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# The impact of social environment and educational level on public knowledge and attitudes towards organ donation: Can we do better?

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*Key words: Organ donation, social environment, education level, knowledge, attitude, transplantation*

*Parole chiave: Donazione di organo, ambiente sociale, livello educativo, conoscenza, atteggiamento, trapianto*

**Abstract**

***Background.*** *For many patients with end-stage disease, organ transplant often provides the only chance for survival. Organ donation (OD) is affected by legislation, cultural and ethnic background, and knowledge and attitudes play a crucial role in promoting that concept. The present study aimed to assess differences in education level, perception, and willingness towards OD among Bosnian immigrants living in Sweden and respondents living in Bosnia and Herzegovina.*

***Study design.*** *We performed a quantitative cross-sectional study using a self-administered questionnaire among 204 participants.*

***Methods.*** *The questionnaire provided demographic characteristics, information about opinions, awareness, and knowledge on the donation process and religious approach to the subject, willingness to donate/receive organs, and possession of a donor card.*

***Results.*** *All respondents supported OD, regardless of their education level. Only 2% of university-educated individuals from Bosnia and Herzegovina claimed to be donor card owners ($p<0.001$). Most of the university-educated respondents in Sweden, compared to Bosnia and Herzegovina, agreed that OD is needed and should be promoted (73.8% vs. 46.9%, $p=0.007$), opposite to the non-university-educated (51.4% vs. 66.0%, $p=0.024$). University-educated respondents stated that the donor card was informative enough ($p=0.014$) and considered self-perceived knowledge about OD to be sufficient or excellent ($p<0.001$). Most respondents were married and employed, practicing Muslims. Most of non-university-educated respondents from both countries believe their religion does not oppose OD ($p=0.032$). However, university-educated individuals strongly believe that OD does not have to be within the same religious group ($p=0.016$), while other participants did not have a definitive opinion.*

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**Conclusions.** *Public behavior towards OD is affected by the social environment and the educational level. The study highlights the importance of achieving a suitable social climate for donation. Also, it suggests that more efforts are needed to harvest the benefits of the substantial support for OD among the Bosnian population.*

## Introduction

Medical problems affecting the major organs are usually extremely serious and very often fatal. Fortunately, medical advances today make it possible to replace unhealthy organs with donated organs by an organ transplant procedure. Organ transplantation (OT) is considered one of the most successful advances in modern medicine (1).

The progressive development of medicine with the help of modern technology significantly influenced the improvement of healthcare. Many patients, who a few decades ago could only expect death or, at best, a torturous and limited life, today can recover by organ replacement and have an almost normal and quality life (2-4).

Organ donation (OD) is an important life-saving method for patients with organ failure and late-stage disease. Organs can be utilized from either living or deceased donors. Kidneys make up the largest proportion of the transplanted organs globally (1). The insufficient number of donated organs is a globally increasing issue and the only way to overcome this problem is to increase the number of deceased donors (5).

Before the global pandemic of SARS-COV-2, the total number of transplants performed each year was on the rise. According to statistics from the Global Observatory on Donation and Transplantation, organ donations globally reached the number of 146,840 in 2018 (6).

In 2019, Spain had the highest number of deceased donors per million population (pmp) (49.6 pmp), followed by the USA (36.9 pmp) and Croatia (36.4 pmp). Concurrently, Turkey had the highest number of living donors (53.2 pmp), followed by South Korea (51.8 pmp) and Saudi Arabia (36.6 pmp). Meanwhile, Sweden had 19.2 deceased and 14.5 living donors pmp, which ranks it in the middle of the list of selected countries. However, Bosnia and Herzegovina with 0.9 deceased and 5.9 living donors pmp in 2017 had one of the lowest OD rates in Europe. During the same period, 1.8 deceased and 5.9 living organ transplants pmp were performed (7).

Preliminary data suggest that COVID-19 has globally reduced transplant activity. The overall drop was almost 16% by the end of 2020, with 11,253 organs transplants carried out across 22 countries. Kidney transplantation was the most affected (-19.14%), followed by lung (-15.51%) and liver (-10.57%) (8).

OD is a multi-factorial issue, affected by legislation, cultural and ethnic background, and development level of society and social system. Culture seems to be one of the most important factors towards OD, which consists of specific behavior, moral values, ethics code, aesthetic ideas, religion, and customs, etc. (9). Since each country is responsible for organizing its organ transplant systems, all of these factors influence OD and OT public policy.

In the post-war context, Bosnia and Herzegovina is often portrayed as a fragmented society with multicultural heritage (2). At the same time, Sweden represents one of the clearest examples of immigrant multiculturalism in Europe, rather unaffected by the current "multiculturalism

crisis". The Swedish case has been recognized as a model for positive immigrant integration (10). Previous studies confirmed the correlation of education level and OD rate (2, 5, 11, 12). Studies also showed the information deficit regarding these problems in young people, as one of the main reasons for inadequate acceptance of OD in public opinions. Even medical students showed modest knowledge due to poor education in this area (3, 11, 12).

Knowledge and attitudes towards OD in the general population play a major role in promoting the concept of OD and OT. Furthermore, education level may be very important, not just among potential donors, but also among transplant recipients, because it may influence health literacy and compliance rate (13-15). It is of great importance to understand the impact of the educational process among other cultural factors on attitude towards OD and OT, not just among medical and healthcare professionals, but also in the general population (13, 16).

The present study aimed to assess differences in education level, perception, and willingness towards OD among immigrants from Bosnia and Herzegovina living in Sweden and respondents living in Bosnia and Herzegovina.

## Methods

*Study design and participants*

The study was designed as a quantitative cross-sectional study. Data were collected using a self-administered questionnaire among the group of participants in Sweden originated from Bosnia and Herzegovina, and the group of participants in Bosnia and Herzegovina. The participants in both groups had various education levels and sociodemographic backgrounds.

The study was performed in two cities in the north-western part of Bosnia and Herzegovina and two cities in the western part of Sweden. The inclusion criteria were: participants older than 18 years of age, who have lived both in Bosnia and Herzegovina and in Sweden for more than 10 years per country, and who were willing to participate.

We excluded individuals with cognitive impairment and those who required OT. We asked 219 people to participate in the present study and 15 (7%) of them declined, due to lack of time. Hence, our final sample consisted of 204 people (102 in each country). The questionnaires and all communication were carried out in Bosnian language in both countries. The information related to the study that was given to the participants included its voluntary nature and the fact that they could withdraw their participation at any time. All the participants provided signed informed consent.

*Data collection*

The questionnaire was specifically designed by the authors and previously validated to achieve the aim of this study. The questions were organized into four sections. The first section contained sociodemographic details of the participants, such as age, gender, education level, religion, and marital status. The focus of the second section was on opinion, awareness, and promotion of OD, as well as sources of information on the subject. The questions in the third section examined participants' medical knowledge, knowledge about the donation process, and knowledge about a religious approach to OD. The last section of the questionnaire aimed to attain information about participants' willingness to participate in the transplant process, possession of a donor card, and readiness to donate/receive organs depending on religious affiliation.

The authors collected the data by face-to-face interview, in a private room, and those participants were then included in the study population. The respondents' participation

was voluntary, after being explained the course and goal of the work, in a language acceptable to them. It took around 15-25 minutes to answer the questionnaire. In the analysis of the data and conception of the work, we excluded all personal data that may indicate the identity of the respondents.

*Statistical analysis*

Data were provided as absolute (N) and relative (%) numbers, median range, and standard deviation (SD). The Kolmogorov-Smirnov test was used for the data distribution analysis. Depending on the distribution of the variables, a comparison between the groups was performed by the T-test for normal distribution data and $\chi^2$-test and Fisher exact test for categorical variables. P values <0.05 were considered statistically significant. Statistical analysis was performed using IBM SPSS (Statistical Package for Social Sciences) ver. 23.0 statistical software system (IBM Corporation, Chicago, Illinois, USA).

## Results

Out of a total of 204 respondents in the two observed groups, the majority of respondents in Sweden had a university level of education [65 (63.7%) vs. 37 (36.3%)], unlike respondents in Bosnia and Herzegovina [49 (48.0%) vs. 53 (52.0%)]. The difference in education level between the two groups was statistically significant (p=0.024).

There was no statistical significance (p=0.092) regarding age between respondents in Sweden and Bosnia and Herzegovina [46.0 (34.75-59.0) vs. 44.5 (35.7-51.3) years]. In both groups, most respondents were Muslims who practice their religion, were married, and employed. Other sociodemographic characteristics of the respondents are shown in Table 1.

Data in Table 2 represent the general knowledge and attitudes of the respondents regarding OD. The largest number of respondents stated that they know what OD is, and no significant difference in opinion was found regarding education level

Table 1 - Sociodemographic characteristics of the respondents in the observed groups

| Characteristic | | Sweden (N. %) | Bosnia and Herzegovina (N. %) |
|---|---|---|---|
| Religion | Muslim | 78 (76.5%) | 87 (85.3%) |
| | Catholic | 20 (19.6%) | 12 (11.8%) |
| | Orthodox | 4 (3.92) | 2 (1.96%) |
| | Atheist | 0 | 1 (0.98%) |
| Practicing of religion | Religious practitioner | 85 (83.3%) | 65 (63.7%) |
| | Religious only | 17 (16.7) | 35 (34.3%) |
| | Non-religious | 0 | 2 (2.0%) |
| Marital status | Married | 72 (70.6%) | 80 (78.4%) |
| | Divorced | 22 (21.6%) | 5 (4.9%) |
| | Single | 8 (7.8%) | 17 (16.7%) |
| Employment | Employed | 68 (66.7%) | 88 (86.2%) |
| | Unemployed | 14 (13.7%) | 12 (11.8%) |
| | Retiree | 16 (15.7%) | 0 |
| | Else | 4 (3.9%) | 2 (2.0%) |

Data are presented as absolute (N) and relative numbers (%)

Table 2 - General knowledge and attitudes of respondents regarding OD

| Questionnaire | | Without university degree | | P | With university degree | | P |
|---|---|---|---|---|---|---|---|
| Statement | Answer | Sweden (N. %) | Bosnia and Herzegovina (N. %) | | Sweden (N. %) | Bosnia and Herzegovina (N. %) | |
| I know what organ donation is! | Yes<br>No | 33 (89.2%)<br>4 (10.8%) | 51 (96.2%)<br>2 (3.8%) | 0.187 | 61 (93.8%)<br>4 (6.2%) | 49 (100%)<br>0 | 0.101 |
| Organ donation is needed and should be promoted! | Agree<br>Disagree<br>Not sure | 19 (51.4%)<br>13 (35.1%)<br>5 (13.5%) | 35(66.0%)<br>5 (9.4%)<br>13 (25.5%) | 0.024 | 48 (73.8%)<br>10 (15.4%)<br>7 (10.8%) | 23 (46.9%)<br>20 (40.8%)<br>6 (12.2%) | 0.007 |
| A signed donor card as a statement is? | Informative<br>Binding | 28 (75.7%)<br>9 (24.3% | 39 (73.6%)<br>14 (26.4%) | 0.823 | 53 (81.5%)<br>12 (18.4%) | 30 (61.2%)<br>19 (38.8%) | 0.014 |
| My knowledge of organ donation and transplantation is? | Insufficient<br>Sufficient<br>Excellent | 15 (40.5%)<br>15 (40.5%)<br>7 (18.9%) | 29 (54.7%)<br>24 (45.3%)<br>0 | 0.004 | 11 (16.9%)<br>27 (41.5%)<br>27 (41.5%) | 16 (32.7%)<br>33 (67.3%)<br>0 | < 0.001 |
| Available information of organ donation is? | Insufficient<br>Sufficient<br>Excellent | 16 (43.2%)<br>16 (43.2%)<br>5 (13.5%) | 22 (41.5%)<br>25 (47.2%)<br>6 (11.3%) | 0.916 | 12 (18.5%)<br>22 (33.8%)<br>31 (47.7%) | 26 (53.1%)<br>21 (42.9%)<br>2 (4.1%) | < 0.001 |

Data are presented as absolute (N) and relative numbers (%)

between the examined groups. Most of of the respondents in Sweden, with university level of education, agreed that OD is needed and should be promoted, compared to respondents in Bosnia and Herzegovina [48 (73.8%) vs. 23 (46.9%), p=0,007], while results in the group of respondents without university education were opposite [19 (51.4%) vs. 35 (66.0%), p=0.024)]. The largest number of respondents in the observed groups stated that the donor card was an informative statement, with a statistically significant difference among university-educated respondents (p=0.014).

When they come to self-perceived knowledge about OD, respondents without a university degree in both countries considered it to be insufficient (p=0.004), while university-educated participants considered their knowledge sufficient or excellent (p <0.001). There was no predominant opinion on the quality of the available information on OD among respondents without a university degree (p=0.16). However, university-educated participants rated their information sufficient or excellent (p <0.001).

The attitudes about the sociomedical aspects of OD are presented in Table 3. Ranging from 39.6% to 78.5% in individual groups, respondents stated that OD does not represent a health risk for the donor, with statistically significant differences in both groups (p=0.011; p=0.038). Results show that the respondents without a university degree had significantly different opinions

on the crucial factor regarding the donor (p=0.047).

Also, there was a statistically significant difference in the university-educated group considering the importance of age, health, and other factors on the donor side (p=0.005). Respondents considered a living donor to be the best option for OT, with results ranging from 54.0% to 84.6% in individual groups (p=0.048; p=0.012).

Respondents' attitude regarding religious considerations towards OD was different, with most of respondents without a university degree from both countries believing their religion does not oppose OD (p=0.032). However, the university-educated groups did not have a statistically significant opinion regarding this statement. But, university-educated individuals strongly believed that OD does not have to be within the same religious group (p=0.016), while those participants without a degree did not have a definitive opinion.

All respondents supported OD, regardless of their level of education (73.6% – 81.6%), with no statistical difference between groups. However, there was a statistically significant difference between respondents in Sweden and Bosnia and Herzegovina in terms of owning a donor card, regardless of their education, with only 2% of university-educated individuals from Bosnia and Herzegovina claiming to have it (p<0.001).

The majority of respondents stated they would accept a donated organ in case of need, even from a person from a different religious group, and they would donate organs to an individual of different religion, as well. There was no statistically significant difference between the observed groups regarding these statements (Table 4).

## Discussion and conclusions

For many patients with end-stage disease, recent advances in the field of OT often provide the only chance for survival and new hope for a life of satisfactory quality. Nowadays, the main challenge in OD and OT in all fields of transplant medicine is the disproportion between organ demand and organ availability (1, 13).

Of all the factors that affect the transplant process, sociodemographic are among the most important, as they directly affect the number of donated organs (1, 17). Ethical implications are the most frequently raised issues, but in a multicultural society such as Bosnia and Herzegovina, additional concerns arise, regarding social and religious issues.

Studies showed that diverse cultural, religious, and traditional concepts related to OD can interfere with its acceptability and cause a lack of willingness to donate organs (17). There are only a few available studies about organ donation and OT in Bosnia and Herzegovina and Sweden, and almost all of them were based on young people and students' knowledge and experiences. A few studies reported the experiences of respondents in the general population regarding the questions about OD and OT. However, there is no available research that provides insight into whether and how environmental change affects respondents of different education levels in relation to the identical observed group that did not change the place and country of origin, and their opinions and attitudes about OD and OT as well.

Religious concerns may be an important reason why patients decline participation in the OD process, even more when live donation is discussed (18). An insight into religious consideration of OD and OT can provide practical points for health care professionals who are involved in these processes.

Almost all world religions basically have a positive attitude towards OD. Christian countries of Europe and America have higher rates of OT, possibly due to the fact

Table 3 - The attitude of respondents regarding socio-medical aspects of OT

| Questionnaire | | Without university degree | | P | With university degree | | P |
|---|---|---|---|---|---|---|---|
| Statement | Answer | Sweden (N. %) | Bosnia and Herzegovina (N. %) | | Sweden (N. %) | Bosnia an Herzegovina (N. %) | |
| Organ donation represents a health risk for the donor? | Yes | 7 (18.9%) | 26 (49.1%) | | 11 (16.9%) | 14 (28.6%) | |
| | No | 21 (56.8%) | 21 (39.6%) | 0.011 | 51 (78.5%) | 28 (57.1%) | 0.038 |
| | Not sure | 9 (24.3%) | 6 (11.3%) | | 3 (4.6%) | 7 (14.3%) | |
| Regarding organ transplant. the crucial factor for the donor is? | Age | 10 (27.0%) | 5 (9.4%) | | 9 (13.8%) | 7 (14.3%) | |
| | Health | 15 (40.5%) | 20 (37.7%) | 0.047 | 38 (58.5%) | 14 (28.6%) | 0.005 |
| | Other | 12 (32.4%) | 28 (52.8%) | | 18 (27.7%) | 28 (57.1%) | |
| The best transplantation outcome is from? | Living donor | 20 (54.0%) | 29 (54.7%) | | 55 (84.6%) | 28 (57.1%) | |
| | Cadaver | 1 (2.7%) | 6 (11.3%) | 0.048 | 1 (1.5%) | 2 (4.1%) | 0.012 |
| | Irrelevant | 16 (43.2%) | 18 (34.0%) | | 9 (13.8%) | 19 (38.8%) | |
| My religion is opposed to organ donation? | Yes | 3 (8.1%) | 14 (26.4%) | | 2 (3.1%) | 2 (4.1%) | |
| | No | 18 (48.6%) | 27 (50.9%) | 0.032 | 45 (69.2%) | 27 (55.1%) | 0.320 |
| | Not sure | 16 (43.2%) | 12 (22.6%) | | 18 (27.7%) | 20 (40.8%) | |
| Transplantation is acceptable only within the same religious group? | Yes | 4 (10.8%) | 11 (20.8%) | | 11 (16.9%) | 6 (12.2%) | |
| | No | 18 (48.6%) | 20 (37.7%) | 0.384 | 47 (72.3%) | 27 (55.1%) | 0.016 |
| | Not sure | 15 (40.5%) | 22 (41.5%) | | 7 (10.8%) | 16 (32.7%) | |

Data are presented as absolute (N) and relative numbers (%)

Table 4 - The attitude of respondents regarding willingness to participate in OD

| Questionnaire | | Without university degree | | P | With university degree | | P |
|---|---|---|---|---|---|---|---|
| Statement | Answer | Sweden (N. %) | Bosnia and Herzegovina (N. %) | | Sweden (N. %) | Bosnia and Herzegovina (N. %) | |
| I support organ donation! | Yes | 29 (78. 4%) | 39 (73. 6%) | 0. 451 | 53 (81. 5%) | 40 (81. 6%) | 0. 992 |
| | No | 7 (18. 9%) | 9 (17. 0%) | | 7 (10. 8%) | 5 (10. 2%) | |
| | Not sure | 1 (2. 7%) | 5 (9. 4%) | | 5 (7. 7%) | 4 (8. 2%) | |
| I have a donor card! | Yes | 11 (29. 7%) | 0 | < 0. 001 | 27 (41. 5%) | 1 (2. 0%) | < 0. 001 |
| | No | 26 (70. 3%) | 53 (100%) | | 38 (58. 5%) | 48 (98. 0%) | |
| I would accept donated organ in case of need! | Yes | 23 (62. 2%) | 35 (66. 0%) | 0. 668 | 52 (80. 0%) | 40 (81. 6%) | 0. 712 |
| | No | 5 (13. 5%) | 9 (17. 0%) | | 5 (7. 7%) | 2 (4. 1%) | |
| | Not sure | 9 24. 3%) | 9 (17. 0%) | | 8 (12. 3%) | 7 (14. 3%) | |
| I would accept organs from a person from a different religion. | Yes | 21 (56. 8%) | 34 (64. 2%) | 0. 062 | 48 (73. 8%) | 42 (85. 7%) | 0. 258 |
| | No | 5 (13. 5%) | 8 (15. 1%) | | 12 (18. 5%) | 4 (8. 2%) | |
| | Not sure | 11 (29. 7%) | 11 (20. 8%) | | 5 (7. 7%) | 3 (6. 1%) | |
| I would donate an organ to a person from a different religion. | Yes | 24 (64. 9%) | 27 (50. 9%) | 0. 377 | 50 (76. 9%) | 35 (74. 6%) | 0. 681 |
| | No | 3 (8. 1%) | 8 (15. 1% | | 8 (12. 3%) | 14 (12. 3%) | |
| | Not sure | 19 (27. 0%) | 18 (34. 0%) | | 7 (10. 8%) | 15 (13. 25) | |

Data are presented as absolute (N) and relative numbers (%)

that many followers view OD as an act of charity and love (19). The Vatican considers both OD and OT as morally acceptable and encourages OD (18). Meanwhile, OD and OT are not allowed without formal consent, as well as mutilation or causing the death of a human being to delay the death of another person (20). However, the role of Catholicism in regards to OD is unclear, because it´s only one of many factors that predict willingness to OD.

These issues are even more complex when it comes to Jehovah`s Witnesses because OT was not allowed by their religious law until recently (18).

Violation of the human body is greatly forbidden in Islam, but in cases of necessity as saving the life of another, Islamic rules support the donation of both living and deceased human organs ("necessities permit the prohibited") (11). Hance, most of the major Islamic academies consider OD as an expression of altruism, generosity, and duty (21, 22).

Similarly, Orthodox Church considers OD as an act of charity. On the other hand, there is no available research on the effect of atheism and agnosticism on attitude towards OD (11).

We have to address all these concerns in order to analyze public opinions and attitudes in multicultural societies such as Bosnia and Herzegovina and Sweden. In our study, most respondents were Muslims who practiced their religion, and we need to have this fact in mind when discussing our results. However, the effect of religion on the attitude towards OD remains controversial.

Some studies showed that religious beliefs are associated with a negative attitude towards OD (23). Despite this, Gross et al. reported a positive impact of religion on attitude to OD among 7,272 Swiss-Italian young adults within a 10-year survey period. 61% of them stated they would donate their organs in case of brain death and their attitude did not change significantly during the survey period. A significantly more positive attitude towards OD was found among participants who felt they were sufficiently informed, who had close next of kin who were aware of their attitude, who had contacts with transplanted persons, and believed in an existence after death (24). Another study showed neither religious beliefs, nor education or employment status affected attitudes towards OD (25).

In our study, when analyzing public opinions on the item: "My religion is opposed to organ donation?", we found that 4,9% of respondents in Sweden and 15,7% in Bosnia and Herzegovina, agreed with the statement, while 33,3% of the respondents in Sweden and 21,6% in Bosnia and Herzegovina were not sure. Our results show that most of respondents would accept a donated organ in case of need, even from a person from a different religious group, and they would donate organs to an individual from a different religion.

Although Muslim scholars and organizations support OD, Muslim respondents, even medical students, had an increased likelihood of negative attitudes towards OD. Hamed et al. found that refusal of OD among students with negative attitudes was justified by religious forbiddance in 19% of the students (11). Similar results were demonstrated in several other studies (26). All of this emphasizes the need to involve religious leaders in public communication in order to correct the popular misconceptions related to this subject.

Inadequate and insufficient knowledge and unclear conception of brain death have a negative effect on OD (27). This is the cause of the changed attitude of medical students and health workers as well. The results from one study on Sweden ICU nurses suggest that less than half of the ICU nurses trusted clinical diagnosis of brain death without a confirmatory cerebral angiography (28). Also, up to 40% of refusal of OD in students was due to a lack of confidence

in the protocol for diagnosing brain death (11, 23, 24). Only 36% of medical students reported overall adequate knowledge, and it decreased to 11,7% when estimating adequate knowledge on brain death. This indicates vagueness and mistakes in the conception of brain death among medical students and hence the general population (11). In our research, 15,7% of respondents in Sweden and 44,1% in Bosnia and Herzegovina rated their knowledge of OD and OT as insufficient.

Public knowledge regarding OD can be improved by targeting the part of the population that can contribute the most, not only by direct participation in the OD process but also indirectly, by influencing people from their environment. Precisely for this reason, there have been many studies on the attitudes and knowledge of medical students and healthcare professionals. Results from the recent study among healthcare personnel in Turkey offered an interesting insight regarding attitudes towards OD. They showed that 52.8% of them were volunteers for OD and only 16.7% had an organ donation card. Also, physicians felt more positive about organ donation than other healthcare personnel (29). Other studies also reported a positive attitude towards this issue (30, 31). The most common reason provided by those who agreed with donation was "helping people" whereas the most common cause of disagreement was "to honor the body" (31).

As the awareness of healthcare professionals regarding OD increases, their potential as a further source of information increases as well. Refusal to donate organs in the general population often originated from lack/misinformation received from healthcare workers. It leads to the fact that, although most people are willing to donate, it´s not reflected in the OD rates. This imposes a need to create education models for medical professionals that will allow them to transmit proper information to the population (32).

Several other studies showed that education about OD can be effective in increasing knowledge and willingness to donate organs (20, 23, 33, 34). However, this kind of education is usually provided in a high-school setting or among students in higher levels of secondary education, without paying attention to lower educational levels (35).

The media have a significant role in affirming knowledge in this area. Besides the media's active role in promoting OD, social media nowadays can serve health educators in many ways. Not limited by traditional media readership of certain demographic groups, social media allows the dissemination of information to people with various sociodemographic characteristics and geographical locations (36, 37). Transplant hospitals and the public can rapidly increase the number of living donors by creating social media communities (36).

A strong correlation between the education level and OD volunteering was underlined in the literature (11, 12, 38, 39). In the present study, most of respondents in Sweden were university-educated ($p=0.024$). Our results indicate that, regardless of their education level, all respondents support OD. However, only 2% of university-educated individuals from Bosnia and Herzegovina claimed to be donor card owners ($p<0.001$). Most of the university-educated respondents in Sweden, compared to Bosnia and Herzegovina, agreed that OD is needed and should be promoted (73.8% vs. 46.9%, $p=0.007$), while results amongst non-university-educated were opposite (51.4% vs. 66.0%, $p=0.024$). Also, university-educated respondents stated that the donor card was informative enough ($p=0.014$) and considered self-perceived knowledge about OD to be sufficient or excellent ($p<0.001$). Furthermore, there was a difference in opinions on factors regarding the donor potential, although the respondents stated that OD does not represent a health risk for the donor.

The relation between the participants' educational level and religious issues regarding OD was interesting. Our research showed that most of non-university-educated respondents from both countries believe their religion does not oppose OD (p=0.032). However, university-educated individuals strongly believe that OD does not have to be within the same religious group (p=0.016), while other participants did not have a definitive opinion.

Some population-based studies suggested that economic status plays a significant role in forming the attitudes regarding OD (39, 40), while others showed no correlation in that sense (38). Most of the respondents in our survey were employed and economically independent.

The results of this study highlight the importance of achieving a suitable social climate for the donation of organs. Also, they suggest that more efforts are needed to harvest the benefits of the substantial support for OD among the Bosnian population.

This article briefly explores the social issues and views involved in OD. The religious and traditional concerns play a significant role and affect OD and OT process much more than we believe. Social environment and the educational level affect the behavior towards OD. Subsequently, a change in the social environment can positively influence the attitudes and perception of available information.

The evaluation of knowledge regarding these issues is of crucial importance to develop more efficient educational programs. We hope that the knowledge provided by this study will benefit both healthcare professionals and patients in raising the public commitment to OD in a multicultural society such as Bosnia and Herzegovina.

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## Riassunto

***L'impatto dell'ambiente sociale e del livello educativo sulla conoscenza, gli atteggiamenti e la disponibilità alla donazione di organi: si può far meglio?***

**Premessa**. Per molti pazienti con malattia allo stadio terminale, il trapianto di organi spesso rappresenta l'unica possibilità di sopravvivenza. La donazione di organi è influenzata dalla legislazione, dall'etnicità e dal background culturale; e la conoscenza e gli atteggiamenti giocano un ruolo cruciale nella promozione di tale disponibilità. Il presente studio mirava a valutare le differenze, sulla base del livello di istruzione, della percezione e della disponibilità verso la donazione d'organo, tra alcuni immigrati bosniaci che vivono da tempo in Svezia e altrettanti soggetti che vivono in Bosnia ed Erzegovina.

**Progettazione dello studio**. Abbiamo condotto uno studio trasversale quantitativo utilizzando un questionario autosomministrato ai 204 partecipanti.

**Metodi**. Il questionario raccoglieva caratteristiche demografiche, informazioni su opinioni, consapevolezza e conoscenza del processo di donazione e dell'approccio religioso alla materia, disponibilità a donare/ricevere organi e possesso di una tessera di donatore.

**Risultati**. Tutti gli intervistati approvano la donazione d'organo, indipendentemente dal loro livello di istruzione. Solo il 2% delle persone scolarizzate in Bosnia ed Erzegovina ha affermato di essere titolare di una carta di donatore (p<0,001). La maggior parte degli intervistati con istruzione universitaria in Svezia, rispetto alla Bosnia-Erzegovina, ha convenuto che la donazione d'organo è necessaria e dovrebbe essere promossa (73,8% contro 46,9%, p=0,007), al contrario di quanti non hanno frequentato l'università (51,4% contro 66,0%, p=0,024). Gli intervistati con istruzione universitaria hanno affermato che la tessera del donatore era sufficientemente informativa (p=0,014) e consideravano la conoscenza auto-percepita sulla donazione d'organo come sufficiente o eccellente (p<0,001). La maggior parte degli intervistati era sposata ed occupata, di fede musulmana e praticante. La maggior parte degli intervistati senza istruzione universitaria di entrambi i paesi ritiene che la propria religione non si opponga alla donazione (p=0,032). Tuttavia, gli individui con istruzione universitaria credono fermamente che la donazione non debba avvenire necessariamente solo all'interno dello stesso gruppo religioso (p = 0,016), mentre altri partecipanti

non hanno sviluppato un'opinione definitiva. Sfondo. Per molti pazienti con malattia allo stadio terminale, il trapianto di organi spesso rappresenta l'unica possibilità di sopravvivenza. La donazione di organi è influenzata dalla legislazione, dal background culturale ed etnico e la conoscenza e gli atteggiamenti giocano un ruolo cruciale nella promozione di tale concetto. Il presente studio mirava a valutare le differenze nel livello di istruzione, nella percezione e nella disponibilità verso la dsonazione tra gli immigrati bosniaci che vivono in Svezia e gli intervistati che vivono in Bosnia ed Erzegovina.

**Conclusioni**. Il comportamento del pubblico nei confronti della donazione d'organo è influenzato dall'ambiente sociale e dal livello di istruzione. Lo studio sottolinea l'importanza di creare un clima sociale adatto alla donazione. Inoltre, suggerisce che sono necessari maggiori sforzi per raccogliere i benefici del sostanziale sostegno alla donazione d'organo già presente tra la popolazione bosniaca. Il comportamento del pubblico nei confronti della donazione d'organo è influenzato dall'ambiente sociale e dal livello di istruzione. Lo studio sottolinea l'importanza di creare un clima sociale adatto alla donazione. Inoltre, suggerisce che sono necessari maggiori sforzi per raccogliere i benefici del sostanziale sostegno alla donazione d'organo tra la popolazione bosniaca.

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