

An assessment of knowledge, attitude, and practice regarding organ donation among students and physicians

Syed Muhammad Ashraf Jahangeer,¹ Anooja Rani,² Muhammad Abdul Rehman,³ Eilaf Ahmed Meenai,⁴ Abdul Hadi Hassan Mallick,⁵ Layiba Masroor,⁶ Muhammad Kamran⁷

Abstract

Objective: To assess the knowledge, attitude and practice of students and physicians regarding tissue and organ donation at a teaching hospital.

Method: The cross-sectional study was conducted at the Dow University of Health Sciences, Karachi, in 2019, and comprised physicians and students of either gender. Data was collected using a 43-item self-administered questionnaire. Dichotomous questions were scored as 1 or 0, while multiple-option questions were scored as 2, 1 or 0. Data was analysed using SPSS 25.

Results: Of the 859 subjects, 761(88.6%) were students with a mean age of 20.3±1.5 years and 98(11.4%) were physicians with a mean age of 30.6±9.4. Among the students, 630(82.8%) were medical students, while 131(17.2%) were dental. The largest group among the students was of those in the second year of their studies 271(35.6%). Besides, 531(69.8%) and 64(65.3%) physicians were females. Compared to males, female students reported better mean scores in terms of attitude, while higher practice scores were obtained by both male students and physicians ($p=0.021$). Muslim subjects scored comparatively lower in knowledge, attitude and practice terms than non-Muslims ($p<0.05$).

Conclusion: There were high knowledge and attitude scores, while scores reflecting practice were low. Effective measures should be taken to encourage medical professionals to donate organs and promote organ donation.

Keyword: Organ transplantation, Organ donation, Tissue and organ procurement, Tissue harvesting, Transplantation. (JPMA 73: 480; 2023) DOI: 10.47391/JPMA.5123

Submission completion date: 20-12-2021 — **Acceptance date:** 13-10-2022

Introduction

Organ donation (OD) involves surgically removing an organ from a human body, either for research or transplantation. In terms of percentage of population, in 2020, the United States (38.0%) had the most actual deceased organ donors, and Turkey (41.1%) had the most living donors. This contrasts starkly with Pakistan, which had no deceased donors, and only 0.86% living donors¹.

In 2016, more than 100 organ transplants per one million inhabitants were performed in the US, while Pakistan managed to perform 5.66^{2,3}. Currently, 20 people die each day waiting for a transplant in the US and one can only expect this number to soar wildly for Pakistan. Pakistan saw its first deceased organ transplantation in 1979^{4,5}.

Closely related to OD is blood donation. According to the World Health Organisation (WHO), a country's blood

requirements are fulfilled if 1% of its population makes the donation. According to estimates, only 0.46% to 0.78% of Pakistan's population donates blood⁶.

Given these facts, it is clear that more work is needed regarding organ and blood donation in Pakistan. The first logical step is to assess how medical professionals view the matter because how they view OD directly which affects how society at large views it.

To achieve this, a survey was conducted in 2013 in which an alarming 18.4% participants did not think OD to be ethically and morally correct⁷. Moreover, a study in 2019 revealed that only 13.4% of its participants had heard about OD through a doctor⁸.

The current study was planned to evaluate the knowledge, attitude and practice (KAP) of students and doctors at a tertiary care hospital, regarding OD.

Subjects and Methods

The descriptive cross-sectional study was conducted at Dow University of Health Sciences (DUHS), Karachi, in 2019. After approval from the institutional ethics review board, the sample size was calculated using OpenEpi based on the 97.5% awareness proportion reported in

.....
¹Department of Community Medicine, Dow Medical College, ²⁻⁷Fourth Year MBBS Student, Dow Medical College, Dow University of Health Sciences, Karachi, Pakistan.

Correspondence: Syed Muhammad Ashraf Jahangeer.

Email: ashraf.jahangeer@duhs.edu.pk

ORCID ID. 0000-0002-3342-3777

2013⁷. Keeping absolute precision 1% and confidence level 95% for target population size of 10,000 the calculated sample size was 857 participants. The sample was raised using random sampling technique. No specialty was discarded, and none was specifically preferred. Students enrolled in either Bachelor of Medicine, Bachelor of Surgery (MBBS) or Bachelor of Dental Surgery (BDS) programmes, and physicians associated with the DUHS were considered. Those excluded were individuals not associated with DUHS and students not enrolled in BDS or MBBS.

After taking written informed consent from all the participants, data was collected using a 43-item questionnaire which was based on literature⁶⁻²⁰, and adjustments were made after conducting an exclusive pilot study on 138 participants.

Entire data was identity delinked and general demographic information, including age, religion and academic stream, was recorded under item numbers 1-10. Questions inquiring about blood donation were separate from those related to solid OD. The questionnaire was divided into sections. Items 10-23 assessed levels of knowledge, 24-38 assessed attitude, and 39-43 assessed practice. Most questions required a dichotomous yes or no response, but, where necessary, multiple responses were available. All items were transformed into objective scores by giving each answer a simple numeric score. Answers that reflected good knowledge, positive attitude, and good practices were assigned higher numbers. Answers that reflected otherwise received lower scores. The internal consistency of the questionnaire was assessed through Cronbach's alpha, which yielded an alpha value of 0.64.

The questionnaires were administered digitally through Google Forms as well as in printed form on the premises. Printed questionnaires were distributed to participants. Every participant was approached individually, and all the filled questionnaires were collected within 7-10 minutes. Most physicians were approached individually during their work hours and their responses were recorded on printed questionnaires. For each participant, knowledge, practice and attitude scores were calculated. Findings were expressed as per the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines²¹.

Main variables included being a doctor or a student, and within the student group, the year of study. Potential confounders were gender, religion, age and year of study for the student cohort.

Data was analysed using SPSS 25. Descriptive data was presented as mean $\pm$ standard deviation (SD). Independent sample student t-test was used to compare mean values for variables between the two groups. One-way analysis of variance (ANOVA) was used for comparison between multiple groups for years of study for students. Point bi-serial correlation was run to compare a dichotomous qualitative variable with a continuous variable. At the design level, allied health categories were excluded from the sample, while at the analysis level, simple stratification technique was used to control for confounding and effect modification. Median values were calculated for knowledge, attitude and practice scores. Individual scores were "high" if above the median score, and "low" if below. Median score values used were 10 for knowledge, 4 for attitude, and 1 for practice. $P \leq 0.05$ was considered statistically significant.

Results

Of the 1024 potential participants approached, 884(86.3%) agreed to take part. After leaving out 25(2.8%) responses owing to ineligibility or substantially incomplete data, 859(97.2%) individuals represented the study universe.

Of the 859 subjects, 761(88.6%) were students with a mean age of 20.3 ± 1.5 years and 98(11.4%) were physicians with a mean age of 30.6 ± 9.4 . Among the students, 630(82.8%) were studying MBBS, while 131(17.2%) were in the BDS stream. The largest group among the students was of those in the second year of their studies 271(35.6%). Besides, 531(69.8%) and 64(65.3%) physician were females. Most students 733(96.3%), and physicians 91(92.9%) were Muslim.

Among the students, there were no significant differences between knowledge scores based on gender ($p > 0.05$). Significant knowledge score differences were found between first-year students compared to the fourth-year ($p = 0.027$) and final-year ($p = 0.000$) students. Similarly, final-year students had significantly higher scores than second-year students ($p = 0.001$).

There was a significant positive correlation ($r = 0.073$) between knowledge and attitude scores ($p = 0.043$). Similarly, higher knowledge scores correlated with higher practice scores as well ($p = 0.000$).

The mean score of participants who had received an organ was 12.5 ± 1.85 . This dropped to 10.3 ± 1.78 for participants who had not received an organ.

A point bi-serial correlation ($r = 0.123$) showed that those who had pledged to donate their organs had significantly higher knowledge scores than those who did not

Table-1: Comparison of knowledge, attitude and practice (KAP) mean scores of physicians and medical students (n=859)..

	Physicians (Mean $\pm$ SD)			Students (Mean $\pm$ SD)			Total (n)	
	Knowledge	Attitude	Practice	Knowledge	Attitude	Practice	Physicians (n=98)	Students (n=761)
Gender								
Male	10.65 $\pm$ 2.01	3.38 $\pm$ 0.95	1.91 $\pm$ 1.16	10.23 $\pm$ 1.76	3.30 $\pm$ 0.95	1.47 $\pm$ 1.19	34	230
Female	10.28 $\pm$ 2.07	3.25 $\pm$ 0.92	1.33 $\pm$ 1.17	10.36 $\pm$ 1.82	3.39 $\pm$ 0.90	1.11 $\pm$ 1.10	64	531
Year of study								
1				10.05 $\pm$ 1.92	3.42 $\pm$ 0.86	1.16 $\pm$ 1.12		198
2				10.13 $\pm$ 1.69	3.31 $\pm$ 0.92	1.14 $\pm$ 1.10		271
3				10.50 $\pm$ 1.79	3.45 $\pm$ 0.89	1.28 $\pm$ 1.15		139
4				10.71 $\pm$ 1.67	3.39 $\pm$ 0.91	1.47 $\pm$ 1.24		92
5				11.11 $\pm$ 1.85	3.15 $\pm$ 1.11	1.25 $\pm$ 1.19		61
Religion								
Islam	10.37 $\pm$ 2.01	3.25 $\pm$ 0.95	1.47 $\pm$ 1.21	10.34 $\pm$ 1.80	3.35 $\pm$ 0.92	1.21 $\pm$ 1.14	91	733
Hinduism	10.86 $\pm$ 2.67	3.86 $\pm$ 0.38	2.29 $\pm$ 0.76	9.93 $\pm$ 2.00	3.63 $\pm$ 0.79	1.41 $\pm$ 1.22	7	27
Sikh	-	-	-	10	2	3	0	1
Mean score	10.41 $\pm$ 2.05	3.30 $\pm$ 0.93	1.53 $\pm$ 1.19	10.32 $\pm$ 1.80	3.36 $\pm$ 0.91	1.22 $\pm$ 1.14	-	-

Table-2: Comparison of students' and physicians' mean knowledge, attitude and practice (KAP) scores on the basis of response groups.

	Knowledge	Attitude	Practice	Knowledge	Attitude	Practice
Do you believe you body should be kept intact after death?						
Yes	10.29 $\pm$ 2.12	3.12 $\pm$ 1.05	1.27 $\pm$ 1.13	10.28 $\pm$ 1.79	3.24 $\pm$ 0.98	0.93 $\pm$ 1.08
No	10.53 $\pm$ 1.99	3.47 $\pm$ 0.77	1.80 $\pm$ 1.21	10.37 $\pm$ 1.81	3.52 $\pm$ 0.79	1.60 $\pm$ 1.10
95% CI – of the mean difference (lower, upper)	-1.07, 0.58	-0.72, 0.02	-1.0, -0.06	-0.17, 0.35	0.15, 0.40	0.52, 0.83
t-stats	-0.589	-1.864	-2.244	0.662	4.266	8.442
p value	0.557	0.066	0.027	0.508	0	0
Do you fear that your body will be disfigured if you donate your organs?						
Yes	10.74 $\pm$ 2.01	3.22 $\pm$ 0.97	1.15 $\pm$ 1.13	10.23 $\pm$ 1.74	3.17 $\pm$ 1.02	0.81 $\pm$ 1.11
No	10.28 $\pm$ 2.06	3.32 $\pm$ 0.92	1.68 $\pm$ 1.19	10.38 $\pm$ 1.84	1.48 $\pm$ 1.08	1.48 $\pm$ 1.08
95% CI – of the mean difference (lower, upper)	-0.46, 1.38	-0.52, 0.32	-1.06, 0.00	-0.11, 0.41	0.17, 0.45	0.51, 0.83
t-stats	0.99	-0.48	-1.984	1.117	4.371	8.243
p value	0.325	0.632	0.05	0.264	0	0
Has a loved one of yours ever needed/received an organ?						
Received	11.13 $\pm$ 1.73	3.75 $\pm$ 0.71	1.88 $\pm$ 1.36	10.31 $\pm$ 1.83	3.64 $\pm$ 0.68	1.51 $\pm$ 1.26
95% CI – of the mean difference (lower, upper)	-0.73, 2.27	-0.18, 1.18	-0.50, 1.26	-0.40, 0.37	0.16, 0.48	0.10, 0.59
t-stats	1.018	1.451	0.857	-0.065	4.035	2.767
p value	0.312	0.15	0.394	0.948	0	0.006
Have you ever received an organ for transplantation?						
Yes	12.00 $\pm$ 2.04	3.50 $\pm$ 1.00	1.75 $\pm$ 2.06	12.5 $\pm$ 1.85	3.00 $\pm$ 1.07	3.25 $\pm$ 1.16
I've never needed it	10.38 $\pm$ 1.83	3.30 $\pm$ 0.94	1.48 $\pm$ 1.14	10.30 $\pm$ 1.78	3.37 $\pm$ 0.91	1.19 $\pm$ 1.12
95% CI – of the mean difference (lower, upper)	-3.68, 0.45	-1.16, 0.75	-3.52, 2.99	-3.45, -0.96	-0.27, 1.01	-2.85, -1.28
t-stats	-1.557	-0.424	-0.257	-3.47	1.138	-5.171
p value	0.123	0.673	0.814	0.001	0.256	0

($p=0.001$).

Corresponding data for physicians was also worked out (Tables 1-2) The mean knowledge scores for students and physicians had no significant difference ($p>0.05$). Students' and physicians' mean attitude scores were not significantly different from each other ($p=0.498$). Practice scores were significantly different between students and physicians ($p=0.011$).

A significant difference was found between the mean scores of males and females ($p=0.000$).

Besides, 757(99.5) students and 97(99.0) physicians had heard of the term 'organ donation'; 650 (85.4) students and 90(91.8%) physicians said they supported OD; and 408(53.6) students and 48(49) physicians said they had not pledged/signed to donate an organ and did not even plan to do so.

Discussion

In the current study, 66.5% students had a high knowledge score, while 33.5% had a low score which could be because the sample did not have a higher number of fourth-year and final-year subjects compared to the first- and second-year participants.(Table-3)

The predominance of female respondents (69.8%) is similar to the pattern observed in two studies, owing to more females undertaking medical education than males in the subcontinent^{7,9}.

Most participants were aware of the term 'organ donation' and sources of OD information included media, educational institutions, relatives (9.7%) and doctors (6.7%), which is inline with literature^{7-9,10,11}.

Only 15.8% of the students knew about 'The Transplantation of Human Organs and Tissues Act, 2010'. Surprisingly, this percentage did not rise much from that reported in a study conducted on medical students several years ago⁷. This is in stark contrast with Indian medical undergraduates, where almost half of the enrolled students were aware of national organ donation laws¹². This indicates the need to incorporate the act in Pakistan's medical education curriculum.

Furthermore, gender caused no significant difference in knowledge scores among the physicians, as has been reported earlier¹³, probably because the medical profession is designed without any gender bias.

Physicians learned about 'organ donation' through an educational institution, followed by media. A possible reason for this could be that medical professionals consider educational institutions a reliable source of

information. This, however, is in contrast with a study conducted in Turkey where media was the most reliable source for information regarding OD compared to educational institutions¹⁴. An explanation for this observed finding could be attributed to a much-developed Turkish media and better awareness regarding OD in Turkey, compared to Pakistan. Over time, the trend of following media for healthcare-related awareness has increased but no notable difference between the knowledge of medical students and physicians in the current study was found, as opposed to a study conducted in Germany in 2004¹³.

Gender also did not have any effect on the attitude of the participants; also supported by literature^{8,11,15}. However, different patterns have also been reported, which probably was because of cultural differences^{9,16}.

Additionally, the two major factors contributing to OD willingness were found to be 'disfigurement of the body' and 'intactness of the body'. Similar to earlier findings, 40.2% of the current participants showed no willingness to donate organs^{17,18}. The practice of selling organs and lack of faith in the medical system play a major role in this regard^{7,17,18}.

Further reasons for unwillingness to donate organs could be the fear of harm to health, lack of confidence, and uncertainty about the health of one's organs¹⁹.

Family plays an integral role in our culture when it comes to decision-making. Therefore, participants whose family was supportive of OD had higher practice scores than those who were not sure of their family's opinion on the matter. This shows that this subject does not hold significant importance in our society. To educate society about this matter, certain measures, such as motivational sessions and awareness campaigns, must be conducted. An interesting finding was that more than half of the medical students were not sure about the stance of their religion on organ and tissue donation. Thus, religious scholars must educate the masses about the stance of their religion on organ donation.

Similarly, the 'disintegration of the body' and 'intactness of the body' played a major role in the physicians' attitude toward the issue, which has also been reported earlier^{13,14,20}.

One alarming finding was that only 2.6% of students pledged to donate an organ. This, however, was higher than 1.4% reported in 2016²².

A significant difference between the practice scores of students and physicians was seen, demonstrating a

Table-3: The percentage of students and physicians present in different response categories of the selected questions.

Questions		Students n (%)	Physicians n (%)
Have you ever heard of the term 'organ donation'?	No	3 (0.4)	1 (1.0)
	Yes	757 (99.6)	97 (99.0)
From where did you hear about organ donation?	Relative	74 (9.7)	6 (6.1)
	Doctor	51 (6.7)	8 (8.2)
	Educational Institution	239 (31.4)	53 (54.1)
	Media	330 (43.4)	18 (18.4)
	Other	67 (8.8)	13 (13.3)
Are you aware of 'The Transplantation of Human Organs and Tissues Act, 2010'? (Passed by the Pakistani government in 2010.)	No	641 (84.2)	68 (69.4)
	Yes	120 (15.8)	30 (30.6)
Do you support organ donation?	No	111 (14.6)	8 (8.2)
	Yes	650 (85.4)	90 (91.8)
Do you think it is ethical to donate blood?	No	24 (3.2)	5 (5.1)
	Yes	737 (96.8)	93 (94.9)
Does your family support organ and tissue donation?	I don't know	276 (36.3)	39 (39.8)
	No	113 (14.8)	18 (18.4)
	Yes, all of them	100 (13.1)	9 (9.2)
	Yes, some of them	272 (35.7)	32 (32.7)
Does your religion agree with organ and tissue donation or transplantation?	I don't know	388 (51.0)	50 (51.0)
	Yes/No	373 (49.0)	48 (49.0)
Do you fear that your body will be disfigured if you donate your organs?	No	467 (61.4)	71 (72.4)
	Yes	294 (38.6)	27 (27.6)
Do you think there will be premature termination of medical treatment for registered organ donors?	I don't know	445 (58.5)	45 (45.9)
	No	192 (25.2)	39 (39.8)
	Yes	33 (16.3)	14 (14.3)
Have you pledged/signed to donate an organ?	No, and I don't plan to do so either	408 (53.6)	48 (49.0)
	No, but I plan to do so	333 (43.8)	47 (48.0)
	Yes	20 (2.6)	3 (3.1)
Have you ever donated blood?	No	550 (72.3)	50 (51.0)
	Yes	211 (27.7)	48 (49.0)
Have you ever received an organ for transplantation?	I am on a waiting list	5 (0.7)	0 (0.0)
	I need it, but haven't received it yet	3 (0.4)	3 (3.1)
	I've never needed it	745 (97.9)	91 (92.9)
	Yes	8 (1.1)	4 (4.1)
Has a loved one of yours ever needed/received an organ?	Needed but hasn't received it yet	32 (4.2)	3 (3.1)
	Never needed it	627 (82.4)	87 (88.8)
	Received	96 (12.6)	8 (8.2)
	They are on a waiting list	6 (0.8)	0 (0.0)

relationship between the level of medical knowledge and practice.

Despite being significant, the number of physicians who pledged to donate an organ was small (3.1%) regardless of having a positive attitude^{14,20}. Interestingly, when medical students and physicians were asked about blood donation, the odds of ever donating blood came out to be 2.29 for non-Muslims compared to the Muslims. This indicates that religion has an impact on such decision-making. However, religion did not influence the decision of donating an organ. This could be because donating an organ is a major decision, while blood donation, in comparison, is a minor one without any significant surgical risks.

The current study has limitations, like not including nurses who play a vital role in healthcare setups. Future studies should include them. Besides, even though the Muslim-to-non-Muslim ratio in the sample size was like the trend found in the general population, it was not sufficient to obtain reliable data for certain questions. Similarly, the sample size of 859 participants was not sufficient to study the effect of religion on attitude and practice. Therefore, it is recommended for future researchers to include participants other than Muslims to raise the power and to obtain actionable results. Furthermore, a few open-ended questions could not be coded and scored in the current study.

While the results can be extrapolated to other low- and middle-income countries, caution should be exercised while doing so due to inherent cultural differences and the heavy influence of religion in Pakistan. Interpretation of results may be subject to bias owing to varying familiarity with religion, culture, etc.

Conclusion

Though knowledge and attitude scores were high, the score for practice was low. Physicians were more inclined to donate organs compared to students. Targeted efforts are needed to improve OD trend in the country.

Disclaimer: None.

Conflict of Interest: None.

Source of Funding: None.

References

1. International Registry in Organ Donation and Transplantation. Donation Activity Charts. [Online] [Cited 2022 April 13]. Available from: URL: <https://www.irodat.org/?p=database>.
2. Home Global Observatory on Donation and Transplantation. [Online] [Cited 2021 May 12]. Available from: URL: <http://www.transplant-observatory.org/>.
3. Jahangir R. Only five deceased organ donations made in country. Pakistan: DAWN. [Online] [Cited 2021 June 13]. Available from: URL: <https://www.dawn.com/news/1305835>.
4. Organ donation statistics. Health Resources & Services Administration. [Cited 2023 April 20]. Available from: URL: <https://www.organdonor.gov/statistics-stories/statistics.html>.
5. Rizvi SA, Naqvi SAA, Zafar MN, Hussain Z, Hashmi A, Akhtar F, et al. Pakistan abolishes kidney market and ushers in a new era of ethical transplantation. *Int J Organ Transplant Med*. 2010; 1:193-7.
6. WHO. Global status report on blood safety and availability. [Online] [Cited 2021 April 23]. Available from: URL: <https://apps.who.int/iris/bitstream/handle/10665/254987/9789241565434-4-eng.pdf;jsessionid=0D9313B2A0BD8363BE9A3903106FCB7B?sequence=1>.
7. Ali NF, Qureshi A, Jilani BN, Zehra N. Knowledge and ethical perception regarding organ donation among medical students. *BMC Med Ethics*. 2013; 14:38. doi: 10.1186/1472-6939-14-38.
8. Khalid F, Khalid AB, Muneeb D, Shabir A, Fayyaz D, Khan M. Level of knowledge and attitude regarding organ donation: a community-based study from Karachi, Pakistan. *BMC Res Notes*. 2019; 12:309. doi: 10.1186/s13104-019-4345-6
9. Hasan H, Zehra A, Riaz L, Riaz R. Insight into the Knowledge, Attitude, Practices, and Barriers Concerning Organ Donation Amongst Undergraduate Students of Pakistan. *Cureus*. 2019; 11:e5517. doi: 10.7759/cureus.5517.
10. Vincent B, Randhawa G, Cook E. Barriers towards organ donor registration and consent among people of Indian origin living globally: a systematic review and integrative synthesis—protocol. *BMJ Open*. 2020; 10:e035360. doi: 10.1136/bmjopen-2019-035360.
11. Lei L, Deng J, Zhang H, Dong H, Luo Y, Luo Y. Level of organ donation-related knowledge and attitude and willingness toward organ donation among a group of university students in western China. *Transplant Proc*. 2018; 50:2924-31. doi: 10.1016/j.transproceed.2018.02.095.
12. Seetharaman RV, Rane JR, Dingre NS. Assessment of knowledge and attitudes regarding organ donation among doctors and students of a tertiary care hospital. *Artif Organs*. 2021; 45:625-32. doi: 10.1111/aor.13871.
13. Schaeffner ES, Windisch W, Freidel K, Breitenfeldt K, Winkelmayr WC. Knowledge and attitude regarding organ donation among medical students and physicians. *Transplantation*. 2004; 77:1714-8. doi: 10.1097/00007890-200406150-00015.
14. Uzuntarla Y. Knowledge and attitudes of health personnel about organ donation: a tertiary hospital example, Turkey. *Transplant Proc*. 2018; 50:2953-60.
15. Ashfaq A, Tariq S, Awan SJ, Sarafraz R, Sultana A, Meraj L. Knowledge, attitude and practices of medical undergraduates of Rawalpindi Medical University regarding potential organ donation. *J Pak Med Assoc*. 2020; 70:1784-8.
16. Ricetto E, Boin I. The effectiveness of current informative material in improving awareness and opinion of undergraduate students towards organ donation: a comparative, randomized survey study. *Clinics (Sao Paulo)*. 2019; 74:e743. doi: 10.6061/clinics/2019/e743.
17. El Hangouche A, Alaika O, Rkain H, Najdi A, Errguig L, Doghmi N, et al. Knowledge, attitudes, and practice of organ donation in Morocco: A cross-sectional survey. *Saudi J Kidney Dis Transpl*. 2018; 29:1358-65.
18. Hu D, Huang H. Knowledge, attitudes, and willingness toward organ donation among health professionals in China. *Transplantation*. 2015; 99:1379-85.
19. Hasan H, Zehra A, Riaz L, Riaz R. Insight into the knowledge, attitude, practices, and barriers concerning organ donation

- amongst undergraduate students of Pakistan. *Cureus*. 2019; 11:e5517.
20. Nadoushan MS, Heshmati BS, Pirsaraee AS, Nodoushan IS, Nadoushan RJ, Yazdi F. Knowledge and attitude of Iranian physicians towards organ and tissue donation. *Int J Organ Transplant Med*. 2014; 5:66-70.
21. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. [Online] [Cited 2022 November 07]. Available from: URL: <https://www.equator-network.org/reporting-guidelines/strobe/>.
22. Panwar R, Pal S, Dash NR, Sahni P, Vij A, Misra MC. Why are we poor organ donors: a survey focusing on attitudes of the lay public from northern India. *J Clin Exp Hepatol*. 2016; 6:81-6.
-