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RESEARCH ARTICLE

THE KNOWLEDGE, PERCEPTION AND ATTITUDES TOWARDS ORGAN DONATION AMONG GENERAL POPULATION - JEDDAH, SAUDI ARABIA.

Layan Khushaim¹, Roaa Al Ghamdi¹, Faisal Al-Husayni², Abdulaziz Al-Zahrani², Arshadullah Khan³ and
 Ahmed Al Zahrani³.

1. College of Medicine, Ibn Sina National College for Health Science, National Guard Hospital, Jeddah, Saudi Arabia.
2. College of Medicine, King Saud Bin Abdulaziz University for Health Sciences, National Guard Hospital, Jeddah, Saudi Arabia.
3. Department of Surgery, King Saud Bin Abdulaziz University for Health Sciences, National Guard Hospital, Jeddah, Saudi Arabia.

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Abstract

Worldwide, organ donation (OD) represents the last resort for millions of patients with end stage organ failure. There is a global shortage of donor organs in comparison to patients awaiting transplantation. Evaluation of Public knowledge and attitude is crucial to develop educational programs to raise the public commitment to OD. Accordingly, the objective of this study was to assess the knowledge and attitude of the general population towards OD in Jeddah city, Saudi Arabia and to analyze various factors affecting them. Self-designed questionnaires were distributed on adult Saudi population of both sexes in four malls in Jeddah, Saudi Arabia and the collected data were statistically analyzed. There were a total of 375 respondents. The respondent's attitude toward organ donation revealed that 107 (28.5%) were not ready to donate while, 24.5% were willing for organ donation and 46.9% were ready to donate only after death. Those showed positive attitude towards organ donation were ready to donate to anyone (53.1%) but, only 16.5% preferred donation to one of their family members. Fear of surgeries (21.9%), family disapproval (12.3%) and religion (5.9%) were the common reasons for the refusal of organ donation. Most of the participants suggested media (38.4%), campaigns (36.0%), and clinics (17.6%) as methods to increase awareness of the public about organ donation. It could be concluded that well-directed educational programs to improve the public knowledge and attitude towards OD are very essential. Maximum use of all possible approaches including mass media, lectures, campaigns, advertisements exhibitions and medical curriculum should be done.

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Introduction:-

Better quality of life as well as medical, psychological, and economic benefits for organ donation have all been well documented (1-3). Although deceased donation rates are increasing and many organs (such as liver, kidney, and

Corresponding Author:-Layan Khushaim.

Address:-College of Medicine, Ibn Sina National College for Health Science, National Guard Hospital, Jeddah, Saudi Arabia.

cornea) are commonly transplanted to recipients, the main obstacle to the transplantation programs is the scarcity of donated organs (4). According to the United Network for Organ Sharing (UNOS) in December 2017, over 114,000 people need a lifesaving organ transplant and are registered in the waiting list for organ donation, while only 34,000 transplants were performed during that year (January - December 2017) (5). In addition, over one million patients in China are diagnosed with end-stage organ disease, and they are waiting for transplantations, but only 10,000 surgeries are performed yearly (6).

There are many factors that affect the rates of organ donation. Knowledge, attitude, and behavior have been shown to have a high influence (7), and individuals with higher level of education revealed a higher motivation to organ donation (8).

A number of studies have been conducted to assess the knowledge and behavior regarding organ donation. In an Indian study, less than 50% of people showed willing to donate their organs (9). A more recent research work on medical students in one of the Mexican universities showed that 50% of students had received no information about organ donation (10). In Turkey, over 60% of medical students were not aware of the process of organ donation (11). Such studies have indicated the need to raise the level of knowledge about organ donation.

Therefore, the current study was carried out to assess the public knowledge, perception, and attitude towards organ donation in Jeddah's community, Kingdom of Saudi Arabia (KSA). Our objectives were to identify whether education level affects the attitude towards organ donation, and to discover the preferred methods of awareness from general population perception and the reasons that prevent them from donation.

Methods:-

Ethical considerations:-

The study participants were interviewed, and the study objectives and methodology were fully explained to them. Participants were considered to have consented if they agreed to complete the study questionnaire. The collected data were kept strictly confidential. Personal information were not reported or gathered. The data were coded and entered into a computer system and were accessed only by the principle investigator and co- investigators. The study researchers have no conflict of interest.

Study design:-

This is a cross-sectional study, based on a questionnaire survey.

Study subjects:-

Saudi adults (18 years-old and older), males and females, residents of Jeddah, Saudi arabia were included, but participants who were younger than 18 years-old and those with incomplete data were excluded from the study.

Study area/setting:-

The study was conducted in four different malls in Jeddah (KSA), namely: (1) Red Sea Mall (North of Jeddah); (2) Alyasmin Mall (East of Jeddah); (3) Alsalam Mall (South of Jeddah); and (4) Stars Avenue Mall (West of Jeddah).

Sample size:

It was determined based on a previous study (12). We had to recruit 364 participants to be 95% confident with 5% margin of error.

Sampling technique:-

The study employed convenience sampling technique to include the desired number of participants meeting the eligibility criteria from four different malls in Jeddah (KSA).

Data collection methods, instruments used, measurements:-

A self-designed questionnaire was used as the study tool. Face validity, content validity and pilot study were carried out. Data were collected in a primary manner where face to face interview was used. The questionnaire consisted of three sections: (1) socio-demographic characteristics and existing diagnosis of any chronic disease; (2) awareness and knowledge about organ donation; and (3) donation attitude.

Data management and analysis plan:-

Data were analyzed using statistical package for social sciences (SPSS) software version 20. Qualitative variables were presented as numbers and percentages in brackets, while quantitative variables were represented as median and interquartile range. Chi-square test was used to determine the association between two variables and Fisher's Exact test was used when >20% of cells had expected count less than 5. P value <0.05 was considered statistically significant.

Results:-

A total of 375 respondents were surveyed, their age ranged from 17 to 70 years with a median age of 30 years (IQR= 240-40). Females outnumbered males (54.7% versus 45.3% respectively). More than half of study population were married and employed (51.55% and 58.4% respectively) Majority (58.9%) of them were at university education and above while, elementary and middle school education represented only .8% and 2.4% respectively. The family income in most of them (38.4%) ranged from 3000 to10000 RS. Additionally, greatest numbers (78.7%) of the participants were healthy with no chronic diseases (table 1).

Out of the total respondents, 361 (96.3%) and 359 (95.7%) have heard of the terms organ donation and transplantation respectively whereas, the majority (83.5%) did not know where to get organ donation card. About two-thirds (66.9%) agree that brain dead persons are eligible to donate organs, and the majority (76.8%) of the participants stated that the family is the entitled to consent for this process. In cases of organ donation from living persons, the majority (91.7%) recognized that the subject himself is the authorized to give consent. Most of the participants believed that organ donation save someone's life while, only view it as a source of money or a social responsibility (86.4%, 7.5% and 6.2% respectively). Except for the significant association between the level of education and the number of participants have heard about organ donation ($p=.001$), there was no significant relation between each of educational level, gender, or the family income and perceptions towards organ donation as shown in tables (2,3 and 4).

Tables (5, 6 and 7) demonstrate the knowledge of the study participants about types of organs that could be donated. Before death, the majority answered kidney (78.4%), followed by liver (47.7%), blood (47.5%), bone marrow (32.5%), heart (25.6%) and cornea (21.3%). Alternatively, heart, kidney, liver and cornea were the most frequently reported organs to be donated after death (52.5%, 49.9%, 40.5% and 39.5% respectively). Significantly higher percentages of university education participants reported kidney as an organ that could be donated before death ($p=.016$). Furthermore, lack of knowledge about organs that could be donated before and after death was significantly higher among those at the level of elementary, middle, diploma and high school education compared to university education ($p<.05$). Table (6) shows that females reported donation of blood, skin and bone marrow before death, and lung and cornea after death significantly more than males. Additionally, there was significant lack of knowledge in males than females (32.4% versus 20.5% respectively). Furthermore, family income did not show significant impact on the level of knowledge of the study population (Table 7).

The respondent's attitude toward organ donation revealed that 107 (28.5%) were not ready to donate while, 24.5% were willing for organ donation and 46.9% were ready to donate only after death. Those showed positive attitude towards organ donation were ready to donate to anyone (53.1%) but, only 16.5% preferred donation to one of their family members. Actually, most of them did not donate before or have an approval card for organ donation after death (98.1% and 97.3% respectively). Fear of surgeries (21.9%), family disapproval (12.3%) and religion (5.9%) were the common reasons for the refusal of organ donation. There was significant association between education level and the reasons that prevent organ donation (.012). Fear of surgeries increased with increase of level of education and it was the most frequent (26.2%) cause among university education and above. On the other hand, family disapproval was the most frequent (33.3%) cause among elementary and middle school education (Table 8). Additionally, fear of surgeries and family disapproval were significantly higher among females than males. While religion and medical condition of the recipient were significantly higher among males ($p=.016$) as shown in table (9). Alternatively, there was no significant association between the family income and attitude of the study population towards organ donation (Table 10).

Most of the participants suggested media (38.4%), campaigns (36.0%), and clinics (17.6%) as methods to increase awareness of the public about organ donation as shown in fig (1). Additionally, they suggested free medical insurance (65.6%), money (26.7%) or awards (7.7%) as a motivation of people towards organ donation (Fig 2).

Table 1:- Socio-demographic data of the study population.

		N=375	%
Age	Range	17.00-70.00	
	Median	30.0	
	IQR	24.00-40.00	
Gender	Male	170	45.3
	Female	205	54.7
Marital status	Single	182	48.5
	Married	193	51.5
Educational level	Elementary	3	0.8
	Middle school	9	2.4
	Diploma	55	14.7
	High school	87	23.2
	University and above	221	58.9
Occupation	Employed	219	58.4
	Not employed	140	37.3
	Retired	16	4.3
Family income (SAR)	<3000	129	34.4
	3000-10000	144	38.4
	>10000	102	27.2
Chronic disease	No	295	78.7
	DM	21	5.6
	HTN	23	6.1
	CKD	1	0.3
	Dyslipidemia	12	3.2
	Hypothyroidism	3	0.8
	Asthma	8	2.1
	Combination	12	3.2

Table 2:- Association between level of education and perceptions towards organ donation.

		Educational level												P valu e
		Elementa ry		Middle school		Diploma		High school		Universit y and above		Total		
		N	%	N	%	N	%	N	%	N	%	N	%	
Have you ever heard of organ donation ?	Yes	3	100. 0	7	77.8	5 1	92. 7	8 1	93. 1	21 9	99. 1	36 1	96. 3	.001 *
	No	0	0.0	2	22.2	4	7.3	6	6.9	2	0.9	14	3.7	
Have you ever heard of organ transpla nt?	Yes	3	100. 0	7	77.8	5 3	96. 4	8 2	94. 3	21 4	96. 8	35 9	95. 7	.119
	No	0	0.0	2	22.2	2	3.6	5	5.7	7	3.2	16	4.3	
Do you know where to get organ	Yes	0	0.0	0	0.0	1 1	20. 0	1 2	13. 8	39	17. 6	62	16. 5	.580
	No	3	100. 0	9	100. 0	4 4	80. 0	7 5	86. 2	18 2	82. 4	31 3	83. 5	

donation card?														
Is organ donation be done from brain dead person?	Yes	0	0.0	6	66.7	3	69.1	5	66.7	14	67.4	25	66.9	.233
	No	3	100.0	3	33.3	1	30.9	2	33.3	72	32.6	12	33.1	
Who is entitled to consent to donate organs from a living person?	Himself	2	66.7	8	88.9	5	94.5	8	94.3	20	90.5	34	91.7	.167
	Family	1	33.3	0	0.0	3	5.5	4	4.6	19	8.6	27	7.2	
	Friends	0	0.0	1	11.1	0	0.0	1	1.1	2	0.9	4	1.1	
Who is entitled to consent to donate organs from a dead person?	Spouse	0	0.0	1	11.1	1	20.0	2	26.4	49	22.2	84	22.4	.710
	Family	3	100.0	8	88.9	4	78.2	6	72.4	17	77.4	28	76.8	
	Friends	0	0.0	0	0.0	1	1.8	1	1.1	1	0.5	3	0.8	
What is your opinion of donating organs	Save life	3	100.0	9	100.0	5	90.9	7	90.8	18	82.3	32	86.4	.126
	Money	0	0.0	0	0.0	0	0.0	4	4.6	24	10.9	28	7.5	
	Social responsibility	0	0.0	0	0.0	5	9.1	4	4.5	14	6.3	23	6.2	

Table 3:-Association between gender and perceptions towards organ donation.

		Gender						P
		Male		female		Total		
		N	%	N	%	N	%	
Have you ever heard of organ donation?	Yes	162	95.3	199	97.1	361	96.3	.366
	No	8	4.7	6	2.9	14	3.7	
Have you ever heard of organ transplant?	Yes	162	95.3	197	96.1	359	95.7	.702
	No	8	4.7	8	3.9	16	4.3	
Do you know where to get organ donation card?	Yes	29	17.1	34	16.6	62	16.5	.903
	No	141	82.9	171	83.4	313	83.5	
Is organ donation be done from brain dead person?	Yes	111	65.3	140	68.3	251	66.9	.539
	No	59	34.7	65	31.7	124	33.1	
Who is entitled to consent to donate organs from a living person?	Himself	152	89.4	192	93.7	344	91.7	.301
	Family	16	9.4	11	5.4	27	7.2	
	Friends	2	1.2	2	1.0	4	1.1	
Who is entitled to consent to donate organs from a dead person?	Spouse	32	18.8	52	25.4	84	22.4	.255
	Family	136	80.0	152	74.1	288	76.8	
	Friends	2	1.2	1	0.5	3	0.8	

What is your opinion of donating organs	save life	151	88.8	173	84.4	324	86.4	.179
	Money	8	4.7	20	9.8	28	7.5	
	Social responsibility	11	6.5	12	5.9	23	6.1	

Table 4:- Association between family income and perceptions towards organ donation.

		Family income								P
		<3000		3000-10000		>10000		Total		
		N	%	N	%	N	%	N	%	
Have you ever heard of organ donation?	Yes	122	94.6	141	97.9	98	96.1	361	96.3	.311
	No	7	5.4	3	2.1	4	3.9	14	3.7	
Have you ever heard of organ transplant?	Yes	123	95.3	139	96.5	97	95.1	359	95.7	.831
	No	6	4.7	5	3.5	5	4.9	16	4.3	
Do you know where to get organ donation card?	Yes	15	11.6	26	18.1	22	21.6	62	16.5	.117
	No	114	88.4	118	81.9	80	78.4	313	83.5	
Is organ donation be done from brain dead person?	Yes	90	69.8	95	66.0	66	64.7	251	66.9	.685
	No	39	30.2	49	34.0	36	35.3	124	33.1	
Who is entitled to consent to donate organs from a living person?	Himself	120	93.0	134	93.1	90	88.2	344	91.7	.195
	Family	9	7.0	7	4.9	11	10.8	27	7.2	
	Friends	0	0.0	3	2.1	1	1.0	4	1.1	
Who is entitled to consent to donate organs from a dead person?	Spouse	26	20.2	40	27.8	18	17.6	84	22.4	.153
	Family	103	79.8	102	70.8	83	81.4	288	76.8	
	Friends	0	0.0	2	1.4	1	1.0	3	0.8	
What is your opinion of donating organs	Save life	117	90.7	125	86.8	82	80.4	324	86.4	.143
	Money	6	4.7	9	6.2	13	12.7	28	7.5	
	Social responsibility	6	4.7	10	6.9	7	6.9	23	6.1	

Table 5:- Association between level of education and knowledge about types of organs that could be donated before and after death.

		Educational level												P valu e
		Elementar y		Middle school		Diploma		High school		University and above		Total		
		N	%	N	%	N	%	N	%	N	%	N	%	
Before death														
Kidney	Yes	0	0.0	5	55.6	4	78.3	6	78.2	17	80.5	29	78.4	.016*
Lung	Yes	0	0.0	2	22.2	7	12.7	1	16.4	49	22.2	72	19.2	.438
Blood	Yes	0	0.0	5	55.6	2	47.3	4	47.1	10	48.0	17	47.5	.650
Heart	Yes	0	0.0	3	33.3	1	18.2	2	25.3	61	27.6	96	25.6	.552
Cornea	Yes	0	0.0	2	22.2	1	20.0	2	24.1	46	20.8	80	21.3	.942
Liver	Yes	0	0.0	5	55.6	3	54.0	3	43.8	10	48.0	17	47.9	.378
Intestines	Yes	0	0.0	1	11.1	4	7.3	4	4.6	23	10.4	32	8.5	.472

Skin	Yes	0	0.0	2	22.2	9	16.4	14	16.1	33	14.9	58	15.5	.927
Bone marrow	Yes	0	0.0	2	22.2	11	20.0	34	39.1	75	33.9	122	32.5	.106
Pancreas	Yes	0	0.0	2	22.2	6	10.9	16	18.4	31	14.0	55	14.7	.635
Limbs	Yes	0	0.0	2	22.2	3	5.5	10	11.5	23	10.4	38	10.1	.440
Brain	Yes	0	0.0	2	22.2	2	3.6	4	4.6	13	5.9	21	5.6	.297
Don't know	Yes	3	100.0	2	22.2	7	12.7	11	12.6	28	12.7	51	13.6	.011*
After death														
Kidney	Yes	0	0.0	3	33.3	23	41.8	46	52.9	115	52.0	187	49.9	.209
Lung	Yes	0	0.0	1	11.1	19	34.5	35	40.2	82	37.1	137	36.5	.359
Blood	Yes	0	0.0	1	11.1	5	9.1	16	18.4	28	12.7	50	13.3	.537
Heart	Yes	0	0.0	5	55.6	23	41.8	43	49.4	126	57.0	197	52.5	.089
Cornea	Yes	0	0.0	3	33.3	17	30.9	31	35.6	97	43.9	148	39.5	.212
Liver	Yes	0	0.0	3	33.3	21	38.2	36	41.4	92	41.6	152	40.5	.755
Intestines	Yes	0	0.0	1	11.1	9	16.4	18	20.7	32	14.5	60	16.0	.715
Skin	Yes	0	0.0	2	22.2	10	18.2	18	20.7	37	16.7	67	17.9	.875
Bone marrow	Yes	0	0.0	2	22.2	13	23.6	21	24.1	60	27.1	96	25.6	.947
Pancreas	Yes	0	0.0	1	11.1	14	25.5	27	31.0	59	26.7	101	26.9	.687
Limbs	Yes	0	0.0	2	22.2	16	29.1	24	27.6	56	25.3	98	26.1	.917
Brain	Yes	0	0.0	0	0.0	15	27.3	18	20.7	37	16.7	70	18.7	.227
Don't know	Yes	3	100.0	3	33.3	19	34.5	21	24.1	51	23.1	97	25.9	.025*

Table 6:-Association between gender and knowledge about types of organ the could be donated before and after death.

		Gender						P
		Male		Female		Total		
		N	%	N	%	N	%	
Before death								
Kidney	Yes	129	75.9	165	80.5	294	78.4	.286
Lung	Yes	31	18.2	41	20.0	72	19.2	.666
Blood	Yes	67	39.4	111	54.1	178	47.5	.004*
Heart	Yes	38	22.4	58	28.3	96	25.6	.190
Cornea	Yes	34	20.0	46	22.4	80	21.3	.566
Liver	Yes	90	52.9	89	43.4	179	47.7	.066
Intestines	Yes	13	7.6	19	9.3	32	8.5	.576
Skin	Yes	14	8.2	44	21.5	58	15.5	<.001*

Bone marrow	Yes	43	25.3	79	38.5	122	32.5	.006*
Pancreas	Yes	25	14.7	30	14.6	55	14.7	.984
Limbs	Yes	16	9.4	22	10.7	38	10.1	.673
Brain	Yes	8	4.7	13	6.3	21	5.6	.493
Don't know	Yes	29	17.1	22	10.7	51	13.6	.075
After death								
Kidney	Yes	80	47.1	107	52.2	187	49.9	.322
Lung	Yes	53	31.2	84	41.0	137	36.5	.050*
Blood	Yes	15	8.8	35	17.1	50	13.3	.019*
Heart	Yes	80	47.1	117	57.1	197	52.5	.053
Cornea	Yes	45	26.5	103	50.2	148	39.5	<.001*
Liver	Yes	68	40.0	84	41.0	152	40.5	.866
Intestines	Yes	23	13.5	37	18.0	60	16.0	.232
Skin	Yes	23	13.5	44	21.5	67	17.9	.046*
Bone marrow	Yes	39	22.9	57	27.8	96	25.6	.283
Pancreas	Yes	36	21.2	65	31.7	101	26.9	.022*
Limbs	Yes	34	20.0	64	31.2	98	26.1	.014*
Brain	Yes	25	14.7	45	22.0	70	18.7	.073
Don't know	Yes	55	32.4	42	20.5	97	25.9	.009*

Table 7:- Association between family income and knowledge about types of organ that could be donated before and after death.

		Family income								P value
		<3000		3000-10000		>10000		Total		
		N	%	N	%	N	%	N	%	
Before death										
Kidney	yes	97	75.2	119	82.6	78	76.5	294	78.4	.287
Lung	yes	24	18.6	25	17.4	23	22.5	72	19.2	.581
Blood	yes	65	50.4	71	49.3	42	41.2	178	47.5	.231
Heart	yes	30	23.3	32	22.2	34	33.3	96	25.6	.109
Cornea	yes	28	21.7	27	18.8	25	24.5	80	21.3	.550
Liver	yes	62	48.1	68	47.2	49	48.0	179	47.7	.988
Intestines	yes	13	10.1	8	5.6	11	10.8	32	8.5	.260
Skin	yes	25	19.4	18	12.5	15	14.7	58	15.5	.283
Bone marrow	yes	48	37.2	40	27.8	34	33.3	122	32.5	.243
Pancreas	yes	19	14.7	23	16.0	13	12.7	55	14.7	.786
Limbs	yes	14	10.9	11	7.6	13	12.7	38	10.1	.402
Brain	yes	8	6.2	7	4.9	6	5.9	21	5.6	.881
Don't know	yes	20	15.5	16	11.1	15	14.7	51	13.6	.532
After death										
Kidney	yes	68	52.7	72	50.0	47	46.1	187	49.9	.605
Lung	yes	59	45.7	51	35.4	27	26.5	137	36.5	.010*
Blood	yes	26	20.2	17	11.8	7	6.9	50	13.3	.010*
Heart	yes	69	53.5	81	56.2	47	46.1	197	52.5	.280
Cornea	yes	46	35.7	62	43.1	40	39.2	148	39.5	.458
Liver	yes	57	44.2	58	40.3	37	36.3	152	40.5	.476
Intestines	yes	26	20.2	23	16.0	11	10.8	60	16.0	.156
Skin	yes	29	22.5	25	17.4	13	12.7	67	17.9	.156
Bone marrow	yes	31	24.0	40	27.8	25	24.5	96	25.6	.745
Pancreas	yes	40	31.0	38	26.4	23	22.5	101	26.9	.342
Limbs	yes	43	33.3	31	21.5	24	23.5	98	26.1	.067
Brain	yes	32	24.8	23	16.0	15	14.7	70	18.7	.084
Don't know	yes	32	24.8	32	22.2	33	32.4	97	25.9	.191

Table 8:-Association between level of education and attitude towards organ donation.

		Educational level												P
		Elementary		Middle school		Diploma		High school		University and above		Total		
		N	%	N	%	N	%	N	%	N	%	N	%	
Are you ready to donate your organs?	Yes	0	0.0	2	22.2	16	29.1	22	25.3	52	23.5	92	24.5	.298
	Only after death	1	33.3	4	44.4	30	54.5	44	50.6	97	43.9	176	46.9	
	No	2	66.7	3	33.3	9	16.4	21	24.1	72	32.6	107	28.5	
Who will you donate?	Family member	1	33.3	0	0.0	12	21.8	18	20.7	31	14.0	62	16.5	.105
	Friend	0	0.0	1	11.1	1	1.8	3	3.4	3	1.4	8	2.1	
	Anyone	0	0.0	5	55.6	33	60.3	46	52.9	115	52.0	199	53.1	
	Not ready to donate	2	66.7	3	33.3	9	16.4	20	23.0	72	32.6	106	28.3	
Have you ever donated to any of your members?	Yes	0	0.0	0	0.0	2	3.6	0	0.0	5	2.3	7	1.9	.386
	No	3	100	9	100.0	53	96.4	87	100.0	216	97.7	368	98.1	
Do you have the approval card to donate organs after death?	Yes	0	0.0	0	0.0	4	7.3	1	1.1	5	2.3	10	2.7	.423
	No	3	100	9	100.0	51	92.7	86	98.9	216	97.7	365	97.3	
What are the reasons that prevent you from donating to a specific person?	Age	0	0.0	1	11.1	1	1.8	3	3.4	2	0.9	7	1.9	.012*
	Religion	0	0.0	0	0.0	2	3.6	6	6.9	14	6.3	22	5.9	
	Medical condition of the recipient	1	33.3	0	0.0	2	3.6	6	6.9	11	5.0	20	5.3	
	Personal relationship	0	0.0	0	0.0	0	0.0	2	2.3	12	5.4	14	3.7	
	Family disapproval	1	33.3	3	33.3	2	3.6	15	17.2	25	11.3	46	12.3	
	Fear of surgeries	0	0.0	2	22.2	7	12.7	15	17.2	58	26.2	82	21.9	
	No	1	33.3	3	33.3	41	74.5	40	46.0	99	44.8	184	49.1	

Table 9:-Association between gender and attitude towards organ donation.

		Gender						P
		Male		Female		Total		
		N	%	N	%	N	%	
Are you ready to donate your organs?	Yes	42	24.7	50	24.4	92	24.5	.703
	Only after death	83	48.8	93	45.4	176	46.9	
	No	45	26.5	62	30.2	107	28.5	
Who will you donate?	Family member	30	17.6	32	15.6	62	16.5	.326
	Friend	6	3.5	2	1.0	8	2.1	
	Anyone	89	52.4	110	53.	199	53.1	
	Not ready to donate	45	26.5	61	29.8	106	28.3	
Have you ever donated to any of your members?	Yes	2	1.2	5	2.4	7	1.9	.369
	No	168	98.8	200	97.6	368	98.1	
Do you have the approval card to donate organs after death?	Yes	4	2.4	6	2.9	10	2.7	.731
	No	166	97.6	199	97.1	365	97.3	
What are the reasons that prevent you from donating to a specific person?	Age	1	0.6	6	2.9	7	1.9	.016*
	Religion	11	6.5	11	5.4	22	5.9	
	Medical condition of the recipient	11	6.5	9	4.4	20	5.3	
	Personal relationship	4	2.4	10	4.9	14	3.7	
	Family disapproval	13	7.6	33	16.1	46	12.3	
	Fear of surgeries	33	19.4	49	23.9	82	21.9	
	No reasons prevent me	97	57.1	87	42.4	184	49.1	

Table 10:-Association between family income and attitude towards organ donation.

		Family income								P
		<3000		3000-10000		>10000		Total		
		N	%	N	%	N	%	N	%	
Are you ready to donate your organs?	Yes	34	26.4	30	20.8	28	27.5	92	24.5	.135
	Only after death	65	50.4	73	50.7	38	37.3	176	46.9	
	No	30	23.3	41	28.5	36	35.3	107	28.5	
Who will you donate?	family member	29	22.5	18	12.5	15	14.7	62	16.5	.075
	Friend	4	3.1	1	0.7	3	2.9	8	2.1	
	Anyone	67	51.9	84	58.3	48	47.1	199	53.1	
	Not ready to donate	29	22.5	41	28.5	36	35.3	106	28.3	
Have you ever donated to any of your members?	Yes	1	0.8	3	2.1	3	2.9	7	1.9	.468
	No	128	99.2	141	97.9	99	97.1	368	98.1	
Do you have the approval card to donate organs after death?	Yes	2	1.6	4	2.8	4	3.9	10	2.7	.537
	No	127	98.4	140	97.2	98	96.1	365	97.3	
What are the reasons that prevent you from donating to a specific person?	Age	4	3.1	1	0.7	2	2.0	7	1.9	.252
	Religion	9	7.0	6	4.2	7	6.9	22	5.9	
	Medical condition of the recipient	9	7.0	6	4.2	5	4.9	20	5.3	

	Personal relationship	4	3.1	6	4.2	4	3.9	14	3.7
	Family disapproval	24	18.6	13	9.0	9	8.8	46	12.3
	Fear of surgeries	28	21.7	32	22.2	22	21.6	82	21.9
	No reasons prevent me	51	39.5	80	55.6	53	52.0	184	49.1

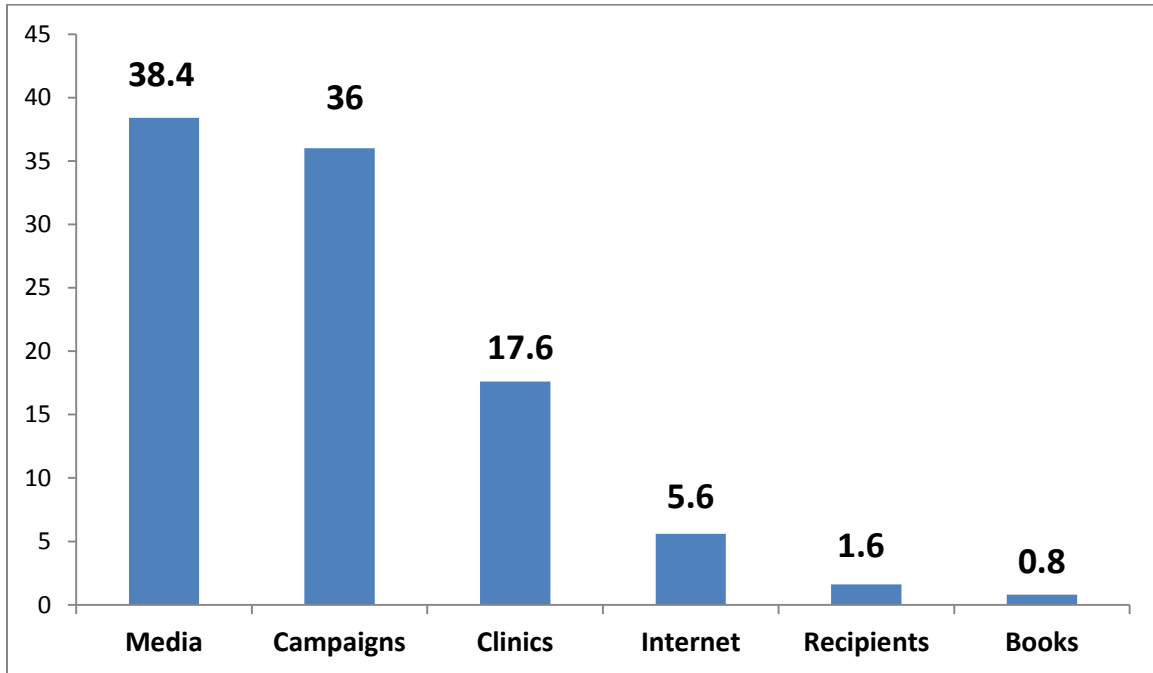


Figure 1:- participant's suggestions to increase a awareness of people about organ donation.

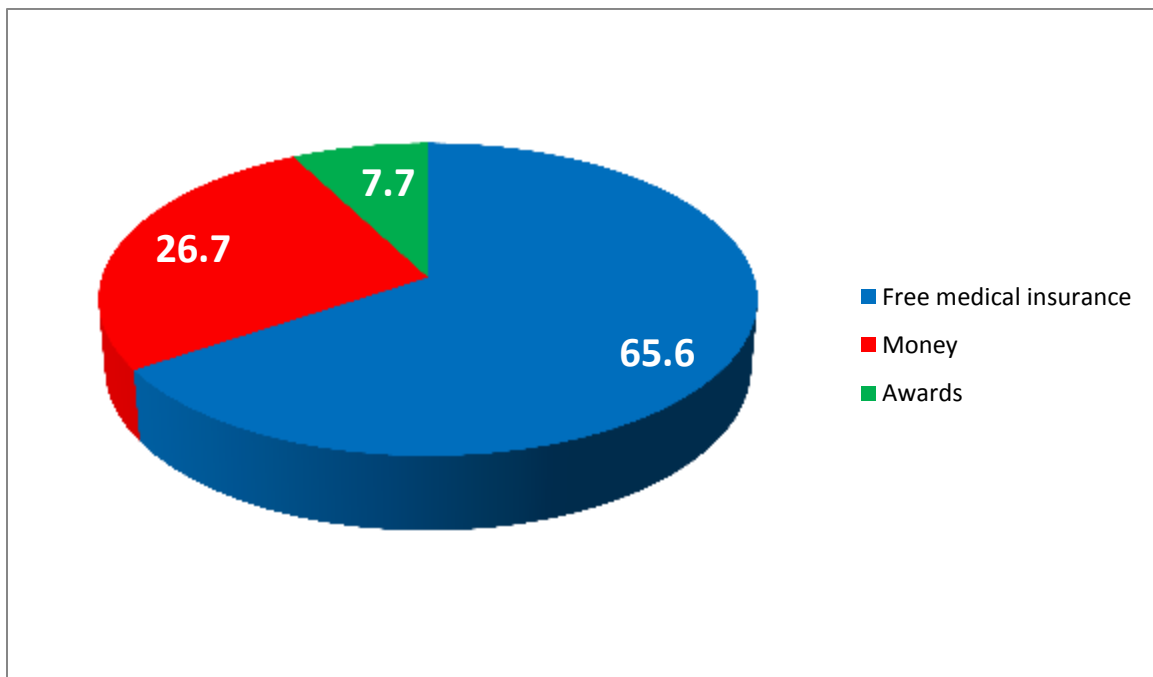


Figure 2:-participant's suggestions to motivate people towards organ donation.

Discussion:-

Worldwide, organ donation (OD) represents the last resort for millions of patients with end stage organ failure (13). There is a global shortage of donor organs in comparison to patients awaiting transplantation (14). Public knowledge and attitude is crucial to overcome the shortage of donor organs (15). So, their evaluation is essential to develop educational programs to raise the public commitment to OD. Accordingly, this study assessed various factors affecting the knowledge and attitude of the general population towards OD in Jeddah city, Saudi Arabia.

In this study, most of the study populations have heard about OD, transplantation and they believed that it saves someone's life. However, the majority did not know where to get organ donation card. This observed lack of knowledge about SCOT and how to get the donation card was also seen among the medical staff in Saudi Arabia as less than one-third of intensivists in a study knew the role of SCOT in organ donation (16). Moreover, this study showed considerable lack of knowledge about organ donation from brain dead persons where only two-thirds stated that brain dead persons are eligible to donate organs. Similar poor knowledge was reported in Pakistan where only 23% of participants knew that organs can come from both living and cadaver bodies (17). Actually, inadequate knowledge and vague conception of brainstem death always had a negative effect on OD (15). A survey on Sweden ICU nurses highlighted that they didn't trust brain death diagnosis (18). The current study also revealed that the overall perceptions about OD did not differ significantly by educational level, gender, or the family income. In contrast, a study in Korea has shown a high level of knowledge among health-care professionals which is influenced significantly by educational level of the respondents (19).

Knowledge about types of organs that could be donated before and after death was assessed in this study. Before death, the majority answered kidney (78.4%), followed by liver (47.7%), blood (47.5%), bone marrow (32.5%), heart (25.6%) and cornea (21.3%). Alternatively, heart, kidney, liver and cornea were the most frequently reported organs to be donated after death (52.5%, 49.9%, 40.5% and 39.5% respectively). It also explored considerable lack of this knowledge among participants with low education and among males. This should be considered and well-directed interventions are needed to educate them about the topic of organ donation.

In this study, about seventy percent showed positive attitude towards organ donation and they were willing to donate either before or after death. On the other hand, 28.5% showed negative attitude and refused organ donation. More negative attitude and refusal of organ donation was reported among Saudi population in Taif (59.3%) and Al-Kharg (75%) by Al-Harathi and Alzahrany (20) and Agrawal et al. (21). In west countries, a public survey in the United States revealed that 75% are more likely to donate their organs, and similarly, in the United Kingdom, a cross-sectional study included 119 respondents has shown two-thirds of them were in favor of donating their organs and participants who knew someone who had donated or received an organ are having a more positive attitude (22, 23). Furthermore, many studies evaluated knowledge and attitude of medical students in different countries such as Saudi Arabia, Ireland, India, and Nigeria revealed adequate level of knowledge, and the majority are willing to donate with a positive correlation between the level of knowledge and the willing toward donation (24-26). Positive attitude of our study participants was also detected in their preference of who to donate where more than half of them were ready to donate to anyone. This agrees with Majeed (26), and it shows their optimistic attitude toward other human being.

In this survey, there was no significant association between the participant's attitudes towards OD and their education, gender or income. In agreement with this Hamed et al. (15) reported absence of association between gender and attitude of medical students toward OD. In contrast, many reports concluded that female gender was significantly associated with positive attitude towards OD (27-29). Another study by Boulware et al. (30) reported that young males with higher education showed better attitude towards OD.

Despite our study participants' positive attitude toward organ donation, only 2.7% of them are holders of donor card. This contribution is much lower than reported among Saudi nursing (28.3%) and medical students (17.5%) at University of Dammam by Majeed (26). Other Asian studies like Korean, Chinese and Japanese, and other American and European studies reported much higher rate of card holders (31-35). This is attributed to the observed lack of knowledge among our study participants about how to get the donor card. This needs to be addressed and it necessitates more efforts by SCOT in order to compensate organ shortage in Saudi Arabia.

Fear of surgeries, family disapproval, and religion were the common reasons for the refusal of organ donation in our study. Additionally, religious causes were more reported by males. In agreement with this, fear of body mutilation,

health complications, lack of proper information, and religious reasons were the most common reasons for a significant proportion of unwillingness for organ donation among Saudi population in Al-Kharj (21). In different studies, health concerns were the main causes to oppose donation including fear of living with one kidney, fear of operation, and other medical reasons, in addition to inadequate information on organ donation (36, 37). Despite many Islamic scholars and organizations had issued Fatwas in favor of organ donation (38, 39). Additionally, Deceased and living donor organ donation is allowed and practiced in many Islamic countries as Saudi Arabia and Pakistan (38). One of the reported issues behind refusal of OD among the study participants are religious causes. Other Saudi studies reported a similar result (37, 40). In Malaysia, an overwhelming majority of the respondents (98.5%) are against donating their organs, despite receiving information on organ donation (41).

Most of the studied participants suggested media, campaigns, and clinics as methods to increase awareness of the public about organ donation. Additionally, they suggested free medical insurance, money or awards as a motivation of people towards organ donation. This shows that the media plays a key role in raising awareness of organ donation. Moreover, more awareness campaigns sponsored by SCOT are to be held throughout the kingdom to improve the population knowledge. Such awareness programs will definitely promote the Public attitude toward organ donation.

Conclusion:-

These results suggest considerable lack in information regarding OD among general population in Jeddah, especially the concept of brain death and types of organs eligible for donation before and after death. Likewise, they showed positive attitude and willingness towards organ donation to anyone, but actually they did not have the knowledge about the responsible governmental institution and how to get the donation card. Moreover, health concerns and religious reasons were reported as important barriers against OD. All these issues should be highlighted and focused on while preparing educational programs to improve the public knowledge and attitude towards OD. Maximum use of all possible approaches including mass media, lectures, campaigns, advertisements exhibitions and medical curriculum should be done. Also, motivation of the public can be increased by some legislation like free medical insurance or awards.

Study limitations:-

Limitation of this study is partly due to the small sample size and being confined to only one city.

Potential conflicts of interest:-

The authors declare that there are no conflicts of interest.

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