STM JOURNALS

International Journal of
Community Health Nursing and Practices

ISSN: 2583-9136
Volume 3, Issue 2, 2025
July–December
DOI (Journal): 10.37591/IJCHNP

https://journals.stmjournals.com/ijchnp

Research IJCHNP

A Study to Assess Effectiveness of Nurse Led Intervention on Knowledge and Attitude Towards Organ Donation Among B.Sc. Nursing 1st Year Students of College of Nursing, PGIMS, Rohtak

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Abstract

Introduction: *Life begins at birth and ends with death. In between, a person goes through various stages, each accompanied by different health challenges. Body donation is a noble act, and Shankaracharya strongly advocated the concept of organ donation, viewing the body as a means to help others. He believed that death is not the end, but rather a new beginning.* ***Aim:*** *To assess knowledge and attitude towards organ donation among B.Sc. Nursing students of PGIMS college, Rohtak.* ***Methods:*** *A pre-experimental, one-group pre-test post-test design using a quantitative approach was adopted for the study. Setting: CON, PGIMS, Rohtak. The study comprised 150 students selected via non-randomized sampling under non-probability convenient sampling. Data collection involved a Self-Structured Questionnaire and an attitude scale, with assessments conducted during the pre-test and followed by the post test. The outcomes were analyzed using both descriptive and inferential statistical methods.* ***Result:*** *The mean post-test scores after the 7th day of teaching for knowledge and attitude were higher {(10.98±2.96 and 22.10±2.91) and (25.35±6.28 and 33.82±4.69) respectively}. The mean differences were 11.01 and 9.75 respectively with calculated t-test values of 33.566 and 13.260 for knowledge and attitude, respectively, with the overall p value 0.000, indicating that the nurse-led intervention significantly enhanced knowledge and attitude regarding organ donation. Term of knowledge score and attitude among B.Sc. 1st year students of the selected college.* ***Conclusion:*** *The study concludes that nurse-led interventions are an effective approach for enhancing knowledge and attitudes toward organ donation among B.Sc. Nursing students, particularly those in their first year. Additionally, demographic variables were considered in relation to the students' perspectives.*

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Received Date: July 27, 2025
Accepted Date: September 12, 2025
Published Date: September 21, 2025

Citation: Durga, Rajpati Amrawat, Kavita Choudhary. A Study to Assess Effectiveness of Nurse Led Intervention on Knowledge and Attitude Towards Organ Donation Among B.Sc. Nursing 1st Year Students of College of Nursing, PGIMS, Rohtak. International Journal of Community Health Nursing and Practices. 2025; 3(2): 10–40p.

Keywords: Assess, knowledge, attitude, organ donation, nurse led intervention, student

INTRODUCTION

What you leave behind is not what is engraved in stones monuments, but what is "woven into the lives of others".

—Pericles

Organ transplantation involves transferring an organ from one body to another or from one part of the patient's own body to another, with the aim of replacing a damaged or missing organ in the recipient. This medical field has advanced

significantly over the years, offering renewed hope to those suffering from end-stage organ diseases. Organ transplantation has saved countless lives around the world. According to the WHO, kidney transplants are performed in 91 countries. In 2005 alone, approximately 66,000 kidney transplants, 21,000 liver transplants, and 6,000 heart transplants were carried out globally. The history of organ donation dates back to as early as the 4th century BC. Ancient Chinese texts mention a surgeon, Tsin Yue-Jen, who is said to have swapped the hearts of two soldiers. Roman Catholic accounts describe 3rd-century saints Damian and Cosmas as performing a leg transplant, replacing the gangrenous leg of Roman deacon Justinian with that of a recently deceased Ethiopian [1, 2].

A living person can donate organs either after natural death or following "brain death". In the case of natural death, only certain tissues, such as the cornea, bones, skin, and blood vessels, can be donated. However, after brain death, up to 37 different organs and tissues, including vital organs like kidneys, heart, liver, and lungs, can be donated. Organ transplantation brings with it several bioethical concerns, including the definition of death, and the timing and process of obtaining consent for organ donation. Other ethical issues that need attention include organ trafficking, illegal organ harvesting, and transplant tourism, which have become more prevalent in economically disadvantaged countries. To regulate organ donation and transplantation activities in India, the government passed the Transplantation of Human Organs Act (THOA) in 1994. This act allows organ donations from both living and deceased individuals who are genetically related [3].

In 2012, the Indian Society of Organ Transplantation launched the Indian Transplant Registry, a web-based platform where institutions conducting organ transplants in India (including kidney, heart, liver, pancreas, and lung transplants) can register. The primary goal of the national transplant registry is to gather data related to transplants from various centers across the country. This data can then be compiled periodically to conduct a national audit, helping to assess both short- and long-term outcomes in the complex field of organ transplantation [4]. In 2008, the Government of Tamil Nadu took a pioneering step by issuing government orders to establish systems and procedures for deceased organ donation and transplantation in the state. Many states are following the suit like DONATE (Delhi organ procurement network and transplant education) in Delhi, Jeevan dan program in Andhra Pradesh, Mirtha Sanjivani in Kerala government and so on [5]. The shortage of organs is virtually a universal problem. In certain countries, the establishment of deceased organ donation programs is hindered by socio-cultural, legal, and other factors. Even in developed nations, where deceased organ donation rates are generally higher, the supply of organs from this source still falls short of meeting the growing demand. While live donors are also used for kidney and liver transplants, the buying and selling of organs from live donors is banned in many countries [6].

In recent decades, the field of organ transplantation has experienced remarkable growth. Advances in transplantation science have significantly improved the lives of many individuals suffering from end-stage organ failure, as it has become the standard treatment for certain such conditions. While solid organ transplant programs have been expanding, they still fall short of meeting global demand, with significant variations between countries. Organ transplantation is a critical component of a developed and well-established healthcare system. The first organ transplant was conducted in 1954, marking the beginning of the transition from experimental procedures to established practices for treating certain end-stage organ failures. Despite widespread awareness and frequent practice of blood donation, organ donation has yet to reach similar levels of recognition and adoption [7].

Organ donation stands as one of the greatest achievements in modern science and offers a new source of hope for many. However, it has not yet gained widespread popularity in India. A lack of awareness and education are primary factors contributing to the scarcity of organs in the country. Today, social media and various platforms can be leveraged to promote the benefits of organ donation, emphasizing how it can save countless lives. The State Organ and Tissue Transplant Organization (SOTTO), the central agency overseeing cadaveric organ donations, reported 70 such donations in 2021. Organ donation after brain stem death remains rare in India, with the country's cadaver organ donation rate at

just 0.08 per million people. In contrast, Spain has the highest rate at 35 per million. According to the WHO, only about 0.01% of people in India donate their organs after death, whereas in Western countries, 70–80% of individuals pledge to donate their organs. According to the NOTTO 2020 report, India recorded the donation of 5,486 kidneys, 1,780 livers, 89 hearts, 67 lungs, 14 pancreases, and 7 small bowels. In comparison, the HRSA (Human Resources and Services Administration) reported over 40,000 transplants in the US in 2021, with one new person being added to the transplant waiting list every 9 min [8].

Organ donation and transplantation hold significant importance in the medical field, but they present numerous sociocultural, legal, and ethical challenges across different societies. The process of organ donation, as a social action, is influenced by various factors, including sociocultural elements. Understanding these factors and the barriers to organ donation is essential to addressing the ongoing shortage of transplant organs. The issue of organ transplantation is complex due to the range of social influences at play. Key factors include religion, culture, community traditions, legal and ethical concerns about removing organs from living individuals, the definition of brain death, and the removal of organs from deceased bodies. Family consent is one of the most critical factors in organ donation, particularly in countries like Iran, where consent from the family of a brain-dead patient is required. Deciding whether to approve organ donation can be a complicated and emotional decision for family members. In fact, one of the main obstacles to organ donation from brain-dead patients is family refusal to give consent. Obtaining approval from the family is the first and most crucial step in the organ donation process. Several factors can influence family members' decisions regarding organ donation [9, 10].

There is a lack of research examining the factors that influence family members' decisions about organ donation from brain-dead patients in Iran. In addition to previous studies, this research explores the experiences and attitudes of both the families of brain-dead patients and healthcare team members. This qualitative study aims to investigate the various factors affecting family members' decisions to donate the organs of brain-dead patients [11].

Organ donation is a vital component of healthcare, capable of saving many lives and significantly improving the quality of life for individuals suffering from organ failure. However, despite the urgent need for organ donors, there remains a global shortage of available organs for transplantation. This shortage can be attributed in part to misconceptions, lack of awareness, and cultural beliefs surrounding organ donation. In many societies, including the one in Rohtak, India, where the College of Nursing PGIMS is situated, there are prevalent myths and misunderstandings regarding organ donation among the general population. Nurses, being at the forefront of healthcare delivery, play a pivotal role in educating and influencing individuals' attitudes and knowledge about organ donation. Recognizing the importance of addressing this issue, this study aims to assess the impact of a nurse-led intervention on the knowledge and attitude towards organ donation among first-year B.Sc. Nursing students at the College of Nursing PGIMS, Rohtak [12, 13].

By targeting nursing students, who represent the future healthcare workforce, this study seeks to not only enhance their understanding and perception of organ donation but also to equip them with the necessary knowledge and skills to advocate for organ donation within their communities and among their future patients. The findings of this study are expected to provide valuable insights into the effectiveness of nurse-led interventions in promoting organ donation awareness and fostering positive attitudes towards organ donation among nursing students. Furthermore, it can inform the development of educational programs and interventions aimed at healthcare professionals to address the persistent challenges surrounding organ donation and transplantation. Ultimately, the goal is to contribute towards increasing the pool of organ donors and saving lives through transplantation [14].

NEED FOR THE STUDY

"Don't take your organs to heaven for God known's they are needed here; you have the power to donate life"

Organ transplantation is one of the most remarkable achievements in modern medicine. Advances in medical technology have significantly improved the success rate of transplants, leading to a rise in the number of procedures performed. However, the demand for transplantable organs still far outweighs the supply. Several factors contribute to this shortage, with one of the most common being a lack of awareness among people about the importance of organ donation. Additionally, misconceptions and false beliefs surrounding organ donation often deter individuals from donating their organs. Another factor is the insufficient government initiative following the passage of the Organ Transplantation Act, highlighting the urgent need for both public education and government action. The primary reason for the organ shortage remains a lack of proper knowledge about organ donation. India ranks 40th out of 69 countries in terms of the number of transplants per million population, with only three people per million receiving a kidney transplant in cases of renal failure, according to a report by Kidney International, the journal of the International Society of Nephrology. Approximately 3,200 transplants take place annually in India. Sunil Shroff, managing trustee of the Support Group Multi Organ Harvesting Aid Network Foundation in Chennai, estimates that the number of transplants per year ranges from 3,000 to 3,500, with only about 5% of these coming from brain-dead donors. The annual need for transplants is about 150,000, while India sees around 140,000 road accident deaths each year, 67% of which result from severe head injuries.

Education and Training Gap

Nursing students often lack thorough education and training on organ donation and transplantation during their academic programs. As future healthcare professionals, nurses play a key role in promoting organ donation and facilitating the donation process. To address this issue, it is crucial to bridge the gap in their knowledge and attitudes toward organ donation through targeted educational interventions.

OBJECTIVES

- To assess knowledge and attitude towards organ donation among B.Sc. Nursing 1st year students.
- To determine the effectiveness of nurse led intervention on organ donation in terms of knowledge score and attitude among B.Sc. 1st year students of college of nursing Pt. B. D. Sharma, PGIMS, Rohtak.
- To examine the relationship between pretest knowledge scores and selected demographic variables among first-year B.Sc. Nursing students.

OPERATIONAL DEFINITIONS

- *Assessment:* Assessment refers to the process used to identify the level of knowledge and attitude of B.Sc. nursing 1st year students towards selected organ donation using a structured questionnaire and a rating scale on organ donation.
- *Knowledge:* Knowledge refers to measure the depth and range of information and correct responses of B.Sc. nursing 1st year students to the knowledge items listed in the structured questionnaire on organ donation.
- *Attitude:* Refers to the expressed opinion of B.Sc. nursing 1st year students towards organ donation as shown on a rating scale related to organ donation.
- *Organ Donation:* The process or act by which a person donates organ for the improvement in the health status of individual or saving the life of others.
- *College Students:* It refers to those who are studying undergraduate first year B.Sc. Nursing.

Hypothesis

All the hypotheses will be tested at p value at 0.05.

- *H01:* There will be no significant difference between the mean pre-test and post-test knowledge and attitude of 1st year B.Sc. Nursing students regarding organ donation.
- *H1:* There will be a significant difference between the mean pre-test and post-test knowledge and attitude of 1st year B.Sc. Nursing students regarding organ donation.

- *H02:* There will be no significant association between the pretest knowledge and attitude score regarding organ donation with selected demographic variables.
- *H2:* There will be a significant association between the pretest knowledge and attitude score regarding organ donation with selected demographic variables.

Assumptions

Students may have some knowledge about organ donation. Nurse led intervention will help to enhance the knowledge and attitude of students towards organ donation.

Delimitations

- The study was limited to the selected area of CON, PGIMS, Rohtak.
- Sample size was limited to B.Sc. Nursing 1st year students available in the CON, PGIMS, Rohtak.
- The study was delimited to 150 samples.

CONCEPTUAL FRAMEWORK

The conceptual framework refers to the interconnected concepts or abstractions that are organized within a logical structure, based on their relevance to a common theme. This study aims to assess the knowledge and attitudes towards organ donation among nursing students.

The General Systems Theory, introduced by von Bertalanffy in 1968, explains that a system is made up of interrelated components that work together to form a unified whole. Each part of the system is crucial for creating a complete and meaningful entity. Von Bertalanffy defines a system as an organized whole, producing an effect or outcome through the interaction of its interdependent components (Figure 1).

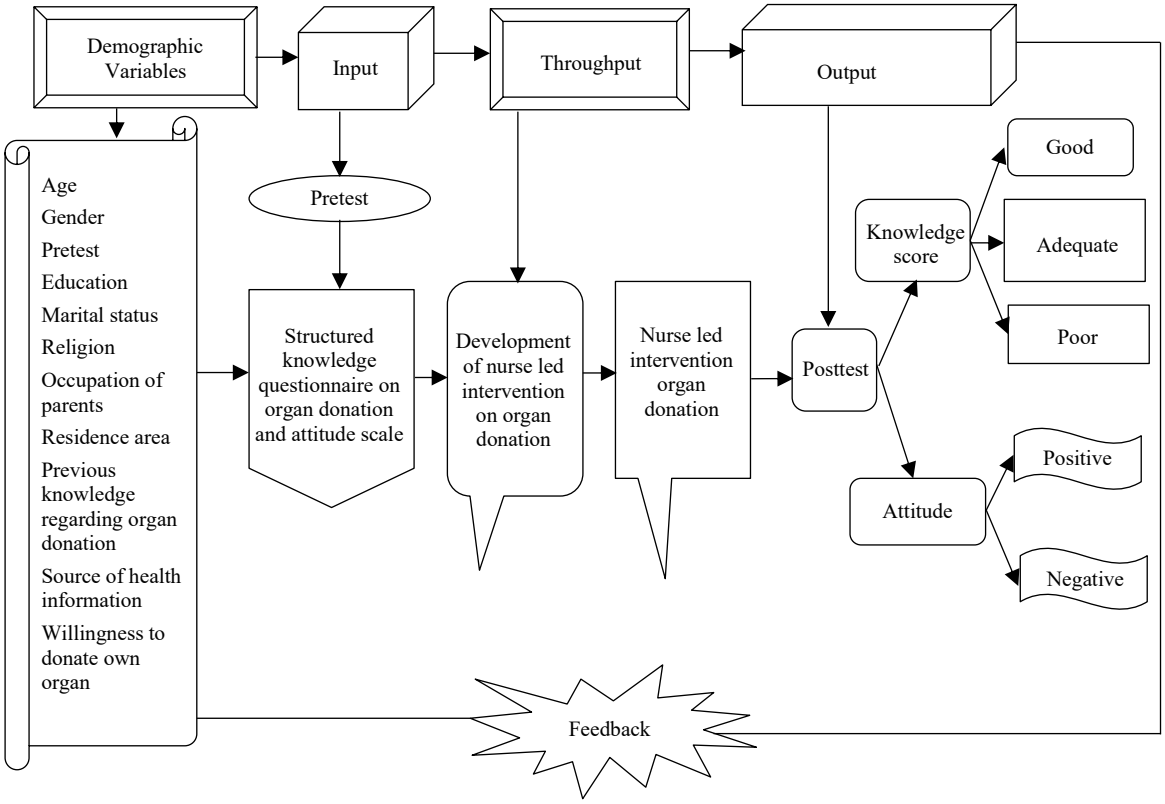

Figure 1. Conceptual framework model based on modified general system theory (Betralanffy & J W Kenny).

Open systems, according to von Bertalanffy, are those in which the parts interact with the environment, leading to the exchange of energy, materials, and information. These systems are characterized by the following components:

- *Input:* The energy or resources entering the system.
- *Throughput:* The process in which the system changes or transforms the input, while recognizing and utilizing different parts of energy.
- *Output:* The energy or products that leave the system, which may include goods, services, or intellectual outputs.
- *Feedback:* The feedback can be measured by output whether they have adequate knowledge and attitude.

REVIEW OF LITERATURE

This study presents a brief report of the related review. The review helps the investigator to develop a deeper insight in to the problem and gain information on what has been done. The study evaluated the knowledge, attitudes, and practices regarding deceased organ donation among 400 medical students in India using a mixed-methods approach. The results showed a high level of awareness about organ donation (90%), but a significantly lower understanding of brain death (27.5%). While most students had a positive outlook on organ donation, only 11% were registered donors, and just 10% had discussed organ donation with their families. Factors that were linked to a greater willingness to donate included being in the third or fourth year of study, growing up in an urban area, having good knowledge, and maintaining positive attitudes. Qualitative findings revealed barriers such as misconceptions about brain death, religious beliefs, lack of firm conviction, and family opposition. Based on these findings, the study suggests incorporating ethical issues into academic curricula, running public awareness campaigns, simplifying the donor registration process, and encouraging family conversations to empower students to become advocates for organ donation in India.

In a related study by Tuncer and Gurses, the knowledge and attitudes of physiotherapy students regarding organ donation and transplantation were assessed. A total of 161 students participated, and their knowledge was evaluated using the 'Organ-Tissue Donation and Transplantation Knowledge Scale'. Results showed good knowledge scores (mean 13.04±2.51). Attitudes were measured using the 'Organ Donation Attitude Scale', with high scores observed for 'humanity and moral conviction' (99.26±13.44), 'fear of medical neglect' (22.29±7.98), and 'fear of bodily mutilation' (29.34±9.65). Most students (90.1%) knew the definition of brain death. The study highlights the crucial role of healthcare professionals, such as physiotherapists, in educating both patients and their families about organ donation. It suggests implementing structured educational programs to enhance physiotherapists' role in promoting public awareness and positive attitudes towards organ donation [15].

The study by Sayin *et al*. aimed to evaluate the knowledge and attitudes of intensive care nurses towards organ donation. A total of 311 nurses took part in the cross-sectional study. Results showed that the majority of the nurses were young, had positive attitudes towards organ donation, and had good knowledge levels. However, most did not possess organ donor cards (98.4%). Factors such as age, gender, education level, type of hospital, and department of work were found to influence attitudes towards organ donation. Nurses with higher education had better knowledge scores. The study found an inverse relationship between negative and positive attitudes towards organ donation. It emphasizes the need for ongoing training for nurses to enhance and sustain their knowledge and attitudes about organ donation. Additionally, the study by Gao *et al*. aimed to evaluate the knowledge, attitudes, and willingness to donate organs among healthcare workers in the intensive care unit (ICU), while also identifying factors that could help address the imbalance between organ supply and demand. 150 ICU healthcare workers from three level 3A hospitals in Huzhou City, Zhejiang Province, China, participated in the cross-sectional study. Results showed moderate knowledge scores (median 7 out of 10) and positive attitudes towards organ donation (mean score 3.87 out of 7). Although ICU healthcare workers demonstrated moderate knowledge and generally positive attitudes toward organ donation,

their willingness to donate remained relatively low, with a median score of 2 out of 5. A multiple linear regression analysis identified several significant factors influencing their knowledge, attitudes, and willingness to donate, including professional title, prior experience persuading others about organ donation, and marital status. These findings suggest the need for targeted strategies by relevant authorities to enhance donation willingness among this group [16, 17].

The scoping review by Saleh *et al*. aimed to summarize organ donation-related articles among the Malaysian public, health sciences students, and health personnel, as well as to analyze knowledge and attitudes towards organ donation in Malaysia. A search of databases such as PubMed, Scopus, Google Scholar, and MyMedR resulted in the identification of 31 relevant articles up to May 2022. The findings indicated a rise in public awareness regarding organ donation. However, issues like non-recognition of brainstem death, lack of knowledge about contacting the Organ Transplant Coordinator, and reluctance to approach potential donor families were identified, leading to healthcare practitioners' lack of confidence in promoting organ donation. The shortage of organ donors in Malaysia is attributed to the passivity of healthcare professionals in promoting the organ donation process [18].

The study by Videira *et al*. evaluated the attitudes and knowledge of 1113 individuals over 18 years old in Vassouras, Rio de Janeiro, Brazil, regarding organ donation. Results showed that 86.78% knew about brain death, with kidneys, heart, liver, cornea, and bone marrow being the most cited organs for potential donation. Knowledge about organ donation was mainly acquired through the internet, and 93.62% knew about living organ donation. However, only 35.30% of participants identified themselves as organ donors, and 45.10% had informed their families about their decision. The study emphasizes the need for educational campaigns to boost organ donation rates [19].

The aim of the study by Bas-Sarmiento *et al*. was to design and assess an educational program for undergraduate students to improve their knowledge, attitudes, and behaviors concerning organ and tissue donation and transplantation (OTDT). The randomized controlled trial involved an experimental group (EG) that received theory lessons and roundtable discussions, a control group (CG) that only attended theory sessions, and a delayed experimental group. Results showed significant improvements in knowledge, attitudes, and behaviors in both experimental groups compared to the control group, particularly in perceived quality of information, level of knowledge, attitude, and behavior towards OTDT. The educational program was effective in promoting knowledge, attitude change, and willingness to donate organs and tissues among undergraduate students, facilitating conversations with families, and potentially increasing the pool of organ donors [20].

The study by Al Wahaibi and Al Wahaibi sought to evaluate the knowledge and attitudes of university students regarding organ donation and transplantation across various colleges. Conducted as a cross-sectional study between August 2021 and February 2022, it involved 2,125 students. The findings revealed that only 34.1% of participants had a solid understanding of organ donation, while 70.2% demonstrated negative attitudes. Furthermore, only 7.53% were well-informed about brain death. The primary motivation for supporting organ donation was the desire to save lives (76.8%), while lack of awareness was the main reason for refusal. Only 25.66% of students held positive attitudes, especially among those with insufficient knowledge. Online platforms and social media were the main sources of information. The study underscores the need for awareness campaigns, events, and the inclusion of organ donation topics in university curricula to improve students' knowledge and attitudes [21].

The integrative literature review by Araujo and Siqueira analyzed the impact of educational initiatives (EIs) on healthcare professionals' knowledge and attitudes towards organ donation and transplantation (ODT) and the associated risks. A total of 21 studies were included, drawn from eight databases. The educational formats varied, including seminars, workshops, and both online and in-person training sessions. Overall, EIs were found to positively influence healthcare professionals' knowledge and attitudes toward ODT, with most studies showing statistically significant improvements. However, the

review noted a lack of research on the transplantation phase itself and identified gaps in knowledge and methodological limitations in the current literature [22].

The study by Abu Alhommos *et al*. aimed to assess public knowledge and attitudes toward organ donation in Saudi Arabia through an online cross-sectional survey conducted in January 2022. Of the 1208 participants, 63% expressed willingness to donate organs for family members, with kidneys being the most commonly cited organ for donation (48%). Most participants indicated a willingness to donate organs to save lives (93%). Knowledge about organ donation was mild to moderate, with younger participants and those in the healthcare sector showing higher levels of knowledge. Similarly, attitudes toward organ donation were mild, with participants aged 31 to 40 years exhibiting more positive attitudes. The study suggests the need for awareness campaigns targeting the elderly population to enhance their understanding and support for organ donation [23].

The online cross-sectional survey, conducted in Saudi Arabia between July and September 2022 by Alghamdi *et al.*, aimed to evaluate the awareness, attitudes, and beliefs surrounding organ donation among the Saudi population. A total of 3,507 individuals participated, with 68.1% of them aged between 18 and 30 years. The findings revealed that 24% were aware of the legislative body overseeing organ donation, 58.5% believed that organ donation should be encouraged, and 66.1% held a positive attitude toward organ donation. However, factors such as being aged 31–50 years, male gender, unemployment or working in a government job, and marital status were linked to a reduced likelihood of having a positive attitude toward organ donation. Despite the generally favorable beliefs and attitudes about organ donation, the level of awareness was insufficient. The study suggests that bridging these knowledge gaps through social media and mass media campaigns is essential to boost organ donation [24].

The study by Tsun-Wai *et al.* sought to explore the knowledge, attitudes, and behaviors regarding organ donation among medical students in Hong Kong using a cross-sectional design, with 377 participants. The results revealed that while 99.5% of students held a positive attitude toward organ donation, only 28.1% had registered as organ donors. Factors influencing knowledge included beliefs about the preservation of the body after death and the confidence to discuss organ donation. Key factors that predicted organ donor registration included knowledge of organ donation, perceived ease of registration, commitment to donation, and exposure to organ donation topics. The study concluded that there is a positive relationship between knowledge of organ donation and the actions of registering as a donor, emphasizing the importance of addressing specific beliefs and enhancing students' confidence in discussing organ donation in medical education to potentially increase donor registration rates [25].

A cross-sectional online survey was conducted by Narayanan *et al*. among medical, nursing, and allied health science students in Coimbatore, Tamil Nadu, during the summer of 2021. Statistical analysis was carried out using IBM SPSS version 27. The results showed high awareness levels, with 83.1% expressing interest in organ donation, but 37.4% were unsure about pledging. Concerns raised included misuse of organs, legal complexities, family or social objections, and religious beliefs. Although awareness was high, actual organ donation rates remained low due to these factors. The study emphasized that health science graduates, if properly empowered, could play a significant role in promoting organ donation [26].

This cross-sectional study aimed to assess the knowledge and attitudes of 1,078 undergraduate students at Golestan University of Medical Sciences, Gorgan, Iran, regarding organ donation and transplantation. The data were collected using a questionnaire to measure the students' knowledge and attitudes. The results indicated that the mean knowledge score was 8.48±1.71, and the mean attitude score was 48.55±8.11, highlighting an overall moderate level of knowledge and attitude toward organ donation among the students. Female, married students, and those with an organ donation card had significantly higher knowledge scores. Nearly all students had heard about organ donation and transplantation, with television programs being the main source of information. Although most students

expressed willingness to donate their organs, only a small percentage knew how to obtain an organ donation card, and few were registered donors.

The study by Kolagari *et al*. highlights the need for increased awareness and promotion of organ donation among college students and the general public, especially through social media campaigns [27].

The goal of the study by Molina-Pérez *et al*. was to evaluate public awareness and perspectives on the family's involvement in deceased organ donation across Europe. A thorough search of six databases identified 33 relevant studies from 2008 to 2017. The results indicate that, in cases where the deceased has not specified their wishes, most of the public favor the family taking on the role of a surrogate decision-maker. However, responses vary depending on factors such as the deceased's expressed consent, respondents' own donor status, and familial relationships and cultural backgrounds. Further research is needed to understand public views on family authority in organ donation decision-making, and a standardized framework and validated questionnaires are recommended for future studies. These findings should guide government policies and recommendations regarding the involvement of families in deceased organ donation [28].

The systematic review by Reena *et al*. aimed to assess the current knowledge and attitude of nurses regarding organ donation, as well as the effectiveness of intervention programs in improving their knowledge and attitude. Articles were retrieved from the MEDLINE database using relevant MeSH terms. Descriptive analysis of the data revealed that nurses' knowledge and attitude towards organ donation are often inadequate, although some studies found satisfactory levels of knowledge influenced by factors like age and experience. Intervention programs, such as workshops and peer education, were found to significantly improve nurses' knowledge. Overall, the review highlights the importance of interventions in enhancing nurses' knowledge and attitude towards organ donation [29].

The survey by Robert *et al*. aimed to assess the knowledge and attitude of undergraduate medical students from Montreal, Laval, and Sherbrooke universities regarding organ donation (OD). A total of 22% of students completed the survey. While 91% correctly understood that neurological death is irreversible, only 76% recognized that neurological death can occur while the heart is still beating, and 69% were unaware of circulatory determination of death. Senior students generally demonstrated better knowledge than junior students in one aspect. The overall knowledge score was linked to exposure to organ donation (OD) during medical studies and confidence in answering patients' questions about OD. Despite a positive attitude, with 96% of participants willing to become organ donors after death and 92% supporting OD education in medical training, the study emphasizes the need for a formal OD curriculum, as reflected in the students' expressed interest [30].

The study by Kapikiran *et al*. examined the awareness and perspectives on organ donation among patients who have undergone liver transplants. Conducted at organ transplantation clinics, data were collected from 129 participants through in-person interviews. Findings revealed that 83% of patients received organs from live donors, 36% underwent liver transplants within the past year, over 70% agreed to donate their organs, and 80% believed awareness about organ donation should be raised in society. Despite being organ donation recipients, participants expressed a need for more information on the topic. The study emphasizes the importance of nurses and nurse managers understanding the knowledge and attitudes of organ donation patients, aiming to enhance their awareness and behavior regarding organ donation [31].

The study by Abdulrazeq *et al*. aimed to assess public attitudes and knowledge about deceased organ donation (DOD) in Jordan, with the goal of increasing donor rates. A mixed qualitative and quantitative approach was employed, involving one-on-one interviews followed by a survey administered to randomly-selected individuals. Among the 500 completed surveys (78.4% response rate), only 15.6% were aware of the option to donate organs after death, and 9.8% were registered as donors. The main

sources of information were the internet (52.2%) and social media (51.0%). Knowledge scores averaged 68.8%, with persistent misconceptions about body disfigurement and brain-death diagnosis. Attitude scores averaged 65.8%, with positive views on public awareness campaigns and regulatory legislation. Female respondents exhibited significantly higher scores on organ donation significance and overall attitude. These findings highlight knowledge gaps and misconceptions but suggest potential receptivity to educational campaigns and regulatory measures [32].

The study by Naveena and Margaret used an evaluative research design with a pre-experimental single-group pre-test and post-test approach. The study sample consisted of fourth-year B.Sc. nursing students from NDRK College of Nursing in Hassan, Karnataka, selected through simple random sampling. A structured questionnaire was used for data collection. The results revealed that the mean post-test knowledge score (88.7%) was significantly higher than the mean pre-test score (48.2%), with a paired "t" value of 35.72 at P=0.001, indicating statistical significance. The study concluded that the structured teaching program (STP) on organ donation was an effective approach for enhancing knowledge from moderate to adequate levels and improving attitudes from unfavorable to favorable final year B.Sc. nursing students to enhance their knowledge and promote the positive attitude for the noblest organ donation [33].

Jothula and Sreeharshika conducted a cross-sectional descriptive study carried out to assess attitudes, knowledge, and willingness to donate organs among Indian nursing students. Using self-reported questionnaires. All the participants were aware of organ donation. The majority (n=251, 94%) of them were unaware of organ donation law. The result of the study findings suggests the need for revising the nursing curricula to prepare the future nurses to become competent in encountering the related issues [34].

The systematic review by Jawoniyi *et al*. aimed to examine the role of healthcare professionals in the organ donation and transplantation process. 13 publications were included, revealing that the global organ shortage cannot be solely attributed to healthcare professionals. Instead, various factors contribute to the imbalance between organ donation and transplantation. These include healthcare professionals' attitudes, experiences, education, clinical specialties, and the legal frameworks governing organ donation. Addressing these factors requires sufficient voluntary organ donations to meet transplantation needs globally [35].

Adithyan *et al.* conducted a cross-sectional study among 160 interns with a pre-tested, semi structured questionnaire in order to assess their knowledge, attitude and practice regarding organ donation. Data collected was analyzed using SPSS software. The mean age of the Interns was 23.03±0.73 and majority were females (70%). 79.4% of were having adequate knowledge and majority (77.5%) were willing for organ donation. Only 5.6% had donor card. Though most of the interns had adequate knowledge, still gaps exist in their knowledge. Providing right knowledge and orientation can encourage individuals to become future organ donors [36].

Poreddi *et al.* conducted a cross-sectional study to assess the knowledge of medical students regarding organ donation at Government Medical College, Trivandrum, and Kerala, India. Self-administered questionnaire was completed by 194 final-year MBBS students. The convenient sampling technique was used in this study. The questionnaire had three sections to collect information of socio demographic details of the students, regarding knowledge on organ donation, the findings of the study showed that a majority of the students had adequate knowledge about organ donation, but it was not translated into their willingness for donation, both cadaveric and live. The study reiterates the need for educational interventions for medical students, who can then easily motivate their patients [37].

Chakradhar *et al.* conducted a cross-sectional study performed on 450 healthcare personnel; self-administered questionnaires were used to derive data from individuals. A slight majority of individuals (51.66%; n=187) were unwilling to donate their organs, while 48.34% (n=175) expressed willingness.

These findings highlight the need for enhanced educational programs to improve knowledge about organ transplantation and donation [38].

RESEARCH METHODOLOGY

Research methodology is the systemic way of doing research to solve a problem. This study deals with the methodology selected by the investigator to assess knowledge and attitude of nursing students regarding organ donation (Figure 2).

- *Research Approach:* Quantitative research.
- *Research Design:* Pre-experimental research design (pre-test and post-test one group only).
- *Setting of the Study:* College of Nursing, PGIMS, Rohtak.
- *Population:* B.Sc. Nursing 1st year students.
- *Sampling Technique:* Non-probability convenient sampling technique.
- *Sample Size:* 50.
- *Data Collection Tool:* Self structured knowledge questionnaires and 5-points attitude scale.
- *Data analysis:* Descriptive and inferential statistics.

Research Variables

- *Independent Variable:* Nurse Led Intervention.
- *Dependent Variable:* Knowledge score and attitude score of students.
- *Demographic Variable:* Age, Gender, Educational status, Marital status, Religion, Occupation of parents, Residential area, Do you know about organ donation, Sources of information, willing to donate organ.

Sampling Criteria

Inclusion Criteria

- B.Sc. Nursing 1st year students, College of Nursing of PGIMS, Rohtak.

Exclusion Criteria

- Students who were not willing to participate.
- Those who were not present on that day.

Data Collection Tool and Techniques

- *Section-1:* Socio-demographic data.
- *Section-2:* Self structured Questionnaire of assess the knowledge of students.
- *Section-3:* 5-points attitude scale to assess the attitude of students toward organ donation.

Section-1: Socio Demographic Data

This section consists of items pertinent to the patients regarding Age, Gender, Educational status, Marital status, Religion, Occupation of parents, Residential area, previous knowledge about organ donation, Sources of information, and willing to donate organ.

Section-2: Self Structured Knowledge Questionnaire Regarding Organ Donation

This section consisted of 30 items regarding organ donation. The items were developed to cover the whole concept of organ donation. The tool possible score was 30 with, one correct answers or response, score one is given. The respondent was requested to tick (√) marks against the correct response in box.

Section-3: 5 points Attitude Scale to Know the Attitude of Students Toward Organ Donation

This section consisted of 10 items regarding organ. It consists of the attitude scale containing 50 points with answering positive/negative with remarks prepared to assess the attitude of students regarding organ donate on. Minimum mark: 10 marks, and Maximum mark: 50 marks. The respondent was requested to tick (√) marks against the correct response in box.

Nurse Led Intervention

Nurse led intervention program for students regarding of organ donation was prepared and implemented.

Validation of the Tool

The tool is validated by research committee, college of nursing, Pt. B. D. Sharma, PGIMS Rohtak. The experts in addition to judging each item were also requested to identify any concept that has been missed from the tool. The clarity, relevance and appropriateness were judged by experts and the suggested amendments were done in the tool by the researcher.

Content Validity

The prepared tool along with the objectives and planned education program was submitted to experts. Corrections and modifications were made on the basis of recommendations and suggestions of experts after consulting the guide and co-guide.

Ethical Clearance

Ethical clearance was obtained from concerned authority of selected area at Rohtak.

Reliability of the Tool

Reliability is the degree of consistency and accuracy with which an instrument measures the attribute for which it is designed to measure. A pre-test was conducted to assess the reliability and language clarity of the tool, using the split-half method to evaluate the feasibility and reliability of the knowledge questionnaire employed in the study.

Pilot Study

- Data collection was done from 5 to 12 January 2024.
- Permission for conducting pilot study was taken from authority of respective college.
- Pilot study was done at BDM, College of Nursing Chhuchhakwas, Jhajjar.
- Purpose of the study was to assess the knowledge and attitude regarding organ donation among B.Sc. nursing 1st year students.
- Verbal consent was taken from the subject.
- Data was collected by using questionnaire method and attitude scale.
- Data was collected using paper-pencil technique.

Findings of the Pilot Study

- A pilot study was conducted on a sample of 15 first-year B.Sc. Nursing students at the selected BDM College of Nursing to assess their knowledge regarding organ donation.
- In the pre-test using the structured knowledge questionnaire, majority of students (80%) had an average knowledge, 20% had poor knowledge, and no one had good knowledge regarding organ donation.
- Whereas in Post test, majority of students (80%) had good knowledge, 20% had average knowledge, and none of them had Poor knowledge regarding organ donation.
- In Pre-test on attitude, majority of students (53%) have neutral attitude, 27% have negative attitude and 20% have positive attitude regarding organ donation. Whereas in post-test, majority of students (73%) have positive attitude, 27% have neutral attitude, and none of them has negative attitude regarding organ donation.

Procedure For Main Study Data Collection

- Legal administrative permission was obtained from principal, college of nursing Pt. B. D. Sharma, PGIMS, Rohtak.
- The data was collected from 24-01-2024 to 23-02-2024.
- Sample was collected according to the selection criteria.

- Informed written consent was taken from the participants.
- Pre-test was taken by administrating self-structured questionnaires for assessment of the knowledge and 5-point attitude scale for attitude assessment of students regarding organ donation.
- Nurse led intervention program regarding organ was administered to students after pre-test.
- Post-test was taken after 7 days by using same self-structured questionnaires and 5-point attitude scale.

Data Analysis Plan

- Descriptive and inferential statistics was used to analyze the data.
- Frequency and percentage were computed to describe the demographic data.
- Mean, median, standard deviation of observation came by questionnaire of pre-test and post-scores.
- Effectiveness of planned teaching program was analyzed by paired t-test; as well as the association between the knowledge scope with the selected demographic variables.

MATERIALS AND METHODS

Analysis and Interpretation

This section presents the analysis and interpretation of data collection to assess the knowledge and attitude regarding organ among adults. The main aim of the study was to assess effectiveness of nurse led intervention, knowledge and attitude regarding organ donation among student of colleges of B.Sc. Nursing 1st year students, College of nursing, Pt. B D. Sharma PGIMS, Rohtak.

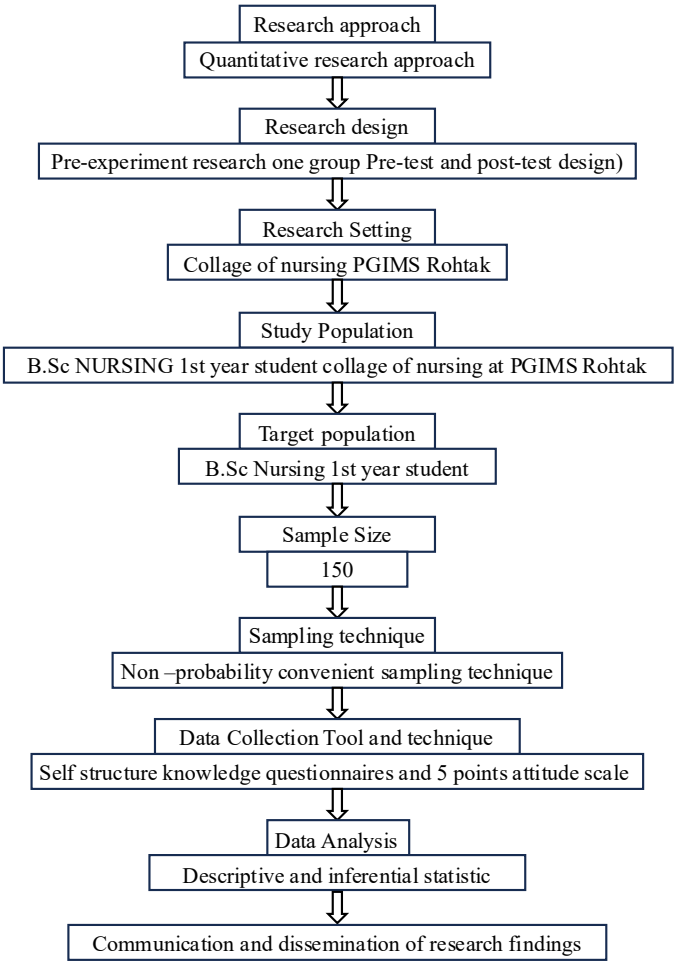

Figure 2. Research methodology.

Table 1. Frequency and percentage distribution of demographic variables of the subjects (N=150).

S.N.	Sample Characteristics	Frequency	Percentage
1.	***Age***		
	17–18 years	26	17%
	19–20 years	106	71%
	Above 21 years	18	12%
2.	***Gender***		
	Male	0	0%
	Female	150	100%
	Other	0	0%
3.	***Education Status***		
	12th	23	16%
	UG	123	82%
	Diploma	2	1%
	Other	2	1%
4.	***Marital Status***		
	Married	2	1%
	Unmarried	148	99%
5.	***Religion***		
	Hindu	147	98%
	Christian	0	0%
	Muslims	3	2%
	Others	0	0%
6.	***Occupation of Parents***		
	Medical profession	15	10%
	Non-medical profession	57	38%
	Other	77	52%
7.	***Residential Area***		
	Urban	55	37%
	Rural	95	63%
	Other	0	0%
8.	***Do you know about organ donation***		
	Yes	150	100%
	No	0	0%
9.	***If Yes, Sources of Information***		
	Media(TV, New paper, computer, phone)	119	79%
	Health professionals	13	9%
	Family members and relatives	16	11%
	Friends and neighbors		1%
10.	***Are you willing to donate organ?***		
	Yes	90	60%
	No	60	40%

Section-A: Frequency and Percentage Distribution of Demographic Variables of the Subjects

Table 1 reveals the data in frequency and percentage distribution of demographic variables of the subjects: majority 106 (71%) of subjects were between the age group of 19–20 years, 26 (17%) of subjects were between the age group of 17–18 years, and 18 (12%) age of subjects were in the age group of above 21 years.

- 150 (100%) all of students were Females.

- Majority (123 (82%)) of participants had UG, 23 (16%) students belong to 12th, 2 (1%) belong to Diploma, and 2 (1%) belong to Other.
- Majority (148 (99%)) of subjects were Unmarried, and the rest 3 (1%) were married.
- Majority (147 (98%)) of participants belonged to Hindus, and the rest 3 (2%) belonged to Muslims.
- Majority (77 (52%)) Parents of participants were from other profession, 57 (38%) subjects were from Non-Medical Profession, and 15 (10%) were from Medical Profession.
- 55 (37%) participants belonged to Urban, 95 (63%) belonged to Rural, and 0 (0%) belong to Other.
- 150 (100%) all students were aware about organ donation.
- Majority (79%) of participants had information from Media (TV, Newspaper, Computer, Phone), 13 (9%) of participants had information from Health professionals, 16 (11%) from Family members and relatives, 2 (1%) of participants had information from Friends and neighbors.
- Majority (90 (60%)) students were willing to donate organs, whereas 60 (40%) students were not willing to donate organs.

Table 2 depicts that majority (106 (71%)) of subjects were between the age group of 19 and 20 years, 26 (17%) of subjects were between the age group 17 and 18 years, 18 (12%) of subjects were in the age group of above 21 years (Figure 3).

Table 3 reveals that 150 (100%) of students were Females (Figure 4).

Table 2. Distributions of demographic variables of the subjects according to age (N=150).

S.N.	Sample Characteristics	Frequency	Percentage
1.	***Age***		
	17–18 years	26	17%
	19–20 years	106	71%
	Above 21 years	18	12%

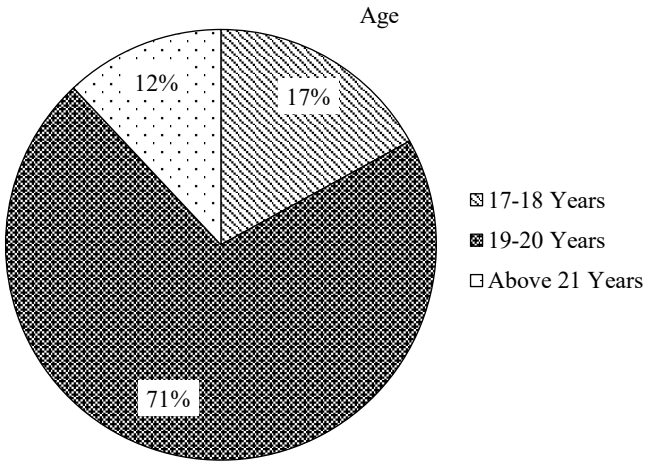

Figure 3. Diagram showing percentage of sample subject according to age.

Table 3. Distribution of demographic variables of the subjects according to gender (N=150).

S.N.	Sample Characteristics	Frequency	Percentage
2.	***Gender***		
	Male	0	0%
	Female	150	100%
	Other	0	0%

Table 4 reveals that majority (123 (82%)) of participants had UG, 23 (16%) students were having 12th, 2 (1%) were having Diploma, and 2 (1%) had other academic education (Figure 5).

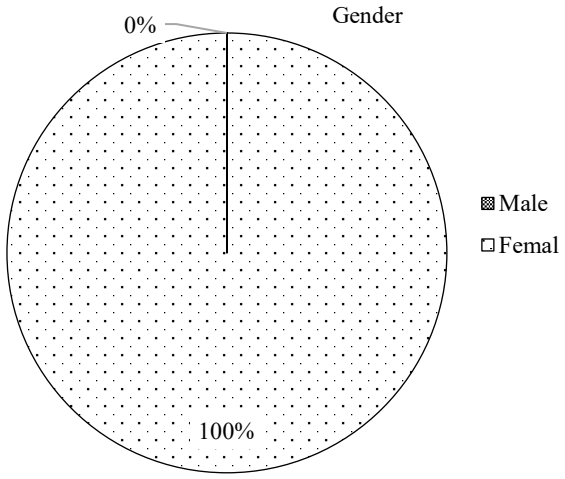

Figure 4. Diagram showing percentage of sample subject according to gender.

Table 4. Distribution of demographic variables of the subjects according to education status (N=150).

S.N.	Sample characteristics	Frequency	Percentage
3.	***Education Status***		
	12th	23	16%
	UG	123	82%
	Diploma	2	1%
	Other	2	1%

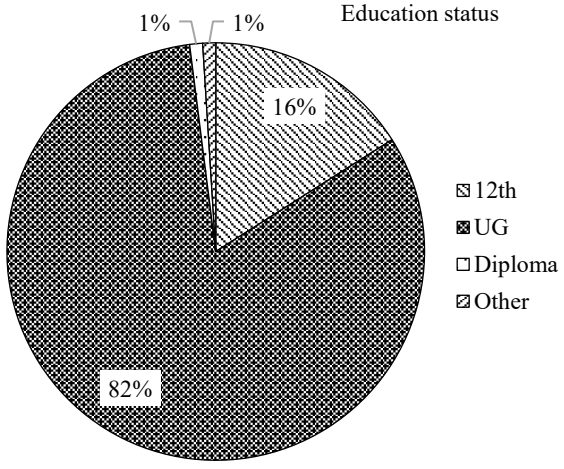

Figure 5. Distribution of demographic variables of the subjects according to education status.

Table 5. Distribution of demographic variables of the subjects according to marital status (N=150).

S.N.	Sample characteristics	Frequency	Percentage
4.	***Marital Status***		
	Married	2	1%
	Unmarried	148	99%

Table 5 and Figure 6 depict that majority (148 (99%)) of subjects were Unmarried, and rest of 3 (1%) were married.

Table 6 and Figure 7 reveal that majority (147 (98%)) of participants were Hindus, and rest of 3 (2%) were Muslims.

Table 7 and Figure 8 reveal that majority (77 (52%)) occupation of parents had Other profession, 57 (38%) occupation of parents had from Non-Medical Profession, and 15 (10%) Occupation for parents had from Medical Profession.

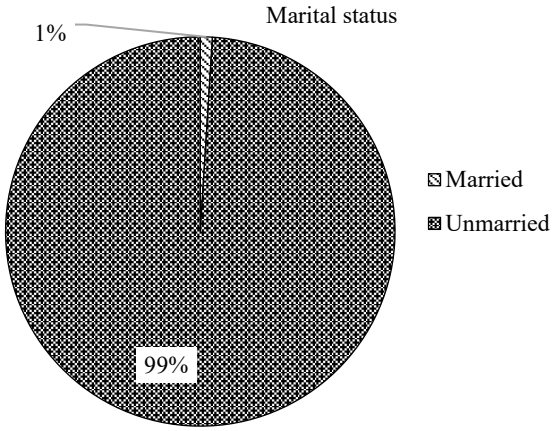

Figure 6. Distribution of demographic variables of the subjects according to marital status.

Table 6. Distribution of demographic variables of the subjects according to religion (N=150).

S.N.	Sample Characteristics	Frequency	Percentage
5.	***Religion***		
	Hindu	147	98%
	Christian	0	0%
	Muslims	3	2%
	Others	0	0%

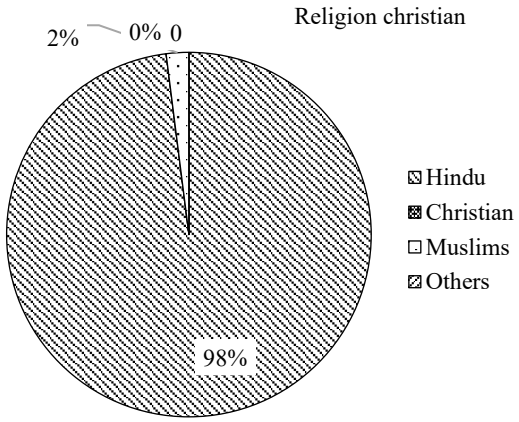

Figure 7. Distribution of demographic variables of the subjects according to religion.

Table 7. Distribution of demographic variables of the subjects according to occupation of parents (N=150).

S.N.	Sample Characteristics	Frequency	Percentage
6.	***Occupation of parents***		
	Medical profession	15	10%
	Non-medical profession	57	38%
	Other	77	52%

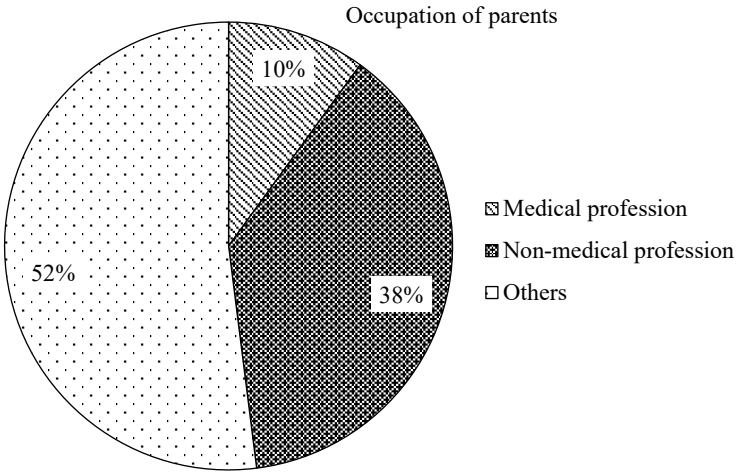

Figure 8. Distribution of demographic variables of the subjects according to occupation of parents.

Table 8. Distribution of demographic variables of the subjects according to residential area (N=150).

S.N.	Sample Characteristics	Frequency	Percentage
7.	***Residential Area***		
	Urban	55	37%
	Rural	95	63%
	Other	0	0%

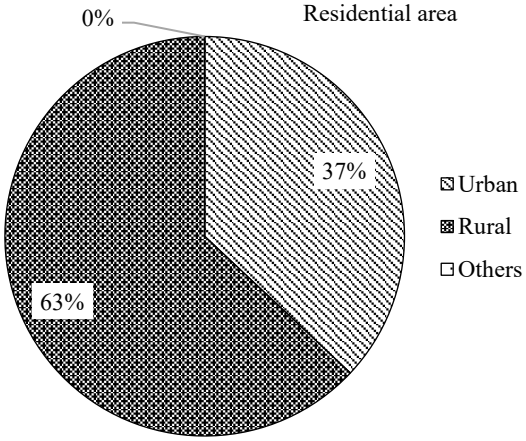

Figure 9. Distribution of demographic variables of the subjects according to residential area.

Table 9. Distribution of demographic variables of the subjects according to knowledge about organ donation (N=150).

S.N.	Sample Characteristics	Frequency	Percentage
8.	***Do You Know About Organ Donation***		
	Yes	150	100%
	No	0	0%

Table 8 and Figure 9 depict that 55 (37%) participants belonged to Urban area, and 95 (63%) belonged to Rural area. Table 9 and Figure 10 depict that 150 (100%), i.e., all participants were aware about organ donation.

Table 10 and Figure 11 depict that majority (79%) of participants had information from Media (TV, Newspaper, Computer, Phone), 13 (9%) of participants had information from Health professionals, 16 (11%) of participants had information from Family members and relatives, and 2 (1%) of participants had information from Friends and neighbors.

Table 11 and Figure 12 depicts that majority (90 (60%)) student samples were willing to donate organs, whereas 60 (40%) students were not willing to donate organs.

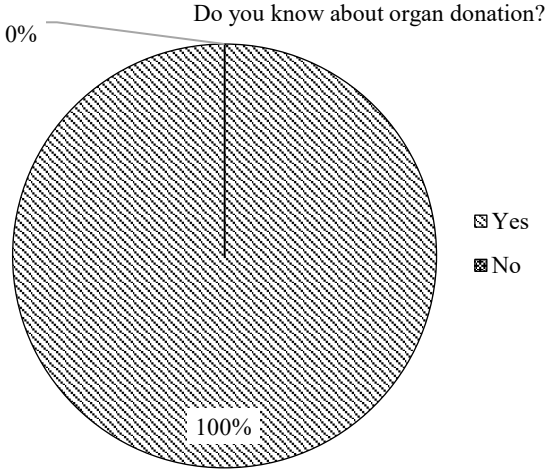

Figure 10. Distribution of demographic variables of the subjects according to previous knowledge about organ donation.

Table 10. Distribution of demographic variables of the subjects according to sources of Information (N=150).

S.N.	Sample characteristics	Frequency	Percentage
9.	***If Yes, Sources of Information***		
	Media (TV, New paper, computer, phone)	119	79%
	Health professionals	13	9%
	Family members and relatives	16	11%
	Friends and neighbors	2	1%

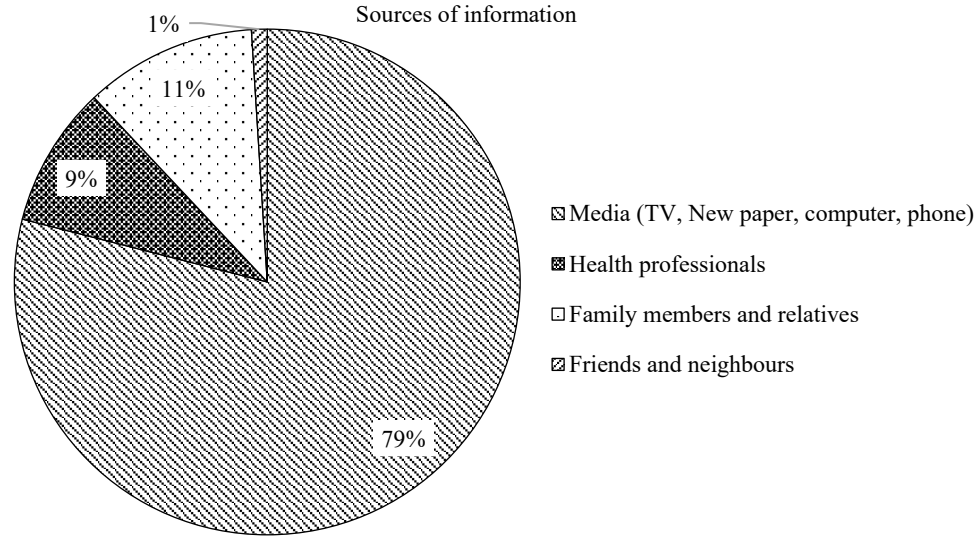

Figure 11. Distribution of demographic variables of the subjects according to sources of information.

Table 11. Distribution of demographic variables of the subjects according to attitude towards donating organ (N=150).

S. N.	Sample characteristics	Frequency	Percentage
10.	***Are you willing to donate organ?***		
	Yes	90	60%
	No	60	40%

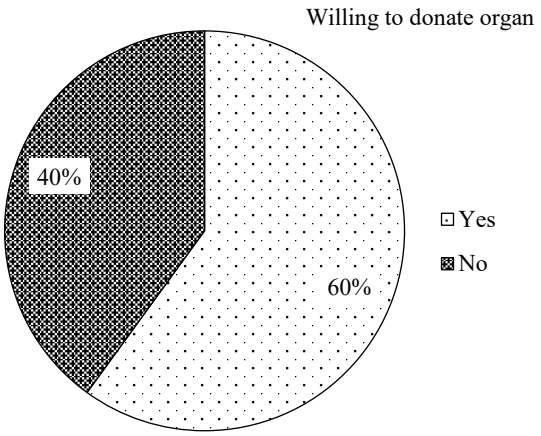

Figure 12. Distribution of demographic variables of the subjects according to attitude towards donating organ.

Section B: Knowledge and Attitude Score of Students Regarding Organ Donation

Table 13 and Figure 14 reveal that 70% subjects had good knowledge, 30% subjects had average knowledge and no one had poor knowledge regarding organ in post-test.

Table 12. Distribution of subjects according to the level of knowledge in pre-test (N=150).

Level of knowledge	Frequency	Percentage (%)
Poor knowledge	63	42%
Average knowledge	86	57%
Good knowledge	1	1%

Table 12 and Figure 13 represent that majority (57%) subjects had average knowledge, 42% subjects had poor knowledge and 1% subjects had good knowledge in pre-test.

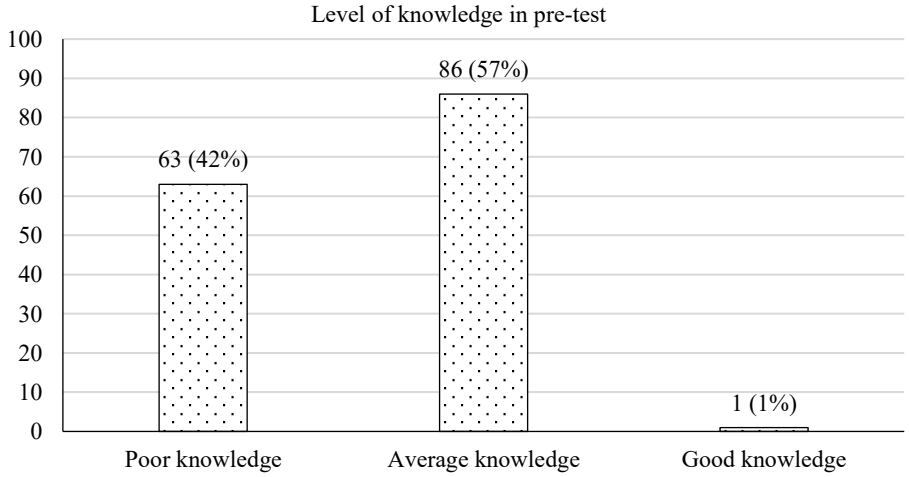

Figure 13. Distribution of the subjects' knowledge score in pre-test.

Table 13 and Figure 14 reveal that 70% subjects had good knowledge, 30% subjects had average knowledge and no one had poor knowledge regarding organ donation in post-test.

Table 14 and Figure 15 reveal that 41% of students had positive attitude and 59% of students had negative attitude towards organ donation.

Table 13. Distribution of subjects according to the level of knowledge in post-test (N=150).

Level of knowledge	Frequency donation	Percentage (%)
Poor knowledge	0	0%
Average knowledge	45	30%
Good knowledge	105	70%

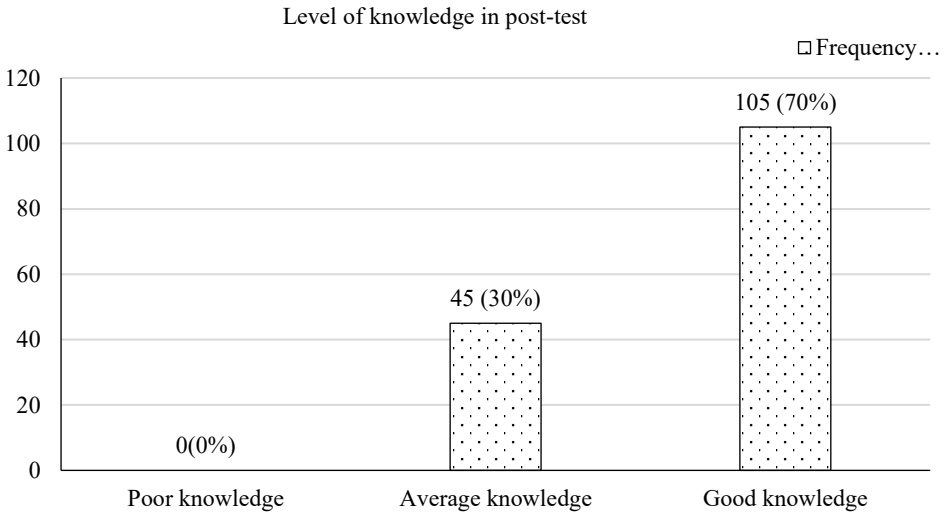

Figure 14. Distribution of the subjects' knowledge score in post-test.

Table 14. Distribution of subjects according to the attitude score in pre-test (N=150).

Level of attitude	Frequency	Percentage (%)
Positive Attitude	61	41%
Negative Attitude	89	59%

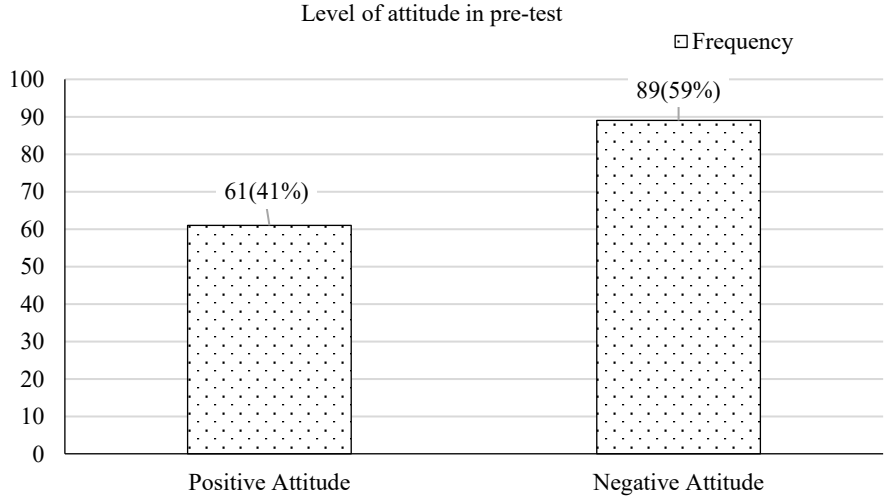

Figure 15. Distribution of the subjects' attitude score in pre-test.

Table 15 and Figure 16 reveal that 88% of students had positive attitude and 12% of students had negative attitude toward organ donation.

Section C. Effectiveness of Nurse Led Intervention in Terms of Knowledge and Attitude Regarding Organ Donation

Table 16 and Figure 17 represent that 57% subjects had average knowledge and 42% subjects had poor knowledge and 1% subjects had good knowledge regarding organ donation in pre-test. After giving the intervention 70% subjects had good knowledge and 30% subjects had average knowledge and none of them subjects had poor knowledge regarding organ donation in Post test.

Table 15. Distribution of subjects according to the attitude score in Post-test (N=150).

Level of attitude in post-test	Frequency	Percentage%
Positive Attitude	132	88%
Negative Attitude	18	12%

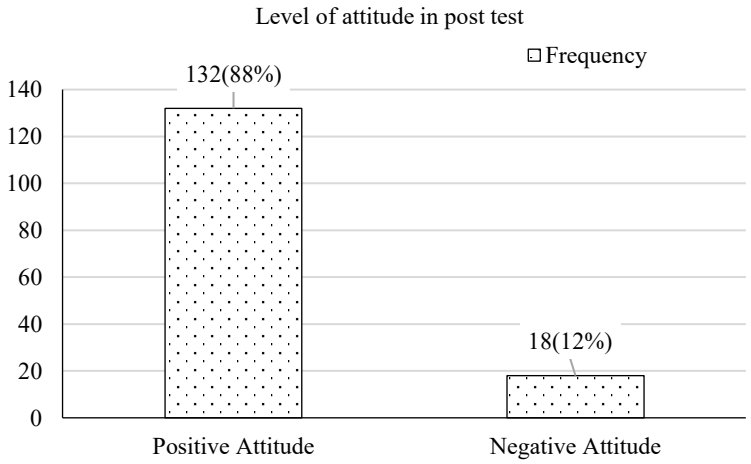

Figure 16. Distribution of subjects according to the attitude score in post-test.

Table 16. Comparison of knowledge level of student before and after nurse led intervention (N=150).

Level of knowledge	Pre-test frequency (%)	Post-test frequency (%)
Poor knowledge	42%	0%
Average knowledge	57%	30%
Good knowledge	1%	70%

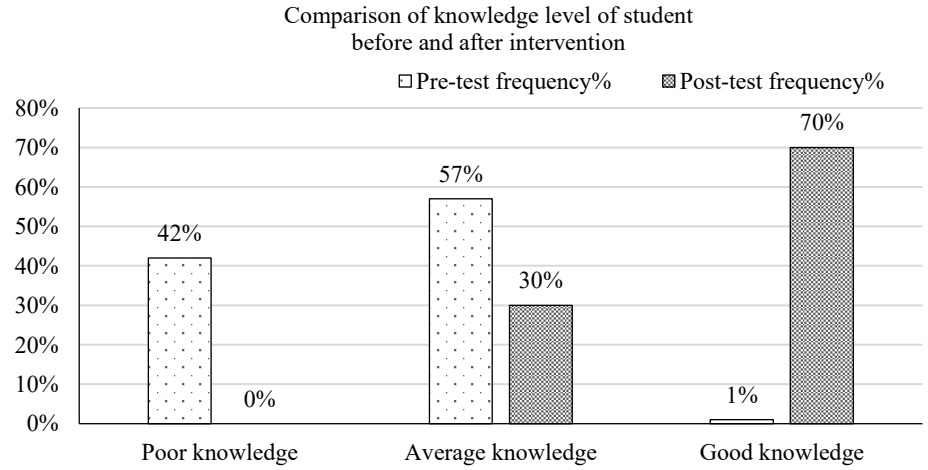

Figure 17. Comparison of knowledge in pre-test and post-test.

Table 17 and Figure 18 represent that 59% had negative attitude and 41% have positive attitude regarding organ donation in pre-test. After giving the intervention, 88% have positive attitude and 12% have negative attitude regarding organ donation in post-test.

Table 18 and Figure 19 reveal that in pre-test, mean of knowledge was 10.98 and standard deviation was 2.96, whereas in post-test, mean of knowledge 22.1 and standard deviation was 2.91. The mean difference between pretest and post-test knowledge score was 11.12. Therefore, a significant difference was observed between the pre-test and post-test knowledge scores of the participants regarding organ donation.

Table 17. Comparison of attitude level of student before and after nurse led intervention (N=150).

Attitude	**Pre-test frequency (%)**	**Post-test frequency (%)**
Positive Attitude	41%	88%
Negative Attitude	59%	12%

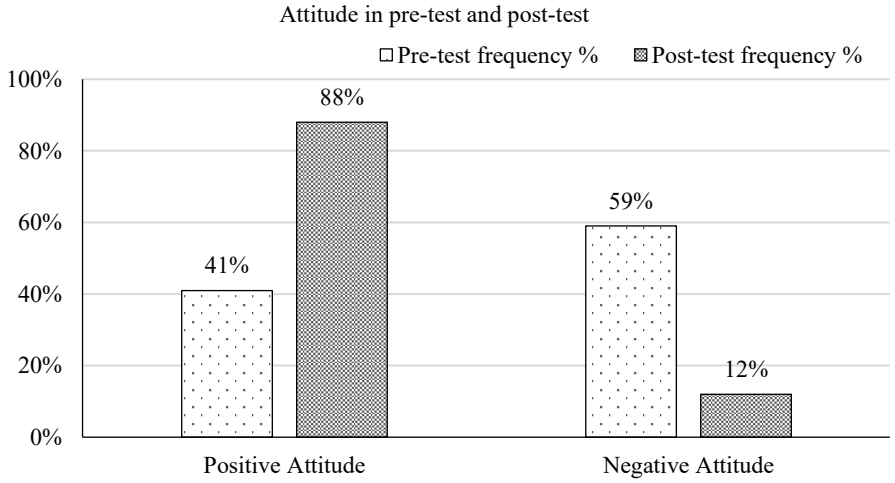

Figure 18. Comparison of attitude in pre-test and post-test.

Table 18. Pre-test and post-test knowledge mean and standard deviation of students regarding organ donation (N=150).

	Pre-test		**Post- test**		**Mean difference**
	Mean	SD	Mean	SD	
Knowledge	10.98	2.96	22.10	2.91	**11.12**

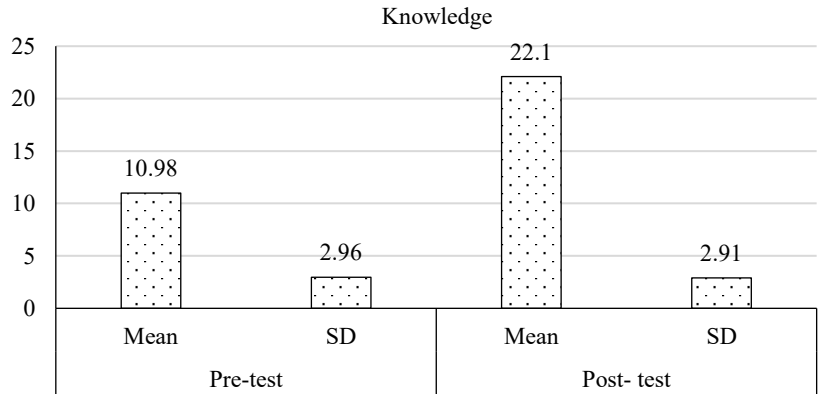

Figure 19. Pre-test and post-test knowledge mean and standard deviation of students regarding organ donation.

Description of Evaluation of Effectiveness of Nurse Led Intervention in Terms of Attitude Toward Organ Donation

Table 19 and Figure 20 reveal that in pre-test of attitude score of subjects, mean was 25.38 and standard deviation was 6.28, while in post-test, mean was 33.82 and standard deviation was 4.69. The mean difference between pre-test and post-test attitude score is 8.44. So, there is significant difference between pre-test and post-test attitude score of subjects toward organ donation.

As shown in Table 20, the statistical paired t-test shows that the difference between the pre-test and post-test knowledge scores was statistically significant at the 5% level ($p<0.05$), with a paired t-test value of –32.566. The calculated value is –32.566 which is larger than tabulated value (1.984) at df 149, which inferred that H1 is accepted and H01 is rejected. So, there is significant difference between pre-test and post-test knowledge score of subjects regarding organ donation.

Table 21 depicts that the statistical paired "t" test implies that difference in the pre-test and post-test value of attitude score was found statistically significant at 5% level (p, 0.05) with a paired "t" test value of 13.260. The calculated value is 13.260 which is larger than tabulated value (1.984) at df 149, which inferred that H1 is accepted and H01 is rejected. So, there is significant difference between pre-test and post-test attitude score of subjects toward organ donation.

Table 19. Pre-test and Post-test attitude mean and standard deviation of students regarding organ donation (N=150).

	Pre test		**Post test**		
	Mean	SD	Mean	SD	Mean difference
Attitude	25.38	6.28	33.82	4.69	8.44

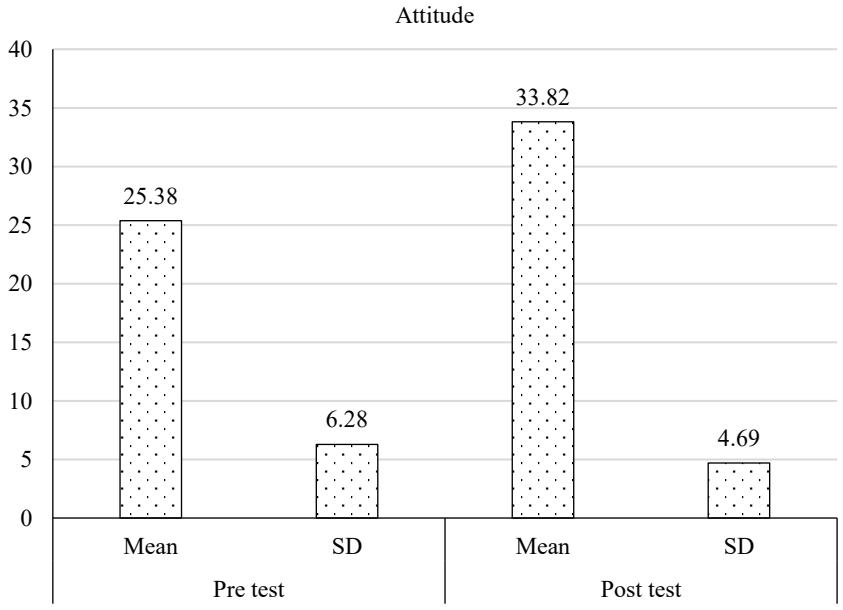

Figure 20. Pre-test and Post -test attitude mean and standard deviation of students regarding organ donation.

Table 20. Paired "t" test on pre-test and post-test mean knowledge on organ donation.

	Pre test		**Post test**		**Paired "t" test**
	Mean	SD	Mean	SD	
Knowledge	10.98	2.96	22.10	2.91	–32.566

Table 21. Paired "t" test on pre and post-test mean attitude regarding organ donation.

Aspects	Pre test		Post test		Paired "t" Test
	Mean	*SD*	*Mean*	*SD*	
Attitude Assessment	25.38	6.28	33.82	4.69	13.260

Table 22. Determine the association between demo-graphic variables and knowledge level of respondents regarding organ donation.

S.N.	Socio Demographic Variables		Poor	Average	Good	Chi Test	df	p-value	Table value	Result
1.	Age (Years)	17–18 years	7	19	0	10.701	4	0.030	9.49	significant
		19–20 years	46	60	0					
		Above 21 years	9	8	1					
2.	Gender	Male	0	0	0	-	-	-	-	Not significant
		Female	62	86	2					
		Other	0	0	0					
3.	Education status	12th	7	16	0	4.885	6	0.559	12.59	Not significant
		UG	55	67	1					
		Diploma	0	2	0					
		Other	0	2	0					
4.	Marital Status	Married	1	1	0	0.073	2	0.964	5.99	Not significant
		Unmarried	61	86	1					
5.	Religion	Hindu	62	84	1	2.217	2	.330	5.99	Not significant
		Christian	0	0	0					
		Muslim	0	3	0					
		Others	0	0	0					
6.	Occupation of parents	Medical	5	10	0	4.860	4	0.302	9.49	Not significant
		Non-Medical	19	38	0					
		Other	38	39	1					
7.	Residential Area	Urban	25	30	0	1.114	2	0.573	5.99	Not significant
		Rural	37	57	1					
		Other	0	0	0					
8.	Do you know about organ donation	Yes	62	87	1	-	-	-	-	Not significant
		No	0	0	0					
9.	Sources of Information	Media	47	71	1	3.761	6	0.709	12.59	Not significant
		Health Professional	5	8	0					
		Family members and relatives	8	8	0					
		Friends and neighbors	2	0	0					
10.	Willing to donate organ	Yes	41	49	0	2.961	2	0.228	5.99	not significant
		No	21	38	1					

Section-D: Association Between Demographic Variables and Pre-test Knowledge and Attitude Level of Respondents Regarding Organ Donation

Table 22 reveals that the calculated chi square of knowledge (10.701) is greater than the tabulated chi square value (9.49) at 4 degrees of freedom and 0.05 level of significance. So null hypothesis is

rejected. It proves that there is significant association between pre intervention knowledge score and age of subjects.

- No statistics are computed because gender is a constant.
- The calculated chi-square value for knowledge (4.885) is smaller than the tabulated chi-square value (12.59) at 6 degrees of freedom and a 0.05 level of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention knowledge score and Education status.
- The calculated chi-square value for knowledge (0.073) is lower than the tabulated chi-square value (5.99) at 2 degrees of freedom and a 0.05 level of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention knowledge score and marital status.
- The calculated chi-square value for knowledge (2.217) is smaller than the tabulated chi-square value (5.99) at 2 degrees of freedom and a 0.05 level of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention knowledge score and religion.
- The calculated chi square value of knowledge (4.860) is less than the tabulated chi square value (9.49) at 4 degrees of freedom and 0.05 level of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention knowledge score and occupation of parents.
- The calculated chi-square value for knowledge (1.114) is lower than the tabulated chi-square value (5.99) at 2 degrees of freedom and a 0.05 level of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention knowledge score and residential area of subjects.
- No statistical calculations were made as knowledge about organ donation remained constant.
- The calculated chi-square value for knowledge (3.761) is lower than the tabulated chi-square value (12.59) at 6 degrees of freedom and a 0.05 level of significance. Therefore, the null hypothesis is accepted, indicating no significant association between pre-intervention knowledge scores and the sources of information for the subjects.
- The calculated chi-square value for knowledge (2.961) is less than the tabulated chi-square value (5.99) at 2 degrees of freedom and a 0.05 level of significance. Hence, the null hypothesis is accepted, showing no significant association between pre-intervention knowledge scores and the willingness to donate organs.

Table 23 reveals that the calculated chi square value of attitude (2.944) is less than the tabulated chi square value (5.99) at 2 degrees of freedom and 0.05 levels of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention attitude score and age of subjects.

The calculated chi square value of attitude (1.316) is less than the tabulated chi square value (3.84) at 1 degree of freedom and 0.05 level of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention attitude score and gender.

The calculated chi square value of attitude (6.664) is less than the tabulated chi square value (7.81) at 3 degrees of freedom and 0.05 level of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention attitude score and Education status.

The calculated chi square value of attitude (0.037) is less than the tabulated chi square value (3.84) at 1 degree of freedom and 0.05 levels of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention attitude score and marital status.

The calculated chi square value of attitude (4.003) is more than the tabulated chi square value (3.84) at 1 degree of freedom and 0.05 level of significance. So, null hypothesis is rejected. It proves that there is significant association between pre intervention attitude score and religion of subjects.

Table 23. Association between demographic variables and attitude level of respondents regarding organ donation.

S.N.	Socio bio demographic characteristics		Positive	Negative	Chi Test	df	p-value	Table value	Result
1.	Age (Years)	17–18 years	14	12	2.944	2	0.229	5.99	Not significant
		19–20 years	46	60					
		Above 21 years	5	13					
2.	Gender	Male	0	0	1.316	1	0.251	3.84	Not significant
		Female	65	85					
		Other	0	0					
3.	Education status	12th	15	8	6.664	3	0.083	7.81	Not significant
		UG	49	74					
		Diploma	0	2					
		Other	1	1					
4.	Marital Status	Married	1	1	0.037	1	0.848	3.84	Not significant
		Unmarried	64	84					
5.	Religion	Hindu	62	85	4.003	1	0.045	3.84	Significant
		Christian	0	0					
		Muslim	3	0					
		Others	0	0					
6.	Occupation of parents	Medical	9	6	2.750	2	0.253	5.99	Not significant
		Non-Medical	21	36					
		Other	35	43					
7.	Residential Area	Urban	41	54	0.003	1	0.955	3.84	Not significant
		Rural	24	31					
		Other	0	0					
8.	Do you know about organ donation	Yes	85	85	-	-	-	-	Not significant
		No	0	0					
9.	Sources of Information	Media	51	68	2.127	3	0.547	7.81	Not significant
		Health Professional	7	6					
		Family members and relatives	7	9					
		Friends and neighbors	0	2					
10.	Willing to donate organ	Yes	46	44	5.543	1	0.019	3.84	Significant
		No	19	41					

The calculated chi square value of attitude (2.750) is less than the tabulated chi square value (5.99) at 2 degrees of freedom and 0.05 level of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention attitude score and occupation of parents.

The calculated chi square value of attitude (0.003) is less than the tabulated chi square value (3.84) at 1 degree of freedom and 0.05 level of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention attitude score and residential area of subjects. No statistics are computed because knowledge about organ donation is a constant.

The calculated chi square value of attitude (2.127) is less than the tabulated chi square value (7.81) at 3 degrees of freedom and 0.05 level of significance. So, null hypothesis is accepted. It proves that there is no significant association between pre intervention attitude score and sources of information of subjects.

The calculated chi square value of attitude (5.543) is more than the tabulated chi square value (3.84) at 1 degree of freedom and 0.05 level of significance. So, null hypothesis is rejected. It proves that there is significant association between pre intervention attitude score and students willing to donate organ.

RESULT AND DISCUSSION

The association between the pre-test attitude level and selected socio-demographic variables was analyzed using the chi-square test. A statistically significant association was found between the pre-test attitude score and religion, as the calculated chi-square value (4.003) exceeded the tabulated chi-square value (3.84) at 1 degree of freedom and the 0.05 level of significance, leading to the rejection of the null hypothesis. This indicates a significant relationship between pre-intervention attitude scores and religion. Similarly, a significant association was found between pre-test attitude scores and students' willingness to donate organs, as the calculated chi-square value (5.543) was greater than the tabulated chi-square value (3.84) at 1 degree of freedom and the 0.05 level of significance, leading to the rejection of the null hypothesis. However, the other selected variables were not statistically significant in relation to the pre-test attitude scores.

CONCLUSION

In this study the conclusion is:

- Improved knowledge levels among the students regarding various aspects of nursing.
- Positive changes in attitudes towards the nursing profession.
- Recognition of the effectiveness of nurse-led interventions in educational settings.
- Potential implications for curriculum development and educational strategies in nursing programs.

Implications of the Study

The study findings have certain very important implications for the nursing profession i.e. clinical practice, community health nursing, nursing education, nursing administration and nursing research. In all the areas, nurses act as an educator, organizer, leader, counsellor and motivator. Nurses can provide a family centered approach to help family to gain knowledge regarding organ donation.

Nursing Education

- The study suggests the need for incorporating organ donation education into nursing curricula. Nursing schools may consider revising their programs to include dedicated modules or courses focused on organ donation, ensuring that students receive comprehensive training on this topic.
- The effectiveness of nurse-led interventions highlights the importance of interactive and engaging teaching methods. Nursing educators can explore innovative pedagogical approaches, such as simulation exercises, case studies, and role-playing, to enhance students' understanding and attitudes towards organ donation.
- The study underscores the significance of ongoing education and training for nurses regarding organ donation. Nursing schools should emphasize the importance of lifelong learning and provide opportunities for students to stay updated on advancements in organ donation practices throughout their careers.

Nursing Practice

- Nurses play a pivotal role in patient education and advocacy, including discussions about organ donation. The study suggests that nurses with improved knowledge and attitudes towards organ donation can better support patients and families in making informed decisions about donation.

- Collaboration with Multidisciplinary Teams: Enhanced understanding of organ donation among nurses can facilitate collaboration with multidisciplinary teams, including transplant coordinators, physicians, and social workers. This collaborative approach can streamline the organ donation process and improve outcomes for both donors and recipients.
- Nursing practice should be culturally sensitive and respectful of diverse beliefs and values regarding organ donation. Nurses should receive training on addressing cultural considerations and effectively communicating with patients and families from different cultural backgrounds.

Nursing Research

- The study contributes to the evidence base on interventions aimed at improving knowledge and attitudes towards organ donation among nursing students. Further research is warranted to explore the long-term effects of such interventions and their impact on nursing practice and patient outcomes.
- Future research can investigate the barriers and facilitators to organ donation education and advocacy among nursing students and practicing nurses. Understanding these factors can inform the development of targeted interventions to address knowledge gaps and promote positive attitudes towards donation.

Nursing Administration

- Nursing administrators can use the findings of the study to advocate for policy changes within nursing education programs and healthcare institutions. This may include recommending guidelines for integrating organ donation education into nursing curricula and promoting a supportive organizational culture that values donation advocacy.
- Nursing administrators may allocate resources towards nurse-led interventions and educational initiatives aimed at enhancing knowledge and attitudes towards organ donation. This could involve funding for training programs, workshops, and educational materials for nursing students and practicing nurses alike.

Recommendations

Based on result of the study, followings recommendations are made:

- The study can be replicated on large sample to validate and generalize its findings.
- The study may be replicated in different settings especially urban and rural areas.
- A study can be conducted to assess effectiveness of an information leaflet on knowledge and attitude of students regarding organ donation.
- An appropriate motivational campaign should be launched to increase voluntarily organ donation awareness and attitude practices.
- A pre-experimental study can be conducted to assess the knowledge and attitude of students regarding organ donation.
- A comparative study can be conducted to assess knowledge and attitude of students regarding organ donation.

Limitations

- The study was confined to 150 students. It limits the generalization of the finding to only study sample.
- The study was limited to assessing the knowledge only once due to time constraints.

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