Influence of knowledge for organ and tissue donation for transplantation

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Abstract— Objective: to investigate the opinion and intention of the adult population in the city of Belém, State of Pará, Brazil, regarding the donation of organs and tissues for transplantation. Method: a cross-sectional, population-based, descriptive study with a quantitative approach, carried out in the city of Belém of Pará, Brazil, from July to August 2019. Results: 387 participants were interviewed, where 70.8% expressed a positive opinion regarding donation and intention to donate organs and tissues; and 50.9% had expressed their desire to be a donor to a family member. 88.6% of the interviewees would authorize the donation of organs and tissues after the death of a family member, provided that he previously expressed his willingness to be a donor. However, only 59.7% would authorize the donation of organs from a loved one diagnosed with brain death. There was a greater intention to donate, among female individuals, aged between 18 to 27 years, students, with family income between 3 to 5 minimum wages, who have children, Catholics and who live 3 to 4 hours a day with the family. Conclusion: this study allows us to conclude that older individuals with less education have less intention to donate their organs. The lack of information on organ donation and transplantation and all the consequences of not knowing the donation process is certainly a limiting factor for the increase in the number of donors.

Keywords— Transplant. Procurement of Tissues and Organs. Knowledge.

I.   INTRODUCTION

Organ and tissue transplantation is an effective therapeutic alternative for patients with severe diseases, whether acute or chronic, and who have no other therapeutic alternative. This process involves several actions in the assistance to the Potential Donor (PD) by the professionals of the multidisciplinary team, aiming at the hemodynamic maintenance and viability of the organs for transplantation, in addition to handling the doubts and conflicts that permeate the relationship with family members who experience the pain of loss[(1)].

The donation of organs and tissues is a noble act that can improve and expand the possibilities of survival. Often, organ and tissue transplantation can be the only life expectancy or the opportunity for a fresh start for people who need an organ or tissue. Therefore, they are themes that have aroused a lot of interest and instigated several discussions in society in general. The lack of clarification and the way in which information is disseminated through

the mass media, commonly generate myths and reinforce controversies and prejudices on this topic[2].

The donation of organs and tissues allows several people on the waiting list for transplants (unique registration in Brazil) to have the prospect of survival, which can be done in two ways: between living / intervening (inbreeding kinship up to fourth degree), or through deceased donor of multiple organs in Brain Death, or deceased donor of stopped heart, where it is only possible to capture tissues like corneas for example[3].

Transplantation has become an excellent option in the treatment of terminal organ failure. This position was achieved after major advances in the areas of intensive care, immunology and pharmacology; however, when the demand is compared to the availability of organs, there is a huge gap that prevents the increase in transplant rates, since the number of patients waiting for this procedure exceeds the supply of organs[4].

Transplantation is a complex process, which begins with the identification and maintenance of potential donors. The potential donor in brain death can donate the following organs and tissues: heart, lungs, liver, kidneys, pancreas, intestines, corneas, skin, bones, tendons, bone marrow and blood vessels. With regard to the living donor, who can donate even organs or fragments of liver or lung or even tissues such as blood and bone marrow, there are rules to be met, such as: the donor must have a blood relationship of up to four degrees with the recipient, in case there is no blood relationship there is a need for judicial authorization in Brazil. In both cases, there is a need for numerous tests, such as HIV1, HTLV, hepatitis B and C, VDRL, serology for cytomegalovirus, chagas disease, in addition to liver, renal, pancreatic, cardiac and pulmonary function tests[5].

The PDs of organs and tissues in BD are individuals who are diagnosed and declared dead under the terms established by the Federal Medical Council resolution n. 1.480 / 97, which provides for the registration in the medical record of a Term of Declaration of Brain Death (TDME), describing the elements of the neurological examination that demonstrate the absence of the reflexes of the brain stem, as well as the report of a complementary examination[6].

After the identification of the potential donor, health professionals inform the family of the suspected brain death, perform the supporting exams, notify the potential donor to the Intra-hospital Organ and Tissue Donation Commissions for Transplantation (CIHDOTTs) or the Organization for the Search for Organizations Organs (OPOs) that forward the notification to the Central

Notification, Collection and Distribution Organs (CNCDO) / State Transplant Center (CET)[5].

Resolution no. 1,480 / 97, emphasized that it was necessary: clinical examinations, performed by different doctors, one of whom was a neurologist or neuropediatrician, and complementary examinations, performed at variable time intervals. Resolution no. 2,173 of December 15, 2017, maintain the same criteria, only establishing new time limits between examinations and define the new medical specialties authorized to perform the clinical examinations of the diagnosis of brain death. Complementary exams must clearly demonstrate: absence of electrical brain activity, or absence of metabolic activity or absence of cerebral blood perfusion[7].

On the standardization for the diagnosis of brain death in Brazil, the Resolution of 1991, n. 1,346, was revoked in 1997 by resolution no. 1,480. The latter was updated and replaced by resolution no. 2,173 of December 15, 2017 in effect today. The procedures for the determination of brain death occur in a standardized manner, and should be initiated in all patients who have a nonperceptive coma, absence of supraspinatus reactivity and persistent apnea. The patient's clinical condition must also have all the following prerequisites: presence of a brain injury of known and documented cause, irreversible and capable of causing brain death, in addition to other causes that may mimic the condition, such as: hypothermia, disorders basic acids, hydroelectrolytics and use of central nervous system depressant drugs. In this resolution, criteria are also established so that a doctor is considered capable of making the diagnosis, and also expands the medical specialties that will be able to determine the diagnosis of brain death[8].

In this context, a potential donor is a patient diagnosed with brain death and an effective donor, any potential donor, in which at least one organ or tissue has been removed for the purpose of transplantation[9].

In the world panorama, Brazil occupies the second place in the ranking of countries with the highest number of transplants performed, behind only the United States of America (USA). It is important to highlight that Brazil is a world leader in terms of transplant surgery performed by the Unified Health System (SUS)[10]. In addition, it currently has about 548 health establishments and 1,376 medical teams authorized to perform the transplant[11].

The annual growth of effective donors and, consequently, of transplants performed, is also explained by the increase in the number of notifications from DPs to the State Transplant Centers (CET)[12]. There were about 27 thousand transplants performed in 2017. The data

represents the resumption of growth after some years of decline and small advances in relation to the rate of effective donors. Brazil had an increase of 15.7% in the first half of 2017[13].

Data from 2017 shows the rate of effective donors per million people per year, which was 16.6 pmp, an increase compared to 2016 (14.6 pmp). Regarding the high rate of donations, there is a considerable disproportion between organ donation and people on the waiting list. And these numbers still do not meet the needs of people who wait for an organ and / or tissue[14].

According to the Brazilian Transplant Registry (RBT), the State of Pará still has a low percentage of transplants performed. From January and June 2020, Pará obtained 8.8 pmp / year of notifications from the PD with 3 (0.8 pmp / year) from donors whose organs were transplanted. Non-donors were 92%, as follows: eligible donors with 5.1 pmp, effective donors with 0.7 pmp, donors whose organs were transplanted with 0.7 pmp and finally, donors with multiple organs presenting (0 %) of transplants performed[15].

Despite the unquestionable advances in the current scenarios, the numbers still indicate a very long queue and inversely proportional to the number of transplants performed, showing that the number of organ and tissue donors is still insufficient to supply this demand, which is configured as the only chance of life for many Brazilians[1,2].

Organ and tissue transplantation, despite being one of the most notable scientific achievements, still presents many obstacles, although it is a technique of great importance to save thousands of lives and restore the health of countless people[16].

The subject in question is on the agenda of both formal discussions between health professionals and questioning by society, involving legal aspects that support the donation and the activity of the health professional, involving ethical and moral aspects, with the need to make organ and tissue donation is a matter of public knowledge[1].

The 1988 Federal Constitution establishes the right to life. And to reinforce this right, Law No. 9.434, of February 4, 1997, establishes the legality regarding the removal of organs, tissues and parts of the human body for the purposes of transplantation and treatment, if it is free will and authorized by the donor or your responsible family member. Organ donation is free. It is a subject that must be well leveled between the donor and his family. The doctor and the multidisciplinary team can contribute to this process in a humanized way, with safe guidelines for the procedures. Once the BD protocol has started, a real race for life begins, where every minute is crucial for the qualitative outcome of the graft uptake and implantation in the recipient[17].

Anyone can donate organs and tissues, as long as they do not have any infectious diseases or that compromise the functioning of the organs. To be a donor, it is not necessary to leave a written document, it is up to the family to authorize the removal of the organ after the death is confirmed. However, there are still doubts, myths and prejudices when it comes to organ transplantation in humans; a controversial issue that has aroused interest and discussions in various segments of society[1].

Organ donation is an act of charity and love for others. Each year, many lives are saved by this altruistic gesture. The population's awareness of the importance of organ donation is vital to improve the reality of transplants in the country[18]. Therefore, we emphasize the importance of carrying out the study, since it will benefit not only professionals and academics, but also society in general. The focus of this study is to investigate the opinion and intention of the adult population, that is, to define what are the factors that influence when making a decision to donate organs and tissues.

It is understood that it is necessary to have a better understanding about the process of donating organs and tissues for transplantation, since doubts generate an unfavorable decision making by the population; understanding that transplantation represents one of the greatest advances in the health area, and in some contexts it is configured as the last therapeutic alternative in terminal organ and tissue failures. However, this subject is still very much brought up by myths, and arouses much discussion and debate in the various segments of society[14].

Given the above, the present study aimed to investigate the opinion and intention of the adult population of the city of Belém, State of Pará, Brazil, regarding the donation of organs and tissues for transplantation.

II.   METHOD

Descriptive, cross-sectional, population-based cohort study with a quantitative approach, carried out in public squares in the city of Belém, State of Pará, Brazil, from July to August 2019.

The study was developed based on the application of a digital questionnaire designed and validated by Barcelos[19], completed through interviews.

The questionnaire was made up of two parts and adapted to the objectives of the present study. The first part had the purpose of identifying the profile of the population, containing sociodemographic data (gender, age, profession, etc.). In the second part, we sought to identify the knowledge and opinions capable of influencing the decision of individuals to donate their organs and tissues after death, understanding about the concept of brain death and its diagnosis, the main reasons that would influence the decision to donate their organs and tissues and their relatives and knowledge about the organs and tissues that can be donated.

Inclusion criteria were: adult people, who were in the aforementioned public squares; older than 18 years; of both genders and who felt able psychologically to answer the questionnaire. Exclusion criteria: health professionals and academics were not considered.

According to data from the Brazilian Institute of Geography and Statistics (IBGE)[20], Belem has a territorial area of 1,059,458 km² and has an estimated population of N = 1,485,732 inhabitants. Based on this estimate, a 5% margin was adopted as a sampling error, with a 95% confidence level, alpha (α) of (0.05), which implies the use of the value of Z = 1.96, establishing as sample n = 384.06, rounding up to 385 people, who were interviewed, Fontelles[21]:

$$No = \frac{No}{1+\left(\frac{no}{N}\right)} \text{ where, } No = \left[\frac{Z^{\alpha/2}}{E}\right].Po_{(1-Po)}$$

Calculation:

$$No = \left[\frac{1,96}{0,05}\right]^2.0,5.(1-0,5) = 384,16$$

$$No = \frac{384,16}{1+\left(\frac{384,16}{1.485.732}\right)} = 384,06 = 385,00$$

Being:

n = Size of the studied population.

N = Approximate value of the sample size.

P = Sample proportion.

E = Sample error (margin of error).

Trust level: 95%.

For this study, a number of 385 was adopted, plus 2 more participants, resulting in a sample of 387 participants.

Weekends and holidays were scheduled when there were schedules in the respective public squares to approach the participants. At the time, the research methodology and objectives were explained. After clarifying doubts about the study, the Free and Informed Consent Term was delivered with the appropriate guidelines to be analyzed and signed by the possible research participants.

The statistical treatment seeks to identify, by means of absolute frequencies, whether the data converge to any particular differential or whether there is a trend or not, using the descriptive statistics of the data based on absolute and relative frequencies, and in followed by the application of statistical tests[22].

In the measurement of absolute and relative frequencies, the quantitative research used aims to give statistical treatment to the data, with the purpose of identifying trends, adherences and associations between the variables under study[23].

In this study, the Chi-square likelihood ratio test was used for independent samples. It is a hypothesis test that uses statistical concepts to reject or not a null hypothesis (**H0** = there is no significant trend between frequencies). It is a statistical test for n samples whose proportions of the different modalities are arranged in frequency tables, with the expected values being deduced mathematically, trying to determine whether the proportions observed in the different categories occur as expected or show any tendency. To perform the test, a significance level of p-value <0.05 was adopted, that is, if p-value <0.05 **H1** is accepted = there is a significant trend between the frequencies.

To verify the correlation between demographic, socioeconomic, cultural factors and the decision of individuals to donate their organs and tissues after death, Pearson's Chi-square test (Wilks' G²) was performed for independence between nominal variables and the ANOVA test with Tukey for numerical variables, as it was observed that the data do not have a normal distribution.

Thus, the data collected were tabulated, interpreted, processed and analyzed using descriptive and inferential statistics. For data analysis, computing resources were used, through processing in the Microsoft Windows Excel system, Statistic Package for Social Sciences (SPSS)® version 24.0, all in Windows®7 environment.

The fulfillment of the requirements of the National Health Council (CNS) and the National Research Ethics Commission (CONEP) through Resolution n. 510/16 making it clear that "public opinion polls with unidentified participants should not be registered or evaluated by the CEP / CONEP system", and should not, in these cases, submit the research protocol to the system.

III.   RESULTS

There was a significant predominance (p-value <0.05) of female individuals (236; 61%), aged between 18 and 27 years (153; 39.5%), whose main occupation is students (95; 24, 5%), single (197; 50.9%). In addition, it was found that most are from the municipality of Belém (321; 82.9%), State of Pará (377; 97.4%) (Table 1).

Table 1: Sociodemographic characteristics of the investigated participants regarding the intention to donate their organs and tissues after death (n 387). Belém, State of Pará, Brazil, 2019.

Description	n	%	P-Value [1]
Genre			
Female	236	61,0%	0.018*
Male	151	39,0%	
Age			
18-27	153	39,5%	
28-37	75	19,4%	
38-47	65	16,8%	
48-57	46	11,9%	<0.0001*
58-67	30	7,8%	
68-77	14	3,6%	
78-88	4	1,0%	
Occupation			
Student	95	24,5%	
homemarker	24	6,2%	
Self-employed	23	5,9%	
Retired	21	5,4%	<0.0001*
Receptionist	21	5,4%	
Teacher	14	3,6%	
Administrator	8	2,1%	
Others	78	20,2%	
Place of origin			
Belém	321	82,9%	
Ananindeua	24	6,2%	
Mosqueiro	6	1,6%	<0.0001*
Marituba	4	1,0%	
Others	32	8,3%	
State of origin (Brazil)			
Pará	377	97,4%	<0.0001*
Rio de Janeiro	4	1,0%	
Maranhão	4	1,0%	
Amapá	1	0,3%	
Ceará	1	0,3%	
Marital status			
Single	197	50,9%	
Married	111	28,7%	
Stable union	56	14,5%	<0.0001*
Widower	15	3,9%	
Divorced	8	2,1%	

Note: Results are based on non-empty rows and columns in each innermost subtable.

Source: Research protocol (2019).

[1] Pearson's Chi-square test (Wilks' G²) for trend (p-value <0.05).

* Significant Values; NS - Non-Significant Values.

Interpretation of the test:

H0: The observed frequencies occur in the same proportion for the different groups.

Ha: The observed frequencies differ significantly for the different groups.

Decision: As the computed p-value is less than the significance level of alpha = 0.05, the null hypothesis H0 should be rejected and the alternative hypothesis Ha accepted.

It can be seen in Table 2 that there was a significant predominance (p <0.05) of individuals who have children (227; 58.7%), of Catholic religion (238; 61.5%), who keep themselves informed through the internet (253; 65.4%), living 3 to 4 hours a day with the family (134; 34.6%) and with a good family income (261; 97.4%), receiving approximately 3 to 5 minimum wages (168; 43.4%).

Table 2: Demographic, socioeconomic and cultural characterization of the research participants (n 387). Belém, State of Pará, Brazil, 2019.

Description (cont.)	n	%	P-Value[1]
Children			
Yes	227	58,7%	<0.0001*
No	159	41,1%	
Pregnant	1	0,3%	
Religion			
Catholic	238	61,5%	<0.0001*

Evangelical	111	28,7%	
Without religion	17	4,4%	
Spiritism	6	1,6%	
Atheist	5	1,3%	
Umbanda	3	0,8%	
Jehovah's Witness	2	0,5%	
Agnostic	2	0,5%	
Candomblé	2	0,5%	
Theistic	1	0,3%	
Information			
Internet	253	65,4%	<0.0001*
Television	109	28,2%	
Newspaper	20	5,2%	
Radio	5	1,3%	
Living with the family			
3-4 hours	134	34,6%	<0.0001*
Full-time	95	24,5%	
Only on weekends	86	22,2%	
1-2 hours	62	16,0%	
Don't have time for family	6	1,6%	
Holidays only	4	1,0%	
Family income			
Good	261	67,4%	<0.0001*
Bad	72	18,6%	
Great	38	9,8%	
Excellent	16	4,1%	
Salaries			
3-5 salaries	168	43,4%	<0.0001*
1-2 salaries	135	34,9%	
6-9 salaries	65	16,8%	
More than 9 salaries	19	4,9%	

Note: Results are based on non-empty rows and columns in each innermost subtable.

Source: Research protocol (2019).

[1] Pearson's Chi-square test (Wilks' G²) for independence (p-value <0.05).

* Significant Values; NS - Non-Significant Values.

Interpretation of the test:

H0: The frequencies observed occur in the same proportion for the different groups.

Ha: The observed frequencies differ significantly for the different groups.

Decision: As the computed p-value is less than the significance level of alpha = 0.05, the null hypothesis H0 should be rejected and the alternative hypothesis Ha accepted.

It can be seen in Table 3 that the significant majority (p <0.05) of the interviewed individuals would authorize the donation of organs from a relative who had warned about their desire to be an organ donor (343; 88.6%). The percentage of interviewed individuals who would authorize the donation of the organs of a relative who had brain death is predominant, even if this relative had not warned about their intention to be a donor (231; 59.7%).

Thus, it is possible to see that (274; 70.8%) of the population has the intention to donate their organs; to the point that (302; 78%) would authorize after death and (190; 49.1%) shows no position. Among those who informed their intention to close relatives, those who really have the power to decide on the donation, we had a percentage of (197; 50.9%), and of them (50; 25.4%), only the mother advised.

Table 3: Distribution of the interviewees' intention about organ and tissue donation for transplantation (n 387). Belém, State of Pará, Brazil, 2019.

Specific questions about organ and tissue donation for transplantation	N	%	P-Value[1]
1- Imagine that a relative of yours had warned you about your desire to be an organ donor. The doctor warned you that this relative died. Would you authorize this person's organ donation?			
Yes	343	88,6%	<0.0001*
Maybe	25	6,5%	
No	19	4,9%	
2- Imagine that a relative has not discussed with you about your intention to donate organs. Then the doctor tells you that this relative is brain dead. Would you authorize the donation?			
Yes	231	59,7%	<0.0001*
Maybe	80	20,7%	
No	76	19,6%	

3- Do you intend to donate any organ in your body?

Yes	274	70,8%	<0.0001*
Maybe	61	15,8%	
No	52	13,4%	

4-Would you authorize the donation of your organs after your death?

Yes	302	78,0%	<0.0001*
No	44	11,4%	
Maybe	41	10,6%	

5- Would you donate any organ in your body to your relatives or friends in life, if it did not pose risks to your health?

Yes	291	75,2%	<0.0001*
Talvez	68	17,6%	
No	28	7,2%	

6- Have you already warned a close relative of you about your intention to donate organs and tissues?

Yes	197	50,9%	0.0613ns
No	190	49,1%	

6- If yes, who?

Mom	50	25.4%	0.0001*
All the family	39	19.8%	
Husband / wife	34	17.3%	
Parents	30	15.2%	
Brothers	16	8.1%	
Children	12	6.1%	
Uninformed	10	5.1%	
Grandmother	2	1.0%	
Cousins	2	1.0%	
Grand daugther	1	0.5%	
Girlfriend	1	0.5%	

Note: Results are based on non-empty rows and columns in each innermost subtable.

Source: Research protocol (2019).

(1) Pearson's chi-square test (Wilks' G²) for trend (p-value <0.05).

* Significant Values; NS - Non-Significant Values.

Interpretation of the test:

H0: The frequencies observed occur in the same proportion for the different groups.

Ha: The observed frequencies differ significantly for the different groups.

Decision: As the computed p-value is less than the significance level of alpha = 0.05, the null hypothesis H0 should be rejected and the alternative hypothesis Ha accepted.

It can be seen in Table 4 that most of the interviewed participants affirm that the lack of information is one of the main reasons that can lead people to non-donation, being this value (196; 50.6%). The common notion among the participants considers the concept that brain death to be a legal definition of death to be true (247; 63.8%). In this sense, (153; 39.5%) respondents consider that a person who had BD is in fact dead, declaring full confidence in the diagnosis of this clinical condition (166; 42.9%).

Already (332; 85.8%) of the participants agree that there is organ trafficking in Brazil and (258; 66.7%) affirms that the average waiting time in the transplant queue is approximately more than three years, considering that the The chance of receiving an organ for transplantation does not depend on the recipient's social class.

Table 4: Distribution of the interviewees' knowledge about the factors that influence the donation of organs and tissues for the transplant, definition of Brain Death and the average waiting time in the transplant queue (n 387). Belém, State of Pará, Brazil, 2019.

Specific questions about organ and tissue donation for transplantation	n	%	P-Value[1]

7- What reasons can lead people not to donate their organs and tissues after death?

Lack of information	196	50,6%	<0.0001*
Fear	94	24,3%	
Selfishness	40	10,3%	
Religion	37	9,6%	
I don't trust the health system	12	3,1%	
Family not accepted	8	2,1%	

8- Brain death is the legal definition of death. There is a complete and irreversible shutdown of all brain functions. This means that, as a result of severe aggression or serious injury to the brain, the blood that comes from the body and supplies the brain is blocked and the brain dies. Do you agree with this statement?

True	247	63,8%	<0.0001*
I don´t know	120	31,0%	
False	20	5,2%	

9- When a person is brain dead, that person is:

Dead	153	39,5%	<0.0001*
Just dead brain	123	31,8%	
I don´t know	61	15,8%	
Partly alive	50	12,9%	

10- Do you trust the diagnosis of brain death?

Yes, I fully trust	166	42,9%	<0.0001*
Partially trust	159	41,1%	
I do not trust	62	16,0%	

11- Is there organ trafficking in Brazil?

Yes	332	85,8%	<0.0001*
I don´t know	50	12,9%	
No	5	1,3%	

12- The average waiting time in the transplant queue is approximately

Above 3 years	258	66,7%	<0.0001*
More than 1 year	123	31,8%	
Less than 1 year	6	1,6%	

13 - Who is more likely to receive an organ to perform the transplant?

Does not depend on social class	205	53,0%	<0.0001*
Rich	173	44,7%	
Poor	9	2,3%	

Note: Results are based on non-empty rows and columns in each innermost subtable.

Source: Research protocol (2019).

(1) Pearson's chi-square test (Wilks' G²) for independence (p-value <0.05).

* Significant Values; NS - Non-Significant Values.

Interpretation of the test:

H0: The frequencies observed occur in the same proportion for the different groups.

Ha: The observed frequencies differ significantly for the different groups.

Decision: As the computed p-value is less than the significance level of alpha = 0.05, the null hypothesis H0 should be rejected and the alternative hypothesis Ha accepted.

In Table 5, the significant majority (p <0.05) of the interviewed individuals state that the organs and tissues that can be donated for the transplant are: Kidney (376; 97%), Blood (346; 89%), Liver (335; 87%), Bone Marrow (328; 85%), Cornea (323; 83%), Heart (322; 83%), Lung (259; 67%), Tissue (209; 54%), Pancreas (138 ; 36%), Bone (112; 29%), Leg (31; 8%) and Brain (25; 6%).

Table 5: Distribution of the investigated individuals according to the knowledge of the organs and tissues that can be donated for the transplant (n 387). Belém, State of Pará, Brazil, 2019.

Which of the following organs can be donated for the transplant?	N	%	P-Value(1)
14 – Cornea			
Yes	323	83.5%	<0.0001*
I don´t know	54	14.0%	
No	10	2.6%	
15 - Bone Marrow			
Yes	328	84.8%	<0.0001*
I don´t know	48	12.4%	
No	11	2.8%	
16 – Bone			
No	154	39.8%	<0.0001*
I don´t know	121	31.3%	
Yes	112	28.9%	
17 – Kidney			
Yes	376	97.2%	<0.0001*
I don´t know	10	2.6%	
No	1	0.3%	
18 – Lung			
Yes	259	66.9%	<0.0001*
I don´t know	81	20.9%	
No	47	12.1%	
19 – Liver			
Yes	335	86.6%	<0.0001*
I don´t know	33	8.5%	
No	19	4.9%	
20 – Brain			
No	288	74.4%	<0.0001*

I don´t know	74	19.1%	
Yes	25	6.5%	
21 – Leg			
No	281	72.6%	<0.0001*
I don´t know	75	19.4%	
Yes	31	8.0%	
22 – Pancreas			
I don´t know	171	44.2%	<0.0001*
Yes	138	35.7%	
No	78	20.2%	
23 – Blood			
Sim	346	89.4%	<0.0001*
No	26	6.7%	
I don´t know	15	3.9%	
24 – Heart			
Yes	322	83.2%	<0.0001*
I don´t know	60	15.5%	
No	5	1.3%	
25 – Tissue			
Yes	209	54.0%	<0.0001*
I don´t know	131	33.9%	
No	47	12.1%	

Note: Results are based on non-empty rows and columns in each innermost subtable.

Source: Research protocol (2019).

(1) Pearson's chi-square test (Wilks' G²) for independence (p-value <0.05).

* Significant Values; NS - Non-Significant Values.

Interpretation of the test:

H0: The frequencies observed occur in the same proportion for the different groups.

Ha: The observed frequencies differ significantly for the different groups.

Decision: As the computed p-value is less than the significance level of alpha = 0.05, the null hypothesis H0 should be rejected and the alternative hypothesis Ha accepted.

Table 6 shows Pearson's chi-square test, which serves to detect the existence of an association between demographic, socioeconomic and cultural variables that influence or not the decision of individuals to donate their organs and tissues after death.

It appears that the occupation of most individuals who answered yes (77; 28.1%) and perhaps (14; 23%) with the intention of donating their organs and tissues after death, are students, while the majority of individuals who they do not have the intention, they have occupation of the home (7; 13.5%).

The way of obtaining the information also influences the decision to donate or not, so that the majority of individuals who declared the donation positive (207; 75.5%) or perhaps (29; 47.5%), have access to information through the internet, while those who do not intend to donate (29; 55.8%) have access to information through television.

Another influencing factor observed was salary, it appears that those who answered yes (120; 43.8% or perhaps (33; 54.1%) to donate, receive between 3 and 5 salaries, while individuals who do not intend to donate have a lower income, between 1 and 2 minimum wages.

In summary, the factors that significantly interfere (p <0.05) in the intention of donating the respondents are: occupation, means of information, time spent with the family and salary, that is, we conclude that there is dependence between these variables and the intention to donate organs and tissues declared by the investigated, at a significance level of 5%.

Table 6: Demographic, socioeconomic and cultural factors that influence individuals' decision to donate their organs and tissues after death (n 387). Belém, State of Pará, Brazil, 2019.

		Do you intend to donate any organ in your body?						P-Value
		No (n = 52)		Yes (n = 274)		Maybe (n = 61)		
		N	%	N	%	N	%	
Middle Ages		49,5	17,6	33,4	12,9	42,6	18,3	
Genre	Female	31	**59,6%**	173	**63.1%**	32	**52,5%**	0.433ns
	Male	21	40,4%	101	36.9%	29	47,5%	
Occupation	Retired	5	9,6%	10	3,6%	6	9,8%	0.0351*
	Self-employed	5	9,6%	17	6,2%	1	1,6%	
	homemarker	7	**13,5%**	12	4,4%	5	8,2%	

Category	Label	n	%	n	%	n	%	p-value
	Student	4	7,7%	**77**	**28,1%**	14	23,0%	
	Teacher	0	0,0%	12	4,4%	2	3,3%	
	Receptionist	1	1,9%	17	6,2%	3	4,9%	
Marital status	Married	**17**	**32,7%**	73	26,6%	21	34,4%	0.0766 ns
	Divorced	2	3,8%	3	1,1%	3	4,9%	
	Not married	**17**	**32,7%**	**156**	**56,9%**	24	39,3%	
	Stable union	8	15,4%	37	13,5%	11	18,0%	
	Widower	8	15,4%	5	1,8%	2	3,3%	
Children	Pregnant	0	0,0%	1	0,4%	0	0,0%	0.771 ns
	No	7	13,5%	131	47,8%	21	34,4%	
	Yes	**45**	**86,5%**	**142**	**51,8%**	40	65,6%	
Religion	Agnostic	0	0,0%	1	0,4%	1	1,6%	0.611 ns
	Atheist	0	0,0%	5	1,8%	0	0,0%	
	Candomblé	0	0,0%	1	0,4%	1	1,6%	
	Catholic	**31**	**59,6%**	**176**	**64,2%**	31	50,8%	
	Spiritism	2	3,8%	4	1,5%	0	0,0%	
	Evangelical	17	32,7%	68	24,8%	26	42,6%	
	Without religion	2	3,8%	15	5,5%	0	0,0%	
	Theistic	0	0,0%	1	0,4%	0	0,0%	
	Jehovah's Witness	0	0,0%	1	0,4%	1	1,6%	
	Umbanda	0	0,0%	2	0,7%	1	1,6%	
Information	Internet	17	32,7%	**207**	**75,5%**	29	47,5%	0.001*
	Newspaper	4	7,7%	11	4,0%	5	8,2%	
	Radio	2	3,8%	2	0,7%	1	1,6%	
	Television	**29**	**55,8%**	54	19,7%	26	42,6%	
Living with the family	1-2 hours	4	7,7%	49	17,9%	9	14,8%	0.0251*
	3-4 hours	**15**	**28,8%**	**102**	**37,2%**	17	27,9%	
	Don't have time for family	1	1,9%	5	1,8%	0	0,0%	
	Holidays only	0	0,0%	3	1,1%	1	1,6%	
	Only on weekends	14	26,9%	56	20,4%	16	26,2%	
	Full-time	18	34,6%	59	21,5%	**18**	**29,5%**	
Family income	Good	28	53,8%	**190**	**69,3%**	43	70,5%	0.871 ns
	Excellent	4	7,7%	10	3,6%	2	3,3%	
	Great	5	9,6%	29	10,6%	4	6,6%	
	Bad	15	28,8%	45	16,4%	12	19,7%	
Salaries	1-2 salaries	**30**	**57,7%**	83	30,3%	22	36,1%	0.041*
	3-5 salaries	15	28,8%	**120**	**43,8%**	33	54,1%	
	6-9 salaries	7	13,5%	55	20,1%	3	4,9%	
	More than 9 salaries	0	0,0%	1	0,4%	0	0,0%	
	More than 9 salaries	0	0,0%	15	5,5%	3	4,9%	

Note: Results are based on non-empty rows and columns in each innermost subtable.

Source: Research protocol (2019).

(1) Pearson's Chi-square test (Wilks' G²) for association (p-value <0.05).

* Significant Values; NS - Non-Significant Values.

Interpretation of the test:

H0: The frequencies observed occur in the same proportion for the different groups.

Ha: The observed frequencies differ significantly for the different groups.

Decision: As the computed p-value is less than the

significance level of alpha = 0.05, the null hypothesis H0 should be rejected and the alternative hypothesis Ha accepted.

Figure 1 shows the distribution of the individuals investigated regarding the decision to donate their organs and tissues after death, according to age. It appears that the age distribution of the participants does not have a normal distribution because the p-value of the normality test is less than 0.05, so that, although the majority of the investigated have the intention to donate their organs, this position is significantly higher among younger people, with an average age of 33 years (μ = 33.40 ± 12.91).

In Figure 2, it is observed that the Tukey test for multiple comparisons between the groups of responses of the respondents and their age, pointing out that there is a significant difference between those individuals who claimed to donate or perhaps the organs and those who gave a negative answer.

Table 7: Test of analysis of variance between age and the decision of the investigated individuals to donate their organs and tissues after death (n 387). Belém, State of Pará, Brazil, 2019.

Do you have the intention to donate your organs and tissues after death ?	n	Average	DesvPad	IC de 95%
No	52	49.46	17.63	(45.49; 53.43)
Yes	274	33.401	12.914	(31.672; 35.131)
Maybe	61	42.57	18.28	(38.91; 46.24)

Note: Results are based on non-empty rows and columns in each innermost subtable.

Source: Research protocol (2019).

(1) ANOVA Test - Analysis of Variance (p-value <0.05).

* Significant Values; NS - Non-Significant Values.

Interpretation of the test:

H0: The average age of those investigated is not significantly related to the intention to donate organs and tissues.

Ha: There is a significant association between the intention

to donate organs and tissues and the average age of those investigated.

Decision: As the computed p-value is less than the significance level of alpha = 0.05, the null hypothesis H0 should be rejected and the alternative hypothesis Ha accepted.
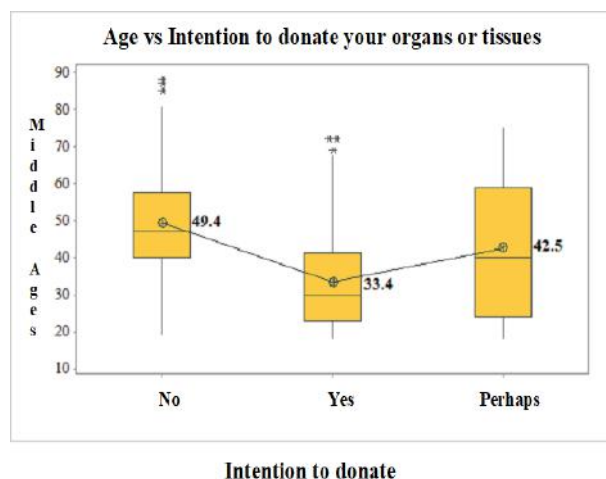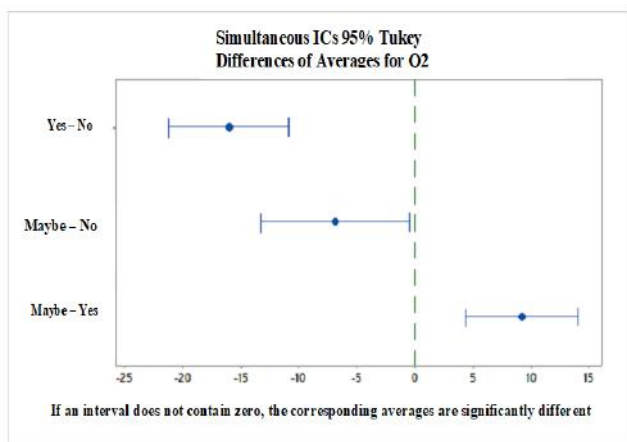
Combined DevPad = 14.5.

Fig.1: Distribution of the individuals investigated according to age and the decision to donate their organs and tissues after death (n 387). Belém, State of Pará, Brazil, 2019

Source: Research protocol 2019.

In order to determine whether the differences between the average ages of the response groups, "yes", "no" and "maybe" are statistically significant, we performed the Tukey Simultaneous test which pointed out that the individuals who claimed to have the intention to donate the organs are less than 16 years old (μ = -16.06) when compared to individuals who said they did not intend to donate organs and tissues.

Table 8: Tukey's Simultaneous Tests for the differences in mean age of the investigated, according to the decision to donate their organs and tissues after death (n 387). Belém, State of Pará, Brazil, 2019.

Difference of Levels	Difference Averages	EP of Difference	IC of 95%	Value-T	Value-P Adjusted (1)
Yes - No	-16.06	2.20	(-21.22; -10.90)	-7.29	0.000*

Maybe - No	-6.89	2.75	(-13.32; -0.45)	-2.51	0.033*
Maybe - Yes	9.17	2.06	(4.35; 14.00)	4.45	0.000*

Individual confidence level = 98.02%

Note: Results are based on non-empty rows and columns in each innermost subtable.

Source: Research protocol (2019).

(1) Tukey's Simultaneous Test (p-value <0.05).

* Significant Values; NS - Non-Significant Values.

Interpretation of the test:

H0: The average age of those investigated is not significantly related to the intention to donate organs and tissues.

Ha: There is a significant association between the intention to donate organs and tissues and the average age of those investigated.

Decision: As the computed p-value is less than the significance level of alpha = 0.05, the null hypothesis H0 should be rejected and the alternative hypothesis Ha accepted.

Combined DevPad = 14.5.

Fig.2: Tukey test for age comparison. Average of those investigated, according to the decision to donate their organs and tissues after death (n. 385). Belém, State of Pará, Brazil, 2019.

Source: Research protocol 2019.

IV. DISCUSSION

In this research, 387 participants were interviewed, 61.0% female and 39.0% male, with a predominance of the age group between 18 and 27 years old, with singles and students being the most likely to donate organs and tissues.

Most individuals expressed an intention to donate their organs after death and a small portion was undecided (15.8%).

In the present study, more than half of the individuals who intended to donate organs have already communicated this decision to a family member (197; 50.9%).

This result was in agreement with the findings of Guadagnoli and other authors (52%), in the North American population, being higher than that found in the population residing in Hong Kong (33%)[24-19].

This fact was an important finding, because 59.7% of the individuals replied that they would authorize the donation of organs from their family members with BD, if they did not know the will of this, while this percentage rose to 88.6%, when the intention to donating was manifested (p-value <0.0001, highly significant).

Siminoff, Gordon, Hewlett and Arnold[25], interviewing family members who consented to the donation of organs and tissues, demonstrated that previous knowledge about the intention to donate was strongly associated with the consent to donate organs and tissues for transplantation. In this context, considering that in Brazil, legislation requires family authorization for organ and tissue donation, it is strongly recommended that educational measures should be planned and implemented in order to encourage discussion of the topic with family members. In this understanding, the importance of sensitizing and encouraging individuals with the intention of donating their organs is emphasized to inform this decision to their family members outside the moment of loss and crisis, where possibly they will be better able to understand such desire.

It is considered valid to highlight the change in the legislation that extinguished the presumed donation in Brazil, with the publication of Law no. 10.211 / 2001, legalizing the consented donation, determining that the donation of organs of deceased persons must be carried out with family authorization.

Regarding the concept of brain death as a legal definition of death, 247 (63.8%) of the interviewees considered this statement to be true. This finding is presented as a positive fact, which favors donation, given that many individuals fail to authorize the donation of organs from their family members, because they do not understand brain death as a death criterion[19].

When analyzing the reasons why the interviewees were taken to position themselves for non-donation, there is a lack of information, which is the most relevant issue, adding up an important 50.6% of the studied population.

The lack of information is considered the point that can bring the most negative consequences to the donation process, and the lack of knowledge about what brain death is, how it happens and its irreversion is highlighted in this context, as it is at this moment that the family becomes more inclined to not authorize the donation of organs from their loved ones due to fear and insecurity in the diagnosis.

According to Diniz[26], the common notion of death has been the occurrence of prolonged cardiac arrest and the absence of breathing, that is, the total and permanent cessation of human vital functions.

This lack of knowledge reaches 31.0%, when referring to the concept of brain death; reaching 31.8%, when we add those who believe that the body remains alive after diagnosis. And yet, those who do not believe in the diagnosis of brain death add up to 16.0%, leading to a possible non-authorization of the donation.

It was evident that age is inversely and linearly associated with the intention to donate organs. Roels and other authors[27]; Barcellos[19], suggest that this finding may be related to the fact that some elderly people may have more difficulty in accepting the diagnosis of brain death, considering that they are too old to donate or because they have less knowledge about the topic of organ donation. and tissue for transplantation. In this understanding, we consider that campaigns should be directed to this age group, in order to clarify that most organs can be donated regardless of chronological age.

It is understood that this clarification is particularly relevant considering that with the increase in the life expectancy of the population, the percentage of potential elderly donors, with expanded donation can become considerably relevant and necessary.

Gender was strongly associated with the intention to donate organs (p-value 0.018). This finding is in line with the results of other studies, where male individuals had a lower prevalence of intention to donate organs. Family occupation and income were also strongly related to the intention to donate organs and tissues.

In the meantime, it is worth noting that low education and socioeconomic status have been referred to as the main factors associated with the lower frequency of intention to donate organs[19].

In the present study, the practice of the Catholic religion was predominant (176; 64.2%), however there was no statistical significance when compared to other religions (p-value 0.611). It is worth noting that religious reasons are often cited as barriers to organ and tissue donation, although the literature shows that most religions are in favor of organ donation; religiosity and individual culture are also revealed as reasons for not accepting the manipulation of the body, because in the imaginary of these families, when handling it, the donor loses its integrity, becoming deformed and not being able to return it as it came to the world[28].

Regarding the means of updating, the internet was more prominent as a source of information, representing 65.4%, which leads to infer that the knowledge of these participants has a tendency to establish more based on research in virtual / online sources, which they are easily accessible, the result of the advent of technological advancement.

When asked to respondents about the existence or not of organ trafficking in Brazil, 332 (85.8%) of these people answered yes, demonstrating the interviewees' distrust in the Brazilian health system.

V. CONCLUSION

From the results, we understand that the most relevant points on the theme were addressed, as well as the research objectives were achieved. The data allowed us to reflect on the intention of the adult population in the city of Belém, State of Pará, Brazil regarding the donation of organs and tissues for transplantation, making a comparison with the results available in the current literature on the factors that interfere in the decision to donate.

Knowing the will of the donor becomes essential, since the family tends to consider it. Failure to understand brain death also significantly interferes with family refusal. Knowing the reasons for the refusal can contribute to support the planning of more effective actions, aiming to promote the donation of organs and tissues, thus collaborating to reduce the waiting list.

This study allows us to conclude that older individuals with less education have less intention to donate their organs. This suggests that the design of the campaigns should target interventions in these groups, sensitizing and educating them about the importance of organ and tissue donation, motivating them to make a conscious decision regarding donation and informing this intention to a family member with autonomy to carry out the authorization.

The lack of information on organ donation and transplantation and all the consequences of lack of knowledge is certainly a limiting factor for the increase in

the number of donors. In order to improve this scenario, it is essential that there be greater investments in campaigns on the topic and effective actions that contribute to the increase in the notification of potential donors, the viability and the use of organs and tissues in order to minimize mortality on the waiting list associated with family refusal rates in Brazil.

In view of the limited number of studies found, we reinforce the need for new research on the topic, with a greater number of participants, using variable methods and assessing the problem from other perspectives, so that the understanding of organ donation and tissues can be expanded.

Finally, the research is of great relevance, as it allowed reflections on the reasons that lead people not to become donors, making this a major concern, since it is necessary for the population to become aware of the importance of the act of donating. In this perspective, it is expected to contribute to the development of new studies, reflections and concerns of professionals who deal daily with family refusals in the presence of a Potential Donor.

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