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Information, Education, and Communication (IEC) Intervention: A strategic approach to improve knowledge, attitude and behavioural changes regarding organ and tissue donation among health science students of Maharashtra

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ABSTRACT

Introduction: Organ and tissue donation is a life-saving act that plays a vital role in modern healthcare. Yet, there is a significant gap in awareness, knowledge, and positive attitude among the general population, especially youth. As future healthcare providers, health sciences students are expected to have accurate knowledge and a favourable attitude towards organ and tissue donation. In the current scenario, with increasing demand for organ transplants and low donation rates in India, there is an urgent need to promote awareness and behavioral change. Information, Education, and Communication (IEC) activities serve as an effective strategy to educate and motivate young health professionals about organ and tissue donation. Strengthening their knowledge and attitude can help in building a supportive environment for organ donation practices in the future.

Methodology: The present study adopted a quantitative research approach with a quasi-experimental design consisting of experimental and control groups. The study was conducted among 600 first-year Health Sciences students selected through purposive sampling technique from various medical, nursing, and BAMS colleges of health science of Maharashtra. The data were collected using structured tools such as a knowledge questionnaire, behavioural change scale, and attitude scale. The IEC (Information, Education, and Communication) activity was implemented for the experimental group using educational sessions, posters, pamphlets, and audiovisual aids to enhance awareness regarding organ and tissue donation. Pre-test and post-test assessments were done to evaluate the effectiveness of the intervention. Ethical permission was obtained from the institutional authorities, and informed consent was taken from participants.

Results: The present study adopted a quantitative research approach with a quasi-experimental research design incorporating experimental and control groups to assess the effectiveness of significant association was found between the pre-test knowledge score and religion ($p=0.044^*$), whereas other socio-demographic variables showed no significant association ($p>0.05$) with the pre-test knowledge score among health sciences students in the experimental group.

Discussion: The study revealed that IEC activities were effective in enhancing knowledge, improving attitude, and strengthening behavioural intentions regarding organ and tissue donation among health sciences students. The educational intervention positively influenced students irrespective of their socio-demographic background. However, religion was found to have a significant association with pre-test knowledge. Integrating organ donation awareness programs in health sciences education is essential for promoting positive behaviour and future advocacy.

Keywords: *Organ Donation, Tissue Donation, IEC Activity, Health Sciences Students, Knowledge, Attitude, Behavioural Intentions, Awareness Program.*

1. INTRODUCTION

Organ and tissue donation is a crucial medical advancement that saves and improves countless lives worldwide. Despite its significance, there remains a lack of awareness and positive attitude towards organ donation, particularly among the younger population in India.[1] Health sciences students, as future healthcare providers, play a pivotal role in promoting organ and tissue donation practices in society.[2] However, various studies have reported inadequate knowledge and misconceptions about organ donation among medical and nursing students.[3] The increasing gap between organ demand and availability

necessitates targeted interventions such as Information, Education, and Communication (IEC) activities to bridge this knowledge-attitude gap.[4] IEC interventions, through structured educational approaches, have proven effective in enhancing awareness, correcting misconceptions, and fostering positive attitudes toward organ and tissue donation.[5] Therefore, strengthening the knowledge and attitude of health sciences students is critical for building a supportive environment for organ donation advocacy in the future.

2. METHODOLOGY

The present study adopted a quantitative research approach with a quasi-experimental research design incorporating experimental and control groups to assess the effectiveness of Information, Education, and Communication (IEC) activity on knowledge and attitude regarding organ and tissue donation among Health Sciences students. The study was conducted in selected medical, nursing, and BAMS colleges located Maharashtra. A total of 600 first-year Health Sciences students were selected through a purposive sampling technique based on inclusion criteria.

The students were randomly assigned into two groups — the experimental group (300 students) and the control group (300 students). Data collection tools included a structured knowledge questionnaire, a behavioral change scale, and an attitude scale developed and validated by experts in the field. These tools measured baseline knowledge, behavioural intentions, and attitude toward organ and tissue donation. The IEC activhealth science students of Maharashtraity was implemented only for the experimental group, comprising a series of structured educational interventions. These interventions included interactive educational sessions, distribution of informative pamphlets, display of posters, and use of audiovisual aids such as videos and presentations designed to promote awareness and motivation regarding organ and tissue donation.

Both groups underwent a pre-test assessment before the intervention to record their baseline knowledge and attitude scores. Following the IEC intervention for the experimental group, a post-test assessment was conducted after 7 days to evaluate the effectiveness of the IEC activity. The control group did not receive any intervention during this period.

Ethical clearance for the study was obtained from the Institutional Ethical Committee, Pravara Institute of Medical Sciences-Deemed University, Loni (Reference No: PIMS/IEC-DR/2021/141; Registration No: PIMS/DR/PhD/CSM/2021/130), dated 26th June 2021. The study was approved under full review for a period of two years. Permission was also secured from the respective college authorities. Informed consent was obtained from all participants, ensuring confidentiality and voluntary participation. The collected data were analysed using appropriate descriptive and inferential statistics to determine the effectiveness of the IEC activity in improving knowledge, behavioural intentions, and attitude towards organ and tissue donation among Health Sciences students.

3. RESULTS

Table 01 Finding related to the Frequency and percentage distribution of the socio-demographic data of health sciences students in the experimental and control groups

n=600

Socio-Demographic Data		Experimental Group		Control Group	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Age	17–19	204	(68.0%)	158	52.7%
	20 – 22	96	(32.0%	142	47.3%
Gender	Male	115	(38.0%	113	37.7%
	Female	185	61.0%	187	62.3%
Course of Study	MBBS	100	33.3%	100	33.3%
	BSc Nursing	100	33.3%	100	33.3%
	BAMS	100	33.3%	100	33.3%
Place of Residence	Urban	122	40.7%	74	24.7%
	Semi-Urban	58	19.3%	141	47.0%
	Rural	120	40.0%	85	28.3%

Family Income (per month in INR)	Less than ₹10,000	54	18.0%	37	12.3%
	₹10,001 – ₹25,000	87	29.0%	69	23.0%
	₹25,001 – ₹50,000	87	29.0%	72	24.0%
	More than ₹50,000	72	24.0%	122	40.7%
Religion	Hindu	105	35.0%	128	42.7%
	Muslim	74	24.7%	77	25.7%
	Christian	62	20.7%	51	17.0%
	Sikh	30	10.0%	26	8.7%
	Buddhist	10	3.3%	18	6.0 %
	Jain	19	6.3%	00	00.0%
Ever heard about organ and tissue donation	Yes	194	64.7%	204	68.0%
	No	106	35.3%	96	32.0%
If yes, source of information	Academic Curriculum	45	15.0%	18	6.0%
	Social Media	63	21.0%	73	24.3%
	Television/Radio	43	14.3%	26	8.7%
	Health Professionals	36	12.0%	56	18.7%
	Family/Friends	7	2.3%	32	10.7%
Attended any awareness program on organ donation	Yes	171	57.0%	141	47.0%
	No	129	43.0%	159	53.0%
Know about the legal framework for organdonation in India.	Yes	110	36.7%	141	47.0%
	No	190	63.3%	159	53.0%
Consider donating an organ while alive or after death	Yes	96	32.0%	40	13.3%
	No	124	41.3%	121	40.3%
	Not Sure	80	26.7%	139	46.3%

Figure 01. Pre and post-intervention frequency and percentage distribution of behavioural intentions regarding organ and tissue donation among health sciences students in the experimental and control groups after the IEC activity.

n=600

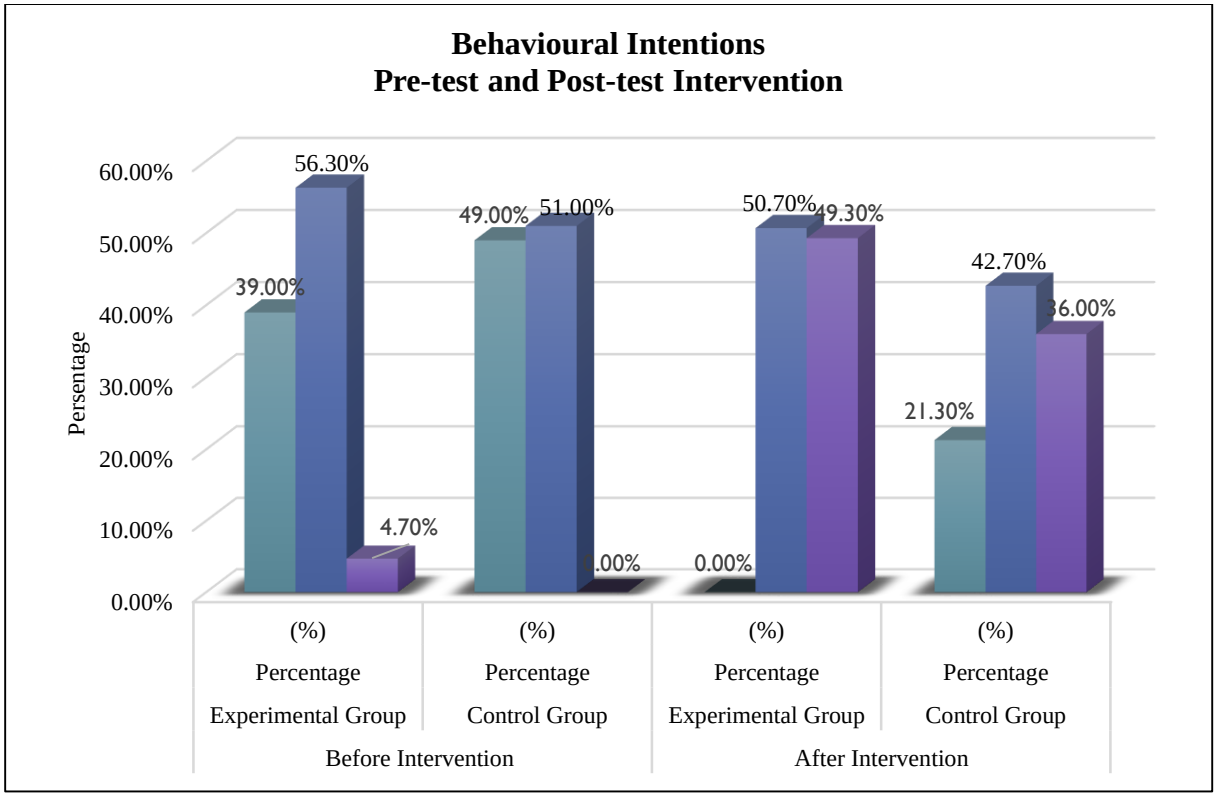

Figure 02. Pre and post-intervention frequency and percentage distribution of knowledge score regarding organ and tissue donation among health sciences students in the experimental and control groups before the IEC activity.

n=600

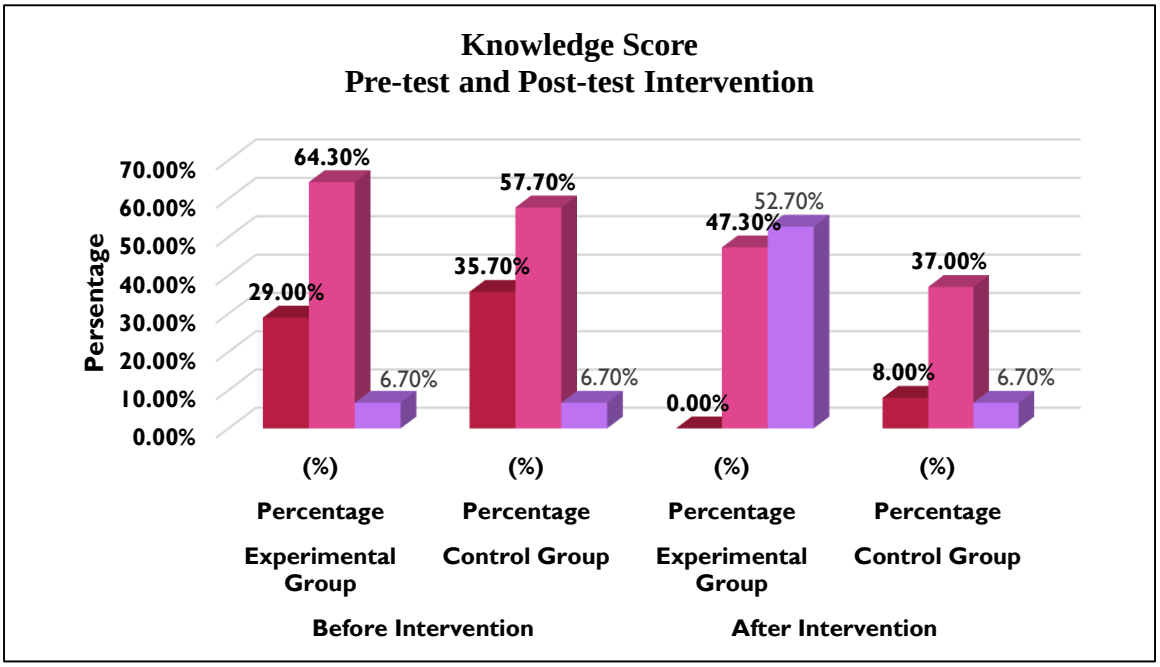

Table 02, Finding related to Pre-post intervention frequency and percentage distribution of positive stated attitude towards organ and tissue donation among health sciences students in the experimental and control groups before the IEC activity.

n=600

Positive Stated Attitude towards Organ and Tissue donation	Experimental Group		Control Group		Experimental Group		Control Group	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Negative Attitude	48	16.0	89	29.7	00	00.0%	00	00.0%
Neutral Attitude	208	69.3%	171	59.0%	96	32.0%	45	15.0%
Positive Attitude	44	14.7%	40	13.3%	204	68.0%	255	85.0%

Table 03. Finding related to Pre-post intervention Frequency and Percentage Distribution of Negative Stated Attitude towards Organ and Tissue donation among Health Sciences Students in the Experimental and Control Groups before the IEC Activity.

n=600

Negative Stated Attitude towards Organ and Tissue donation	Pre Intervention				Post Intervention			
	Experimental Group		Control Group		Experimental Group		Control Group	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Positive Attitude	00	00.0	26	8.7	113	37.7%	109	36.3%
Neutral Attitude	62	20.7%	52	17.3%	187	62.3%	156	52.0%
Negative Attitude	238	79.3%	222	74.0%	00	00.0%	35	11.7%

Table 04. Finding related to Mean and Standard Deviation of the pre-test and post-test of the behavioural intentions and knowledge among Health Sciences Students in the Experimental and Control Groups.

n=600

Knowledge towards Organ and Tissue donation	Test	Behavioural Intentions		Knowledge Score	
		Mean	Standard deviation	Mean	Standard deviation
Experimental Group	Pre-test	3.81	1.063	12.57	3.925

	Post-test	5.37	1.171	20.03	3.436
Control Group	Pre-test	3.58	0.944	12.35	4.067
	Post-test	4.97	1.369	19.54	4.612

Table 05. Findings related to Mean and Standard Deviation of the pre-test and post-test of the Positive Stated Attitude and Negative Stated Attitude towards Organ and Tissue donation among Health Sciences Students in the Experimental and Control Groups

n=600

Attitude towards Organ and Tissue donation	**Test**	**Positive Stated Attitude**		**Negative Stated Attitude**	
		Mean	**Standard deviation**	**Mean**	**Standard deviation**
Experimental Group	Pre-test	20.87	6.90	41.36	4.635
	Post-test	33.71	4.49	19.77	3.948
Control Group	Pre-test	19.70	7.280	40.65	8.780
	Post-test	36.0	7.024		

Table 06. Finding related to the association between pre-test of Behavioral Intentions and selected socio-demographic variables in the Experimental Group.

n=300

Socio-Demographic Variables		**Frequency (f)**	**χ^2Value**	**df Value**	**Level Of Significance (P Value)**
Age	17–19	204	0.754	2	0.686
	20 – 22	96			
Gender	Male	115	0.593	2	0.743
	Female	185			
Course of Study	MBBS	100	4.171	4	0.383
	BSc Nursing	100			
	BAMS	100			
Place of Residence	Urban	122	2.825	4	0.588
	Semi-Urban	58			
	Rural	120			
Family Income (per month in INR)	Less than ₹10,000	54	1.542	6	0.957
	₹10,001 – ₹25,000	87			
	₹25,001 – ₹50,000	87			
	More than ₹50,000	72			
Religion	Hindu	105	3.967	10	0.949

	Muslim	74			
	Christian	62			
	Sikh	30			
	Buddhist	10			
	Jain	19			
Ever heard about organ and tissue donation	Yes	194	2.188	2	0.335
	No	106			
If yes, source of information	Academic Curriculum	45	7.117	10	0.714
	Social Media	63			
	Television/Radio	43			
	Health Professionals	36			
	Family/Friends	7			
Attended any awareness program on organ donation	Yes	171	1.921	2	0.383
	No	129			
Know about the legal framework for organ donation in India.	Yes	110	2.973	2	0.226
	No	190			
Consider donating an organ while alive or after death	Yes	96	7.584	4	0.108
	No	124			
	Not Sure	80			

Table 07. Finding related to association between pretest knowledge score with selected socio-demographic variables in Experimental Group.

n=300

Socio-Demographic Variables		**Frequency (f)**	**χ^2Value**	**df Value**	**Level Of Significance (P Value)**
Age	17–19	204	2.076	2	0.354
	20 – 22	96			
Gender	Male	115	0.667	2	0.716
	Female	185			
Course of Study	MBBS	100	0.242	4	0.993
	BSc Nursing	100			
	BAMS	100			
Place of Residence	Urban	122	6.161	4	0.187
	Semi-Urban	58			
	Rural	120			

Family Income (per month in INR)	Less than ₹10,000	54	3.459	6	0.749
	₹10,001 – ₹25,000	87			
	₹25,001 – ₹50,000	87			
	More than ₹50,000	72			
Religion	Hindu	105	18.702	10	0.044*
	Muslim	74			
	Christian	62			
	Sikh	30			
	Buddhist	10			
	Jain	19			
Ever heard about organ and tissue donation	Yes	194	0.226	2	0.893
	No	106			
If yes, source of information	Academic Curriculum	45	6.003	10	0.815
	Social Media	63			
	Television/Radio	43			
	Health Professionals	36			
	Family/Friends	7			
Attended any awareness program on organ donation	Yes	171	2.257	2	0.324
	No	129			
Know about the legal framework for organ donation in India.	Yes	110	2.959	2	0.228
	No	190			
Consider donating an organ while alive or after death	Yes	96	5.10	4	0.277
	No	124			
	Not Sure	80			

Table 08. Finding related to association between pretest Positive Stated Attitude towards Organ and Tissue donation with selected socio-demographic variables in Experimental Group.

n=300

Socio-Demographic Variables		**Frequency (f)**	**χ^2Value**	**df Value**	**Level Of Significance (P Value)**
Age	17–19	204	3.223	2	0.200
	20 – 22	96			
Gender	Male	115	0.501	2	0.778
	Female	185			
Course of Study	MBBS	100	2.642	4	0.619
	BSc Nursing	100			
	BAMS	100			
Place of Residence	Urban	122	5.909	4	0.206
	Semi-Urban	58			

	Rural	120			
Family Income (per month in INR)	Less than ₹10,000	54	4.218	6	0.647
	₹10,001 – ₹25,000	87			
	₹25,001 – ₹50,000	87			
	More than ₹50,000	72			
Religion	Hindu	105	13.878	10	0.179
	Muslim	74			
	Christian	62			
	Sikh	30			
	Buddhist	10			
	Jain	19			
Ever heard about organ and tissue donation	Yes	194	1.057	2	0.590
	No	106			
If yes, source of information	Academic Curriculum	45	3.835	10	0.954
	Social media	63			
	Television/Radio	43			
	Health Professionals	36			
	Family/Friends	7			
Attended any awareness program on organ donation	Yes	171	1.342	2	0.511
	No	129			
Know about the legal framework for organ donation in India.	Yes	110	1.391	2	0.499
	No	190			
Consider donating an organ while alive or after death	Yes	96	1.013	4	0.908
	No	124			
	Not Sure	80			

Table 09. Finding related to association between pretest Negative Stated Attitude towards Organ and Tissue donation with selected socio-demographic variables in Experimental Group.

n=300

Socio-Demographic Variables		**Frequency (f)**	**χ^2Value**	**df Value**	**Level Of Significance (P Value)**
Age	17–19	204	0.593	2	0.743
	20 – 22	96			
Gender	Male	115	0.005	0	0.945
	Female	185			
Course of Study	MBBS	100	1.139	2	0.566
	BSc Nursing	100			
	BAMS	100			
Place of Residence	Urban	122	3.975	2	0.137
	Semi-Urban	58			
	Rural	120			
Family Income (per month in INR)	Less than ₹10,000	54	3.568	3	0.312
	₹10,001 – ₹25,000	87			
	₹25,001 – ₹50,000	87			
	More than ₹50,000	72			
Religion	Hindu	105	2.683	5	0.749
	Muslim	74			
	Christian	62			

	Sikh	30			
	Buddhist	10			
	Jain	19			
Ever heard about organ and tissue donation	Yes	194	0.752	1	0.386
	No	106			
If yes, source of information	Academic Curriculum	45	3.145	5	0.678
	Social Media	63			
	Television/Radio	43			
	Health Professionals	36			
	Family/Friends	7			
Attended any awareness program on organ donation	Yes	171	4.867	1	0.027
	No	129			
Know about the legal framework for organ donation in India.	Yes	110	3.438	1	0.064
	No	190			
Consider donating an organ while alive or after death	Yes	96	3.016	2	0.221
	No	124			
	Not Sure	80			

Findings related to the association between the pre-test of Behavioral Intentions and selected socio-demographic variables in the Control Group.

The present study aimed to assess the association between the pre-test behavioral intentions regarding organ and tissue donation and selected socio-demographic variables among participants in the control group (n=300). The findings of the study revealed that there was no statistically significant association between the pre-test behavioral intentions and selected socio-demographic variables such as age (χ^2=0.356, p=0.551), gender (χ^2=1.085, p=0.298), course of study (χ^2=1.040, p=0.594), place of residence (χ^2=3.945, p=0.139), and family income per month (χ^2=1.358, p=0.715). Similarly, other socio-demographic variables like religion (χ^2=2.506, p=0.644), having ever heard about organ and tissue donation (χ^2=0.056, p=0.812), source of information regarding organ donation (χ^2=1.686, p=0.891), attendance at any awareness program on organ donation (χ^2=0.511, p=0.475), knowledge about the legal framework for organ donation in India (χ^2=0.064, p=0.801), and consideration for donating an organ during life or after death (χ^2=3.548, p=0.170) also showed no statistically significant association with behavioral intentions at the 0.05 level of significance. Thus, it can be concluded that in the control group, the behavioral intentions toward organ and tissue donation were not influenced by any of the selected socio-demographic variables in the pre-test phase.

Finding related to the association between pretest knowledge score with selected socio-demographic variables in the Control Group.

The findings revealed that there was no statistically significant association between the pre-test knowledge score and selected socio-demographic variables such as age (χ^2=0.465, p=0.793), gender (χ^2=2.905, p=0.234), course of study (χ^2=4.615, p=0.329), place of residence (χ^2=3.567, p=0.468), and family income per month (χ^2=6.443, p=0.375). Furthermore, other variables like religion (χ^2=5.982, p=0.649), having ever heard about organ and tissue donation (χ^2=0.658, p=0.720), source of information regarding organ donation (χ^2=4.207, p=0.938), attendance at any awareness program on organ donation (χ^2=2.634, p=0.268), knowledge about the legal framework for organ donation in India (χ^2=2.270, p=0.321), and consideration for donating an organ during life or after death (χ^2=2.625, p=0.622) also showed no statistically significant association with the knowledge score at the 0.05 level of significance.

Finding related to association between pretest positive and negative stated attitude towards organ and tissue donation with selected socio-demographic variables in the control group.

The findings revealed that there was no statistically significant association between the pre-test attitude score and socio-demographic variables such as age (χ^2=0.244, p=0.885), gender (χ^2=0.792, p=0.673), course of study (χ^2=6.442, p=0.168), family income per month (χ^2=5.938, p=0.430), and religion (χ^2=13.381, p=0.099).

Further, other variables like ever heard about organ and tissue donation (χ^2=1.231, p=0.540), source of information (χ^2=8.896, p=0.542), attendance at any awareness program on organ donation (χ^2=0.823, p=0.663), knowledge about the legal framework for organ donation in India (χ^2=1.146, p=0.564), and consideration for donating an organ while alive or after death (χ^2=3.704, p=0.447) also showed no statistically significant association with the attitude score at the 0.05 level of

significance.

However, a statistically significant association was found between the place of residence and the pre-test positive stated attitude score (χ^2=9.901, p=0.042). This indicates that participants' place of residence had a significant influence on their attitude towards organ and tissue donation in the control group.

The findings revealed a significant association between gender and negative stated attitude towards organ and tissue donation (χ^2=7.075, p=0.029), indicating that gender influenced participants' negative attitude.

However, no significant association was found between negative attitude and other socio-demographic variables such as age (p=0.734), course of study (p=0.943), place of residence (p=0.623), family income (p=0.876), religion (p=0.355), awareness about organ donation (p=0.536), source of information (p=0.256), knowledge about legal framework (p=0.275), or willingness to donate organs (p=0.685).

4. DISCUSSION

The present study aimed to assess and compare the socio-demographic characteristics of health sciences students in experimental and control groups concerning their awareness about organ and tissue donation. A total of 600 students participated, with 300 in each group. In terms of age distribution, the majority of students in the experimental group (68%) were between 17-19 years of age, while 52.7% of students in the control group belonged to the same age group. Similar findings were reported by Singh et al. (2020) who emphasized that younger students, especially those in their late teens, form a crucial target group for educational interventions on health-related topics like organ donation. [6] Regarding gender distribution, the present study revealed a predominance of female participants in both experimental (61%) and control (62.3%) groups. These findings are consistent with the study conducted by Biswas et al. (2021), who observed that female students showed higher participation in awareness and health promotional activities, including organ donation programs.[7] The present study had equal representation from MBBS, BSc Nursing, and BAMS students, indicating a homogenous professional background in both groups. Similar observations were reported by Patel et al. (2019), who suggested that medical and paramedical students are more receptive to awareness interventions due to their curriculum exposure.[8]

Concerning awareness about organ and tissue donation, the present study found that 64.7% of the experimental group and 68% of the control group had heard about organ donation. These findings are comparable with the study conducted by Reddy et al. (2021), which highlighted the increasing awareness levels among youth due to the availability of online health content.[9] In terms of the source of information, social media emerged as the most common medium among students in both groups. This finding corresponds with the work of Sharma et al. (2021), who stated that social media platforms are a dominant source of health-related information for the younger generation.[10]

Furthermore, in the present study, 57% of students in the experimental group had attended an awareness program on organ donation compared to 47% in the control group. This aligns with the findings of Bhattacharya et al. (2019), who emphasized the positive impact of structured health education programs on improving knowledge and attitudes toward organ donation. [11]

The findings of the present study showed a remarkable improvement in behavioural intentions and knowledge regarding organ and tissue donation among health sciences students after the IEC activity. In the experimental group, good behavioral intentions increased from 4.7% before the intervention to 49.3% after the intervention, indicating the effectiveness of the IEC strategy. Similar findings were reported by Verma et al. (2020), who concluded that structured educational interventions significantly enhance positive attitudes and behavioral intentions toward organ donation among students.[12]

In terms of knowledge, good knowledge scores increased from 6.7% to 52.7% in the experimental group after the intervention. This finding is supported by Singh et al. (2022), who found that awareness programs play a vital role in improving knowledge levels regarding organ and tissue donation among health science students.[13] Thus, the present study confirms that IEC activities are effective in promoting positive behavioural intentions and improving knowledge towards organ and tissue donation. In the experimental group, positive attitude increased remarkably from 14.7% before the intervention to 68.0% after the intervention, and negative attitude reduced to 0%. Similar findings were reported by Patil et al. (2021), who stated that awareness programs and IEC activities significantly improve the attitude of students towards organ donation.[14] Additionally, the negative stated attitude towards organ donation reduced from 79.3% to 0% in the experimental group after the intervention, reflecting the effectiveness of the IEC strategy in changing the mindset of students. This is consistent with the findings of Sharma et al. (2022), who concluded that educational interventions effectively decrease negative perceptions and enhance willingness toward organ donation.[15] Thus, the findings of the study strongly support that IEC activities are powerful tools in improving the attitude of students towards organ and tissue donation.

The present study findings showed a significant association between pre-test knowledge score and religion (p=0.044) among the experimental group, while other variables like age, gender, course, residence, and income showed no significant association. Similar findings were reported by Singh et al. (2020) in Punjab, showing religion significantly influences knowledge regarding organ donation.[16] Patil et al. (2019) in Karnataka also found no significant association of knowledge

with age, gender, and education.[17] Further, the present study revealed no significant association between positive stated attitudes towards organ and tissue donation and sociodemographic variables, which is supported by Gupta et al. (2018) in Delhi [18] and Sharma et al. (2021) in Maharashtra, where the attitude towards organ donation was found to be independent of demographic variables.[19]

5. CONCLUSION

The study concluded that the structured educational intervention was effective in enhancing knowledge and promoting a positive attitude toward organ and tissue donation among students in the experimental group. There was a significant association of knowledge with religion, whereas other socio-demographic variables showed no significant association with knowledge and attitude. This highlights the need for continuous awareness programs to promote organ donation irrespective of demographic factors.

Conflict of Interest:

The authors declare no conflict of interest.

Source of Funding:

The study was self-funded. No external financial support was received for conducting this research.

Ethical permission:

Ethical clearance for the study was obtained from the Institutional Ethical Committee, Pravara Institute of Medical Sciences-Deemed University, Loni (Reference No: PIMS/IEC-DR/2021/141; Registration No: PIMS/DR/PhD/CSM/2021/130), dated 26th June 2021. The study was approved under full review for two years.

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