and what is the attitude level of nursing students towards stem cell donation measured on a five-point Likert Scale. Data was collected through Google Forms from (n= 152) nursing students studying in SGT University.

Result: The study revealed that more than half of the nursing students (56%) had poor knowledge regarding hematopoietic stem cell donation and donor registration. Nearly one-third (32%) had moderate knowledge, while only 12% demonstrated good knowledge. The vast majority of nursing students (97%) had a positive attitude towards hematopoietic stem cell donation and donor registration. There was a statistically significant moderate positive correlation between knowledge and attitude scores ($r = 0.503$, $p < 0.001$). This indicates that students with higher knowledge levels tended to have a more positive attitude toward hematopoietic stem cell donation and donor registration.

Conclusion: Although most nursing students had poor knowledge about hematopoietic stem cell donation and donor registration, they generally exhibited a highly positive attitude. A significant positive relationship was found between knowledge and attitude, suggesting that improving knowledge may further enhance positive attitudes.

INTRODUCTION

Hematopoietic stem cell transplantation (HSCT) is an effective therapeutic option for patients with a wide range of malignant and benign conditions. Leukaemia, myelodysplastic syndromes, sickle cell anaemia, thalassemia, severe combined immunodeficiency, and certain cancers are just a few of the illnesses for which hematopoietic stem cell transplantation (HSCT) is a vital medical procedure that may save lives. Peripheral blood stem cell transplantation (PBSCT) and bone marrow transplantation (BMT) are the two main techniques used for HSCT.

Hematopoietic stem cells (HSCs) can produce progenitor cells that can reconstitute the hematopoietic system, including lymphoid, erythroid, and myeloid cell lines. HSCs are found in the bone marrow space (niche) in close proximity to stromal cells and extracellular matrix proteins. True HSC are distinguished by their enormous proliferative potential, quiescence, pluripotency, and limitless capacity for self-renewal.

Types of Hematopoietic stem cell transplantation: Types of HSCT are based on the source of donor cells and the treatment (conditioning) regimen used to prepare the patient for stem cell

infusion and eradicate malignant cells. These include: Allogeneic HSCT (AlloHSCT): From a donor other than the patient; this could be a matched unrelated donor from the National Bone Marrow Registry or Cord Blood Registry, or a linked donor like a family member. Autologous: From the patient. Syngeneic: Derived from an identical twin. Myeloblastic: Consists of administering high-dose chemotherapy and, on occasion, total-body radiation to patients. Nonmyeloblastic Also known as mini-transplants, they do not entirely eradicate bone marrow cells.

Over time, the procedure for acquiring HSCs has changed. In the past, huge volumes of bone marrow tissue were extracted from a donor under general anaesthesia in order to obtain HSCs. However, Peripheral blood stem cells (PBSCs) have supplanted bone marrow (BM) as the primary source of hematopoietic stem cells (HSCs) over the last ten years because of their easier collection, superior capacity for recovery, and increased overall longevity. Patients should ideally obtain PBSCs from a matched blood relative, such as a sibling. But, only one-third of patients have a matched sibling donor since there is only a 25% probability that a sibling will have the same human leukocyte antigen (HLA). An unrelated HLA-matched donor who can be

found through volunteers is the only alternative for other patients.

METHODOLOGY

The study was conducted using a quantitative research approach with a non-experimental descriptive survey design to assess the knowledge, perception, and attitude of nursing students regarding hematopoietic stem cell donation at SGT University, Gurugram, Haryana. A total of 152 nursing students participated in the study, and data were collected using Google Forms, making the process convenient, economical, and accessible to all participants. A socio-demographic questionnaire was used to obtain baseline information such as age, gender, course, and year of study. Knowledge regarding hematopoietic stem cell donation was assessed using a standardized questionnaire developed by Cicek and Dinc (2020). Participants' attitudes toward hematopoietic stem cell donation were measured using a five-point Likert scale, ranging from strongly disagree to strongly agree. The study also assessed the perception of nursing students regarding hematopoietic stem cell donation through structured questionnaire items. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used

to summarize the findings. To determine whether there was a significant association between the level of knowledge and selected demographic variables, the Chi-square test was applied. The Chi-square test is an appropriate statistical method for examining the relationship between categorical variables and helped identify demographic factors significantly associated with students' knowledge regarding hematopoietic stem cell donation.

RESULT

The socio-demographic characteristics of undergraduate nursing students. The mean age of the students was 18.89 ± 0.93 years. The majority (96%) were aged 18 years and above. Most participants were female (70%) and belonged to urban areas (51%). Regarding parental education, 38% of mothers and 48% of fathers had university-level education. Most students (83%) did not attend a session or lecture on stem cell donation, while 90% did not meet someone who needed or received a stem cell transplant. Social media (36%) was the most common source of information.

Table 1: Socio-demographic data of nursing students

n=152

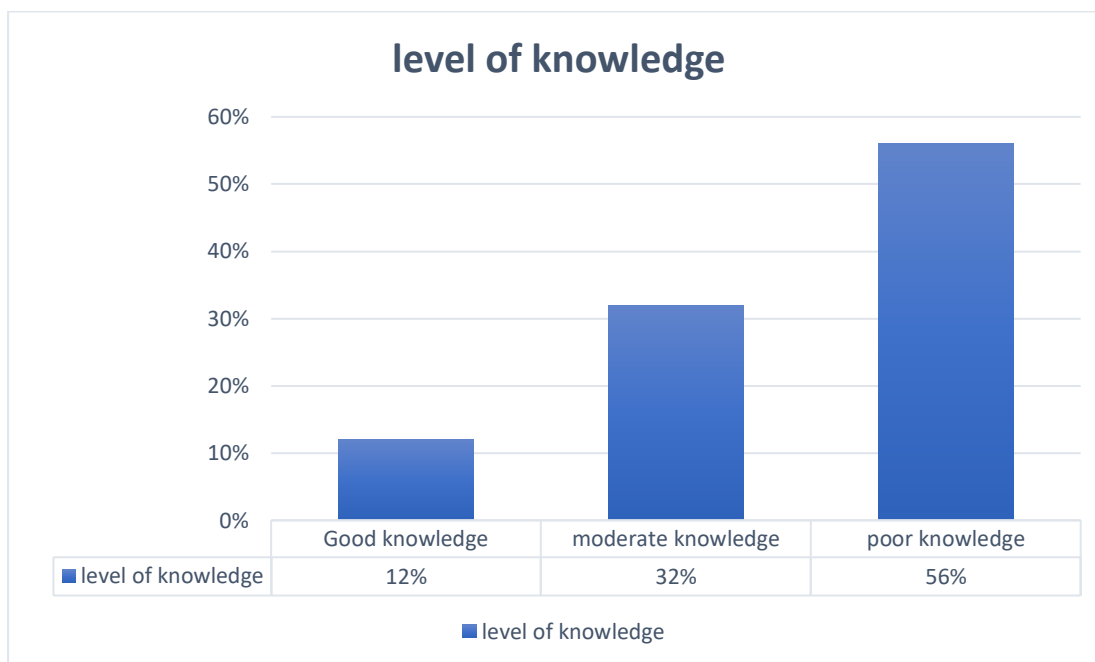
Socio-demographic variables	f	%
Age (in years) Mean $\pm$ SD	18.89 $\pm$ 0.93	
<18	6	4
≥ 18 years	146	96
Gender		
Male	46	30
Female	106	70
Area of Residence		
Rural	53	35
Semi-urban	22	14
Urban	77	51
Mother's education		
Illiterate	11	7
Primary School	12	8
Secondary School	31	20
High School	40	27
University	58	38
Father's education		
Illiterate	2	1
Primary School	8	5
Secondary School	27	18
High School	43	28
University	72	48
Have you ever attended a session/lecture on Stem Cell Donation?		
Yes	26	17
No	126	83
Have you ever met anyone who needed or received a stem cell transplant?		
Yes	15	10
No	137	90
Primary Source of Information about Stem Cell Donation		
Social Media	54	36
Television/News	3	2
Teachers/Faculty	37	24
Friends/Peers	7	5
Health-care Professionals	15	10
Workshops/Seminars	8	5
Other	28	18

f-frequency, %-percentage

Section II: Findings related to the level of knowledge among nursing students

More than half of the nursing students (56%) had poor knowledge regarding hematopoietic stem cell donation and donor

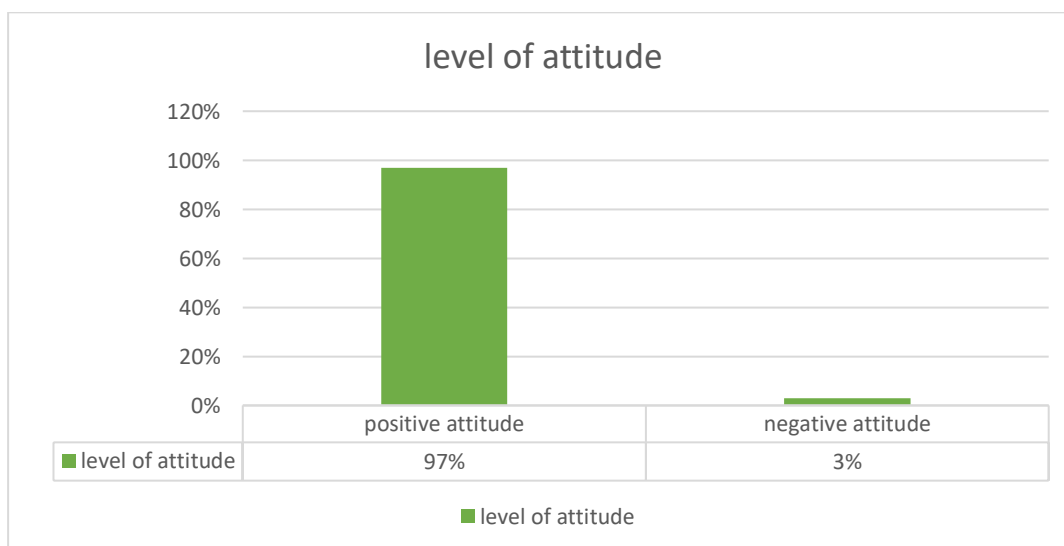
registration. Nearly one-third (32%) had moderate knowledge, while only 12% demonstrated good knowledge.



Section III: Findings related to the level of attitude among nursing students

The majority of undergraduate B.Sc. Nursing 1st year students (97%) had a positive attitude toward hematopoietic stem cell

donation and donor registration, whereas only 3% exhibited a negative attitude.



Section IV: Findings related to the relationship between knowledge and attitude among nursing students.

A moderate positive correlation between knowledge and attitude scores regarding hematopoietic stem cell donation and

donor registration among undergraduate B.Sc. Nursing 1st year students ($r = 0.503$, $p < 0.001$). This indicates that students with higher knowledge scores tended to have a more favourable attitude. The relationship was statistically significant at the 0.05 level.

Table 8: Relationship between knowledge and attitude among nursing students

n = 152

Variables	Mean	SD	Maximum	Minimum	Range	r-value	p-value
Knowledge Score	11.08	7.08	24	0	24	0.503	<0.001
Attitude Score	42.18	5.59	54	34	20		

p-value is significant at < 0.05 level

(Poor knowledge = 0-12, Moderate knowledge = 13-18, Good knowledge = 19-25)

(Negative attitude = 12-35, Positive attitude = 36-60)

Table 9: Association between socio-demographic variables and level of knowledge

Table shows that statistically significant association between knowledge regarding hematopoietic stem cell donation and mother's educational status, attendance at a session/lecture on

hematopoietic stem cell donation, and previous exposure to an individual who required or received a stem cell transplant (p < 0.05). No significant association was observed with the other selected socio-demographic variables.

Variable	Category	Knowledge Score			Chi-square	p-value
		Good	Average	Poor		
Age	<18 years	2	2	2	0.84	0.657
	≥18 years	78	46	22		
Gender	Male	20	16	10	1.96	0.375
	Female	60	32	14		
Area of Residence	Rural	22	20	11	4.82	0.090
	Semi-urban	9	8	5		
	Urban	49	20	8		
Mother's Education	Illiterate	2	4	5	13.24	0.039*
	Primary School	3	5	4		
	Secondary School	14	10	7		
	High School	21	14	5		
	University	40	15	3		
Father's Education	Illiterate	0	1	1	10.11	0.072
	Primary School	2	3	3		
	Secondary School	12	9	6		
	High School	22	14	7		
	University	44	21	7		
Attended Session/Lecture on Hematopoietic Stem Cell Donation	Yes	21	4	1	21.67	<0.001*
	No	59	44	23		
Met Anyone Who Needed/Received Stem Cell Transplant	Yes	12	2	1	9.83	0.007*
	No	68	46	23		
Primary Source of Information	Social Media	26	18	10	12.56	0.051
	Television/News	1	1	1		
	Teachers/Faculty	25	9	3		
	Friends/Peers	3	3	1		
	Health-care Professionals	11	3	1		
	Workshops/Seminars	7	1	0		
	Other	7	13	8		

DISCUSSION

The results of the study showed that while most undergraduate B.Sc. Nursing 1st year students had favourable opinions on hematopoietic stem cell donation and donor registration, their understanding was insufficient.

Over 50% of the participants lacked appropriate understanding about donor registration and stem cell donation. This result is in line with research by Damla Bayrak and Fatima İlkur Çınar (2022), Hazzazi et al. (2019), and Narayanan et al. (2016), which found that health science and medical students had substantial knowledge gaps in donor registration and stem cell donation procedures.

Despite their ignorance, the majority of participants in the current study had positive opinions of stem cell donation.

Almaeen et al. (2021), Woodman et al. (2023), and Ramazan Çiçek and Ayten Dinç (2024) reported similar findings, finding that healthcare students generally felt positively about stem cell donation despite having just an intermediate grasp of it.

This study also discovered a significant positive relationship between attitude and knowledge. Students with greater understanding exhibited more favourable opinions toward donations and donor registration. Our results corroborate those of Alzahrani et al. (2023) and Almaeen et al. (2021), who discovered that favourable attitudes and readiness to donate stem cells were significantly impacted by increased knowledge.

CONCLUSION

The present study concluded that undergraduate B.Sc. Nursing first-year students at SGT University had inadequate knowledge regarding hematopoietic stem cell donation and donor registration, despite demonstrating a highly positive attitude toward the concept. More than half of the participants had poor knowledge, indicating the need for educational interventions to improve awareness and understanding of stem cell donation. The study also found a moderate positive and statistically significant correlation between knowledge and attitude, suggesting that better knowledge is associated with more favourable attitudes toward donation. Furthermore, significant associations were observed between knowledge and selected demographic variables, including mothers' educational status, attendance at educational sessions, and previous exposure to individuals requiring stem cell transplantation. These findings highlight the importance of incorporating structured educational programs, workshops, and awareness campaigns into the nursing curriculum to enhance students' knowledge and encourage future participation in donor registration. Improving nursing students' understanding may ultimately contribute to increased public awareness and a larger pool of potential stem cell donors.

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