

Assessment of Awareness, Knowledge and Attitudes about the Importance of Cadaver and Cadaver Donation: Report of Izmir, Turkey

Evaluación de la Conciencia, el Conocimiento y las Actitudes sobre la Importancia del Cadáver y la Donación de Cadáveres: Informe de Izmir, Turquía

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SUMMARY: The aim of this study was to evaluate the awareness, knowledge level and attitudes of the community in Izmir/Turkey about cadaver donation in medical education. A cross-sectional study was carried out. Randomly chosen 245 participants answered twenty items in the questionnaire providing information about their demographics (5 items), awareness and knowledge (10 items), and attitudes (5 items) about body donation. The questionnaire was applied face-to-face. Descriptive statistics presented. Student T test and One-Way ANOVA test were used for statistical analysis. 123 (50.2 %) participants were male and 159 (64.9 %) were between 30 to 59 years old. 185 (75.5 %) respondents knew what the word "cadaver" means. When asked where they would apply if they decided to donate their body, 104 (42.4 %) of the participants gave the answer "state hospital". The mean score of awareness and knowledge about importance of cadaver and body donation (AWKL-Score) was 0.41 ± 0.24 (min:0.00, max:0.90). AWKL-Score was statistically higher in the youngest (18-29 y) and oldest (>60 y) compared to the other age groups (F:4.115; p:0.007). AWKL-Score increased as the level of education increased. The highest AWKL-Score was at post-graduate level (Level 7,8) (F:22.997; p<0.001). The AWKL-Score was higher in public employees and students compared to other occupational groups (F:5.930; p<0.001). The answers to the questionnaire were important indicators of how much society needs to be informed regarding body donation.

KEY WORDS: Body donation; Cadaver; Awareness and knowledge level; Attitude; Anatomy education; Medical education.

INTRODUCTION

In medical education, cadaver [(k-dav'r) (L., from cadere to fall, to perish) a dead body; generally applied to a human body (Dorland, 2011) is an indispensable material of medical education. Education on the human body is a "sine qua non" of anatomy. Scientific studies have been conducted on cadavers for centuries. Newly developed technological training materials do not appear to replace dissection and cadaver work. For a qualified anatomical and medical education, the students must work on a cadaver. The number of cadavers used in medical school education in Turkey is far below the desired level (Gürses *et al.*, 2018). Unfortunately, in some medical faculties, anatomy education is performed without cadavers. In developed countries, cadavers are provided by public donations. Thousands of people donate their bodies to medical schools for educational and scientific purposes. This is an important indicator of societies' belief and support in science.

Devoting the body to the development of humanity and science is the most valuable gift that a dead person can give to the living, which cannot be measured by any material value. At this point, voluntary body donors, who want to support scientific studies have a big duty. Within the framework of the law, as in other developed countries, in Turkey, after death, people can donate their body for educational and scientific purposes. In addition, the body of the person known to have willing can be donated for the same purpose with the approval of all heirs. The work on the donated bodies is carried out with the utmost respect within the ethical rules, and then the funeral procedures are performed according to the request of the donor. Despite the above, it is remarkable that the number of body donations is not at the desired level in Turkey.

While the number of donors in Europe and North

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America is quite high, unfortunately this number is very low in our country. Accordingly, the number of cadavers obtained from voluntary donors in medical education is extremely low (Gürses *et al.*). Undoubtedly, these difficulties in medical education on cadavers can be overcome by increasing the number of body donors. It is very important to investigate the reasons for not increasing the number of cadaver donors in the society and to propose solutions in this regard (Wight *et al.*, 2000; Dinsmore *et al.*, 2001; Gürses *et al.*). This study aimed to assess the awareness, knowledge and attitudes about the importance of cadaver in medical education and cadaver donation.

MATERIAL AND METHOD

A cross-sectional study was conducted in 2015 and 2016. The data of the study was collected with a questionnaire form prepared by the researchers in accordance with the purpose of the study and the literature (Emson, 1987; Kleinman & Lowy, 1989; Wight *et al.*; Dinsmore *et al.*; Bøgh & Madsen, 2005; Mekahli *et al.*, 2009; da Rocha *et al.*, 2013; Caplan, 2014; Gatica-Araneda & Alfaro-Tolosa, 2014; Dalal, 2015; Saha *et al.*, 2015; Subasinghe & Jones, 2015; Abbasi Asl *et al.*, 2017; Bamaç *et al.*, 2018; Ciliberti *et al.*, 2018; Gürses *et al.*; Wingfield, 2018) [see additional file 1 (English translation of the questionnaire form)]. The questionnaire consists of three sections (Tabla I). The first section includes five questions (Q1-Q5) that question about some sociodemographic characteristics (gender, age, educational status, marital status, occupation). Education status categories are formed by grouping the levels reported at ISCED 2011 (UNESCO, 2012). Awareness and level of knowledge were questioned with ten items (Q6-Q15) in the second part. To determine the awareness and knowledge level, the answers are scored by giving 1 point for the "yes", and 0 point for the "no". Thus, the average level of awareness and knowledge (AWKL-Score) was calculated between 0 and 1. In the third part, the attitudes towards cadaver donation was questioned with a total of five questions (Q16-Q20). In the second and third part of the survey, thoughts about the cadaver, body donation, body donation campaigns and news were investigated as well as the thoughts for requirement of cadaver in medical faculties in our country and cadaver imports. In addition, it was investigated whether the participants knew the procedures related to cadaver donation, cadaver use and post-donation. Participants were asked to answer questions about their knowledge and behavior about body donation, both religiously and sociologically.

The survey population were adults living in Izmir/Turkey who had no impairment answering the questions.

The population of Izmir in 2015 is 4,168,415 and Izmir's population aged 18 and over is estimated approximately 3,334,732. As considering unknown prevalence in general population, 50 % prevalence, 95 % confidence interval and 6 % margin of error were accepted for sample size calculating. Thus, the sample size was calculated as 196. For the research, people living in the center of Izmir were randomly reached in crowded bazaars and shopping centers. A sample group was formed with 245 people who agreed to participate in the study with verbal consent. The questionnaire was applied to the participants by face to face interview technique. Each interview lasted approximately 15-20 minutes.

The data were analyzed using IBM SPSS Statistics v25 (SPSS Inc, Chicago, IL) software package. Descriptive statistics (frequencies and percentages) were used to describe the obtained results. When comparing mean scores for groups two-tailed paired-sample t-test (when comparing two groups' means) was used. One-way Analysis of Variance (ANOVA) test was used to compare the means for more than two groups and post hoc analysis was performed in paired comparisons. Statistical significance was set at $p < 0.05$. and a p -value < 0.001 as highly significant.

RESULTS

The majority of participants (n: 245) were aged between 45-59 years (n: 80, 32.7 %), male (n: 123, 50.2 %), held a Bachelor's or equivalent degree (Level 6) (n: 96, 39.2 %), married (n: 178, 72.7 %), and public employee (n: 49, 20 %). The participants' some sociodemographic characteristics are shown in Table II.

75.5 % of the participants knew what the word cadaver means. The percentage of those who knew they could donate their body (as cadaver) was 66.9 %. With regards to the question "Are you aware of the cadaver donation campaigns?", 20.4 % (n:50) of the participants responded yes. With regards to the question "Do you know that Turkish Universities import donated cadavers from abroad and pay transfer fees?", 17.6 % (n:43) of the participants responded yes. With regards to the question "Are you aware of the fatwa of the Presidency of Religious Affairs regarding the body donation is permissible in Sharia (Islamic law)?", 29.8 % (n:73) of the participants responded yes. Table III shows the distribution of the answers of the participants to the questions measuring the level of awareness and knowledge about importance of cadaver and cadaver donation.

Table I. Questionnaire on awareness, knowledge and attitude about the importance of cadaver and cadaver donation

SECTION 1	1. Gender <input type="checkbox"/> Female <input type="checkbox"/> Male	
	2. Age <input type="checkbox"/> 18-29 <input type="checkbox"/> 30-44 <input type="checkbox"/> 45-59 <input type="checkbox"/> ≥60	
	3. Level of education <input type="checkbox"/> Literate (Level 1) <input type="checkbox"/> Primary School (Less than high school diploma) (Level 2-3) <input type="checkbox"/> High School or equivalent degree (Level 4-5) <input type="checkbox"/> Bachelor's or equivalent degree (Level 6) <input type="checkbox"/> Master's Degree + Doctorate (Level 7-8)	
	4. Marital Status <input type="checkbox"/> Married <input type="checkbox"/> Single / Widowed / Divorced	
	5. Occupation <input type="checkbox"/> Public employee <input type="checkbox"/> Private sector <input type="checkbox"/> Self-employment <input type="checkbox"/> Retired <input type="checkbox"/> Tradesman-Artisan <input type="checkbox"/> Student <input type="checkbox"/> Other	
SECTION 2	6. Do you know what the word "cadaver" means? <input type="checkbox"/> Yes, I do <input type="checkbox"/> No, I don't	
	7. Do you know that you can donate your body as cadaver? <input type="checkbox"/> Yes, I do <input type="checkbox"/> No, I don't	
	8. Are you aware of the cadaver donation campaigns? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	9. Did you coincide with the news about the cadaver in print and visual media? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	10. Do you know that medical faculties in our country suffer from cadaver supply? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	11. Do you know that Turkish Universities import donated cadavers from abroad and pay transfer fees? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	12. Do you think that medical education is possible without cadaver? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	13. Do you know that there is a certain period of use of cadavers? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	14. If you donate your body as a cadaver, do you know that it is delivered to your relatives or buried in accordance with your request after the scientific study (dissection) is finished? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	15. Are you aware of the fatwa of the Presidency of Religious Affairs regarding the body donation is permissible in Sharia (Islamic law)? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	SECTION 3	16. Where do you apply when you decide to donate your body? <input type="checkbox"/> State hospital <input type="checkbox"/> Family doctor <input type="checkbox"/> Private hospitals <input type="checkbox"/> University hospitals
		17. Do you think body donation is permissible in Sharia (Islamic law)? <input type="checkbox"/> I agree with the fatwa of the Presidency of Religious Affairs of Turkey, it is permissible. <input type="checkbox"/> I do not agree with the fatwa of the Presidency of Religious Affairs Turkey, it is not permissible <input type="checkbox"/> no idea
		18. What would be your reaction if a member of your family donated his body as a cadaver? <input type="checkbox"/> I encourage <input type="checkbox"/> I do not interfere. This is his free decision. <input type="checkbox"/> I object
		19. Would you consider donating your body as a cadaver after death? <input type="checkbox"/> Yes, I do <input type="checkbox"/> Never thought, I have no idea <input type="checkbox"/> No, I don't want to donate
		20. Would you please explain why you do not want to donate your body as a cadaver? <input type="checkbox"/> Unanswered <input type="checkbox"/> My family does not want <input type="checkbox"/> I think it is not appropriate for my religion <input type="checkbox"/> I think today's technology makes medical education possible without cadavers. <input type="checkbox"/> I do not think there is a problem in the supply of cadavers in our country <input type="checkbox"/> Personal reasons

The AWKL-Score of the all participants was 0.41±0.24 (min:0.00, max:0.90). The AWKL-Scores for the youngest (18y-29 y) and the oldest (60 y and older) age

groups were 0.49±0.22 and 0.48±0.26, respectively, and were significantly higher (F:4.115; p:0.007) than the other age groups. The AWKL-Score was 0.39±0.25 in males and

0.44±0.23 in females, and no statistically significant difference was found between the genders (t:1.451; p:0.184). The highest AWKL-Score was at the group of master's degree or doctorate (Level 7-8) (F:22.997; p<0.001). It was observed that the higher the education level, the higher the AWKL-Score. The AWKL-Score was 0.40±0.25 in married and 0.46±0.21 in single/widowed/divorced, and no statistically significant difference was found between the groups (t:1.934; p:0.055). AWKL-Score was significantly higher in public employees (0.55±0.21) and students (0.48±0.20) than in other occupational groups (F:5.930; p<0.001). Table IV shows AWKL-Scores of the participants about the importance of cadaver and cadaver donation according to some sociodemographic factors

When asked where they would apply, if they decided to donate their body, 42.4 % (n: 104) of the participants gave the answer "state hospital". With regards to the question "Do you think cadaver donation is permissible in Sharia (Islamic law)?", 40.0 % (n: 98) of the participants responded "I agree with the fatwa of the Presidency of Religious Affairs of Turkey, it is permissible". When asked what their reaction would be if a member of their family donates his/her body as a cadaver, 53.1 % (n: 104) of the participants gave the answer "I do not interfere. This is his/her free decision." 33.4 % (n: 82) of the participants answered "no" the question "Would you

Table II. Sociodemographic characteristics of participants.

Sociodemographic characteristics (n = 245)	n	(%)
Age (years)		
18-29	60	24.5 %
30-44	79	32.2 %
45-59	80	32.7 %
≥60	26	10.6 %
Gender		
Male	123	50.2 %
Female	122	49.8 %
Level of education		
Literate (Level 1)	5	2.0 %
Primary School (Less than high school diploma) (Level 2-3)	52	21.2 %
High School or equivalent degree (Level 4-5)	73	29.8 %
Bachelor's or equivalent degree (Level 6)	96	39.2 %
Master's Degree + Doctorate (Level 7-8)	19	7.8 %
Marital Status		
Single / Widow / Divorced	67	27.3 %
Married	178	72.7 %
Occupation		
Public employee	49	20.0 %
Private sector	41	16.7 %
Self-employment	15	6.1 %
Retired	30	12.2 %
Tradesman-Artisan	26	10.6 %
Student	37	15.1 %
Other	47	19.3 %

consider donating your body as a cadaver after death?". When asked their reason for not donating their body, almost half of the participants (45.7 %) left the question unanswered. Table V shows the distribution of the responses of the participants to the questions showing their attitudes about cadaver donation.

Table III. The distribution of the answers given by the participants to the questions measuring the level of awareness and knowledge about the importance of cadaver and cadaver donation.

Question Id	Questions (N:245)	Yes n (%)	No n (%)
6	Do you know what the word "cadaver" means?	185 (75.5 %)	60 (24.5 %)
7	Do you know that you can donate your body as cadaver?	164 (66.9 %)	81 (33.1 %)
8	Are you aware of the cadaver donation campaigns?	50 (20.4 %)	195 (79.6 %)
9	Did you coincide with the news about the cadaver in print and visual	108 (44.1 %)	137 (55.9 %)
10	Do you know that medical faculties in our country suffer from	141 (57.6 %)	104 (42.4 %)
11	Do you know that Turkish Universities import donated cadavers	43 (17.6 %)	202 (82.4 %)
12	Do you think that medical education is possible without cadaver?	72 (29.4 %)	173 (70.6 %)
13	Do you know that there is a certain period of use of cadavers?	110 (44.9 %)	135 (55.1 %)
14	If you donate your body as a cadaver, do you know that it is delivered to your relatives or buried in accordance with your request after the scientific study (dissection) is finished?	73 (29.8 %)	172 (70.2 %)
15	Are you aware of the fatwa of the Presidency of Religious Affairs of Turkey regarding the body donation is permissible in Sharia (Islamic law)?	73 (29.8 %)	172 (70.2 %)

Table IV. Awareness and Knowledge Level Scores (AWKL-Score) of the participants about the importance of cadaver and cadaver donation according to some sociodemographic factors.

Sociodemographic Characteristics	Awareness and knowledge score Mean±SD	Statistical Analysis t score / F statistic ; p
Age (years)		
18-29	0.49±0.22	
30-44	0.38±0.25	4.115 ; 0.007
45-59	0.38±0.23	
≥60	0.48±0.26	
Gender		
Male	0.39±0.25	1.451 ; 0.184
Female	0.44±0.23	
Level of education		
Literate (Level 1)	0.12±0.04	
Primary School (Less than high school diploma) (Level 2-3)	0.22±0.23	
High School or equivalent degree (Level 4-5)	0.41±0.22	22.977 ; <0.001
Bachelor's or equivalent degree (Level 6)	0.49±0.19	
Master's Degree + Doctorate (Level 7-8)	0.65±0.17	
Marital Status		
Single / Widow / Divorced	0.46±0.21	1.934 ; 0.055
Married	0.40±0.25	
Occupation		
Public Employee	0.55±0.21	
Private sector	0.35±0.25	
Self-employment	0.37±0.24	5.930 ; <0.001
Retired	0.42±0.23	
Tradesman-Artisan	0.33±0.24	
Student	0.48±0.20	
Other	0.33±0.24	
Total	0.41±0.24	
	(min: 0.00. max: 0.90)	

Table V. Distribution of the answers given by the participants to the questions showing their attitudes towards cadaver donation.

Question Id	Questions (n:245)	n (%)	
16	Where do you apply when you decide to donate your body?	104 (42.4 %)	State hospital
		34 (14.0 %)	Family doctor
		16 (6.5 %)	Private hospitals
		91 (37.1 %)	University hospitals
17	Do you think cadaver donation is permissible in Sharia (Islamic law)?	98 (40.0 %)	I agree with the fatwa of the Presidency of Religious Affairs of
		51 (20.8 %)	I do not agree with the fatwa of the Presidency of Religious
		96 (39.2 %)	No idea
		33 (13.5 %)	I encourage
18	What would be your reaction if a member of your family donated his body as a cadaver?	130 (53.1 %)	I do not interfere. This is his free decision.
		82 (33.4 %)	I object.
19	Would you consider donating your body as a cadaver after death?	39 (15.9 %)	Yes, I do
		73 (29.8 %)	Never thought, I have no idea
		133 (54.3 %)	No, I don't want to donate
		112 (45.7 %)	Unanswered
		9 (3.7 %)	My family does not want
20	Would you please explain why you do not want to donate your body as a cadaver?	28 (11.4 %)	I think it is not appropriate for my religion
		12 (04.9 %)	I think today's technology makes medical education possible without cadavers.
		11 (4.5 %)	I do not think there is a problem in the supply of cadavers in our country
		73 (29.8 %)	Personal reasons

DISCUSSION

Awareness and knowledge level of the individuals are important factors for developing positive attitudes towards body donation. Therefore, encouraging works will have a positive effect on the cadaver donation and increase the donation rate (Bamaç *et al.*). "Yes" answers with a rate of 75.5 % to the question "Do you know what the word cadaver means?" does not mean that the participants have a high level of knowledge. Because "yes" answer to the other questions in the questionnaire measuring the knowledge level of the participants varies just between 17.6 % and 66.9 %. These results show that the participants have accurate information about cadaver donation at a maximum level of two thirds, which should be interpreted as an insufficient level.

The proportion of the participants considering applying to the state hospital and family physician (42.40 % and 13.98 %, respectively) for body donation shows that the personnel working in these institutions should be informed about body donation and related procedures.

The percentage (39.2 %) of the answer "no idea" to the question "Do you think body donation is permissible in Sharia (Islamic law)?" provides evidence that the activities of the Presidency of Religious Affairs of Turkey have not yet achieved the desired level.

When the educational level of the participants was evaluated, it was observed that the level of knowledge of the group of literate and primary school degree was inadequate. When the education level group was evaluated in terms of awareness and knowledge level score (AWKL-Score), it was determined that as the level of education increases, knowledge level score increases. In addition, it was determined that the knowledge level of the self-employed group was quite low in the occupational groups. Therefore, it was concluded that these groups should be informed about body donation.

Low body donation rates determined in this study shows that, in Turkey, making significant progress is needed.

The participants' awareness and knowledge level (AWKL-Scores) about cadaver and cadaver donation was evaluated as quite low (0.41 ± 0.24). From this, it was concluded that the community should be informed about body donation. When the relationship between AWKL-Scores and age was evaluated, it was observed that the middle age group should be informed more than the younger (18-29 y) and 60 and older age group.

In parallel with the advancement of medicine, the need

for cadavers is increasing in the fields of anatomy and medical research. Various methods are used in cadaver procurement in different countries and medical schools (Kleinman & Lowy, Mekahli *et al.*; Subasinghe & Jones). In the literature, from an ethical and broad perspective, it is suggested that cadavers obtained from donations will be more appropriate (Emson; Caplan). Throughout the history of anatomy and medicine, obtaining cadavers for education has been an important problem. As a result of ethical discussions, the most accurate method for cadaver procurement was considered to be voluntary donation of the human body or part of it (Bøgh & Madsen; Dalal). Today, cadavers used in medical schools in almost all developed countries are the corpses of people who voluntarily donated their bodies to science. The number of donations has increased in these countries in recent years and has exceeded the storage and/or usage capacity of laboratories. Therefore, there are medical schools that suspend their donation programs for a certain period. In addition, in the USA, the donation programs of scientific institutions for the procurement of cadavers to medical studies or the provision of services from private supply companies are being discussed (Wingfield). It is reported that strong body donation programs are needed in countries where there the body donations are not at desired level (Gatica-Araneda & Alfaro-Tolozá).

There is inadequate published information about body donation programs. There are studies showing that donation rates have increased five times in four years through successful programs, mass media, distribution of posters and brochures, seminars and incentive visits to the anatomy museums (da Rocha *et al.*). It is reported that there is a gap between knowledge and motivation for organ and body donation, which should be filled with an appropriate guidance program and education (Saha *et al.*). The results of previous surveys show that ignorance is the main reason for the reluctance of body donation (Abbasi Asl *et al.*; Bamaç *et al.*; Ciliberti *et al.*).

Limitations. This study has some limitations. First, this is a cross-sectional study. The questionnaire form was developed by the researchers and no validity-reliability tests were performed. The study population consisted of 245 people and may not be considered as representative of Izmir province. However, results of the study offers evidence will provide insight on the subject in Izmir and Turkey.

CONCLUSIONS

The importance of cadaver in medical education and the awareness and knowledge level of the individuals in the society about cadaver donation are very important. The results in our survey was interpreted as indicators of the lack of

knowledge of individuals about body donation. As high awareness and knowledge level will positively affect individuals' attitudes towards body donation, encouraging studies and programs on body donation will have a positive effect on cadaver donation and increase the donation rate.

The data obtained in our study provides important details about which part of the society has low level of knowledge about body donation. The results will also guide anatomists in Turkey about the informative and promotional activities on body donation should be focused on which parts of the society.

In particular, it will be useful to carry out body donation programs supported by public institutions through visual and written press. With the encouragement of these donation programs, we hope that body donation rates in our country can be increased to the required level.

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RESUMEN: El objetivo de este estudio fue evaluar el nivel de conciencia, conocimiento y las actitudes de la comunidad en Izmir / Turquía sobre la donación de cadáveres en la educación médica. Se realizó un estudio transversal de 245 participantes elegidos al azar, que respondieron veinte ítems en el cuestionario proporcionando información sobre su demografía (5 ítems), conciencia y conocimiento (10 ítems) y actitudes (5 ítems) sobre la donación de cuerpos. El cuestionario fue administrado directamente en persona; la prueba T de Student y la prueba ANOVA de una vía se utilizaron para el análisis estadístico. De los participantes 123 (50,2 %) eran hombres y 159 (64,9 %) tenían entre 30 y 59 años. 185 (75,5 %) encuestados sabían lo que significa la palabra "cadáver". Cuando se les preguntó dónde se registrarían, en caso de decidir donar su cuerpo, 104 (42,4 %) de los participantes respondieron "hospital estatal". La puntuación media de conciencia y conocimiento sobre la importancia del cadáver y la donación de cuerpos (puntuación AWKL) fue de $0,41 \pm 0,24$ (mínimo: 0,00, máximo: 0,90). Estadísticamente el puntaje AWKL fue más alto en los más jóvenes (18-29 años) y mayores (> 60 años) en comparación con los otros grupos etarios (F: 4,115; p: 0.007). AWKL-Score aumentó a medida que aumentó el nivel de educación. El puntaje AWKL más alto fue en el nivel de posgrado (Nivel 7,8) (F: 22,997; p < 0,001). El puntaje AWKL fue mayor en empleados públicos y estudiantes en comparación con otros grupos ocupacionales (F: 5,930; p < 0,001). Las respuestas al cuestionario fueron indicadores importantes de cuánto necesita la sociedad estar informada sobre la donación de cuerpos.

PALABRAS CLAVE: Donación de cuerpo; Cadáver; Nivel de conciencia y conocimiento; Actitud; Educación anatómica; Educación médica.

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