

Knowledge of Criteria for Brain Death and Attitudes towards Organ Donation and Transplantation of Nursing Professionals in Tottori Prefecture, Japan

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The nursing professional population in Tottori Prefecture, Japan, was studied for their knowledge of criteria towards brain death and their attitudes towards organ donation and organ transplantation. An attempt was also made to clarify factors involved in issues concerning organ donation and organ transplantation. We distributed 2200 questionnaires to 9 hospitals, and obtained 1879 responses, of which 1683 were valid. The rate of nursing professionals holding donor cards to all respondents was 384/1683 (22.8%). The length of nursing service showed no difference in improvement of awareness of brain death. Longer length of service tended to produce a negative attitude in nurses towards donating their own organs in both brain death and cardiac death. Subjects who were willing to donate organs to others in cardiac death were also willing to do so in brain death. We provided some general suggestions for improving education about organ transplantation in Japan, such as commencing provisions for education regarding organ donation and organ transplantation in junior high school due to ethical issues. To more clearly identify the barriers against the improvement of the situation surrounding organ transplantation, research needs to be cumulated for nursing professionals.

Key words: brain death; nurses' attitudes; organ donation; organ transplantation; questionnaire

Japan is a country where organ transplantation is not well accepted by society and it has long been a controversial issue not only among the general public but also among health care professionals. Although the Government's decision to accept the definition of brain death was officially enacted with the Organ Transplant Bill of 1997, the number of transplant operations has not increased because the number of organ donors has not grown and,

as a result, an extreme shortage of sufficient organs available for transplant still remains (The Japan Society for Transplantation, 2004). There are several reasons for why this is still a critical issue in Japan. One possible explanation is public distrust of the medical profession regarding organ transplantation in Japan (Kimura, 1991). This has resulted from the 1st heart transplantation from a cadaveric donor in 1968. Surgeons performed a successful heart transplant from a cadaveric donor to a patient with heart failure. However, the

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recipient passed away 83 days after the operation. The recipient's history, diagnosis and previous treatment were disclosed after the recipient's death, and this raised such issues as whether the transplantation was justified at all and whether the criterion of brain death was appropriate. Issues arose about the donor as well (Kimura, 1991).

The major limitation of organ transplantation is the shortage of organs available for people with irreversible organ failure (Kibert and Kibert, 1992). Therefore, widespread information regarding organ donation and organ transplantation needs to be provided to the general public so that a higher rate of donation can be made possible. Nursing professionals are well placed to play an extremely important role in the health care needs of patients who undergo organ transplantation. Singh et al. (2002) asserted that it is impossible to perform organ donation and transplantation as a regular medical practice if health care professionals, especially nurses, do not accept and approve of organ donation and transplantation. As a result, health care professionals have been struggling to promote awareness of organ transplantation in the Japanese general public (Kita et al., 2000).

This study was conducted to assess the attitude to organ donation and organ transplantation among nursing professionals at hospitals in Tottori Prefecture, Japan, and to clarify the factors associated with the issues regarding organ donation and transplantation. It was also intended to identify the future direction for the development of organ transplantation status in Japan.

Subjects and Methods

Development of the questionnaire

A questionnaire was modeled after a previous study by an author of the present study (Hiramatsu et al., 2003). The questionnaire was constructed to examine professional nurses' personal knowledge and attitudes regarding criteria involving brain death, organ donation and organ transplantation. It consisted of 45 questions which included 10 items

of the demographic characteristics of individuals. The level of knowledge and attitudes towards issues regarding brain death, organ donation and organ transplantation were examined by applying nominal and ordinal scales.

This questionnaire contained 15 items for examining awareness and attitudes towards brain death, organ donation and organ transplantation. The need for education regarding organ transplantation was based on educational levels—elementary school, junior high school, high school and university. These were also examined. To explore the current attitude regarding organ transplantation in each workplace, one item was added.

Distribution of the questionnaire and subjects

Questionnaires were distributed to nursing professionals working in 9 general hospitals between September 2003 and January 2004 through the permission from the nursing director in each hospital. These hospitals were selected based on the following 2 criteria: the bed number of over 300, and kidney transplantations from living donors performed as a regular medical practice. Questionnaires were subsequently distributed to nurses stationed at medical and surgical wards, emergency units, intensive care units, high care units and operating rooms. A cover letter was attached that explained the purpose of the present study and the voluntary and anonymous basis of this study. Questionnaires were returned in envelopes provided in each workplace, then collected by the authors and kept confidential. A total of 2200 questionnaires were distributed and 1879 were returned (response rate: 85.4%). In the present study, 1683 of the 1879 (89.6%) were considered as valid responses.

Statistical Analysis

All responses were scored numerically for analysis, and numbers and percentages were computed for each question. Differences in noncontiguous variables were tested by chi-square analysis. Cor-

relations between attitude items regarding organ transplantation were examined by Pearson's correlation coefficients analysis. Statistically significant differences were tested at a level of $P < 0.05$. Statistical analysis was performed on a personal computer with the SPSS version 11.5 software package.

Results

Demographic characteristics

The demographic characteristics of subjects are shown in Table 1. There is no significant difference between the rate in working experience in critical care units and the rate of donor card holding ($\chi^2 = 0.795$, $P = 0.373$).

Criteria for brain death

Knowledge of criteria for brain death

In order to assess whether or not subjects felt they had knowledge of criteria for brain death regardless of the amount or depth of the criteria, a simple question was asked to subjects. The question was "do you have any knowledge of the criteria for brain death?" The rate of subjects who claimed to have "knowledge" regarding criteria for brain death was 1372/1683 (81.5%), and 17.4% of them [$n = 293$] claimed to have "no knowledge" regarding criteria for brain death. When the difference in knowledge of criteria for brain death was analyzed according to the period worked as a nurse, the length of nursing service was found to have no effect on the development of knowledge regarding the criteria of brain death.

Knowledge of criteria for brain death and holding donor cards

As shown in Fig. 1, a significant difference was found between the rate of subjects who claimed to have knowledge of criteria for brain death and the rate of subjects who hold the donor cards. Donor card holders claimed to have "knowledge" about the criteria of brain death more than no-

Table 1. Demographic Characteristics [$n = 1683$]

Characteristics	Number of subjects (%)
Age (year)	
20–29	610 (36.2)
30–39	429 (25.5)
40–49	389 (23.1)
50–59	250 (14.9)
≥ 60	5 (0.3)
Mean ± SD	36.1 ± 10.6
Gender	
Male	20 (1.2)
Female	1663 (98.8)
Work experience (year)	
< 10	710 (42.2)
10–19	396 (23.5)
20–29	402 (23.9)
30–39	149 (8.9)
≥ 40	5 (0.3)
No answer	21 (1.2)
Mean ± SD	14.0 ± 10.3
Minimum	less than 1
Maximum	47
Work experience in critical care units	
Yes	712 (42.3)
No	963 (57.2)
No answer	8 (0.5)
Participation in lectures or seminars	
Yes	512 (30.4)
No	1139 (67.7)
No answer	32 (1.9)
Holding a donor card	
Yes	384 (22.8)
No	1282 (76.2)
No answer	17 (1.0)

Demographic characteristics are classified as age, sex, work experience (year), work experience in critical care units, participation in lectures or seminars and holding a donor card.

Work experience in critical care units means work experience in environments such as emergency units, intensive care units, high care units and operating rooms.

Participation in lectures or seminars means that subjects had some experience in attending any sort of lecture or seminar in relation to organ transplantation in the past.

The donor cards mentioned above provide information on whether or not respondents hold donor cards; however, it does not mean that it provides information on whether or not respondents are willing to be organ donors in a state of brain death or cardiac death.

holders ($\chi^2 = 16.871, P < 0.001$). However, 10.7% of card holders [$n = 41$] claimed to have “no knowledge” about the criteria for brain death.

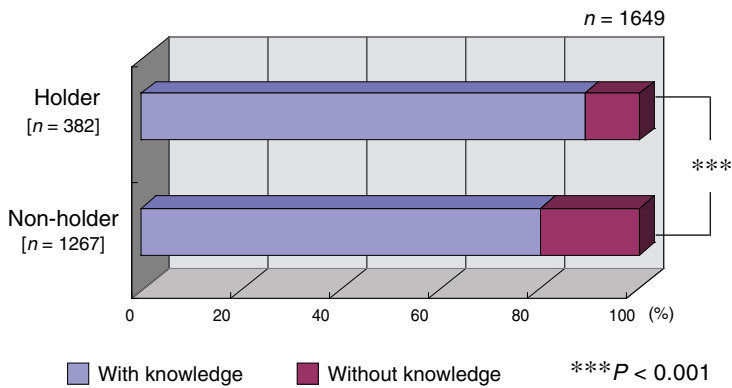


Fig. 1. Knowledge of criteria for brain death by holding donor cards. Of 1683, 1649 answers were given to this issue.

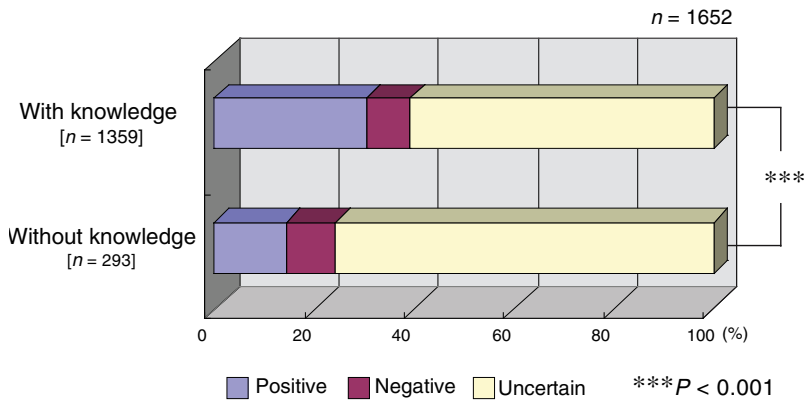


Fig. 2. Knowledge of and attitudes for criteria for brain death. Of 1683, 1652 answers were given to this issue.

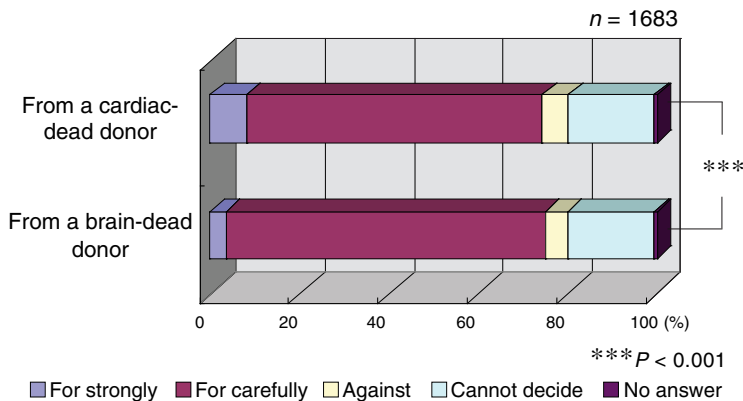


Fig. 3. View of organ transplantation by different states of death. The responses were from all subjects.

Knowledge and attitudes of criteria for brain death

As shown in Fig. 2, there was also a significant difference concerning knowledge about the criteria of brain death and the attitude that brain death could be recognized as the death of a human being. Subjects who answered that they knew what brain death was had more positive responses regarding the attitude that brain death could be recognized as the death of a human being than subjects who claimed to have no knowledge of criteria for brain death ($\chi^2 = 32.860, P < 0.001$). However, more than half of the subjects could not respond whether or not brain death was the death of a human being.

Attitudes regarding organ transplantation and donation

Promotion of organ transplantation

As shown in Fig. 3, the majority of subjects expressed the view for organ transplantation carefully and not strongly regardless of whether the organ is from a brain-dead donor or from a cardiac-dead donor. Even though all subjects were nursing professionals, 20% of them could not decide whether or not they were for organ transplantation.

Organ donation for others

The rate of subjects who responded that they would donate their organs to others in brain death was 391/1683 (23.2%). Of 1683, 374 subjects (22.2%) responded that they would not donate their organs to others in brain death. Similarly, 24.2% of subjects [$n =$

408] responded that they would donate their organs to others in cardiac death, and 22.2% of subjects [$n = 373$] responded that they would not donate their organs to others in cardiac death. More than half of the subjects could not decide whether or not they would donate their organs to others in either brain death or cardiac death. In addition, there were no significant differences between nursing experience in critical care units and the attitude of organ donation for others. Interestingly, the length of nursing service tend to produce negative attitudes instead of positive attitudes on donation of their organ in both brain death and cardiac death as shown in Figs. 4 and 5.

Donation of family member’s organs

As shown in Fig. 6, even though family members of subjects expressed a wish to donate their own organs before they became brain-dead or in a state of cardiac death, 11% of subjects did not agree with donating their family member’s organs to others. Furthermore, around 35% of subjects could not decide whether they would agree with donating their family member’s organs to others although their family member had already expressed a wish to donate their organs to others in brain death or cardiac death.

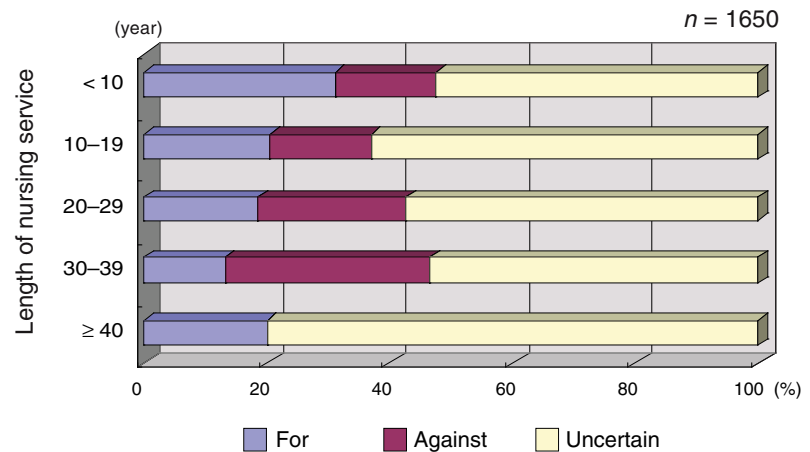


Fig. 4. Attitude for organ donation in a brain-dead state by the length of nursing service. Of 1683, 1650 answers were given to this issue.

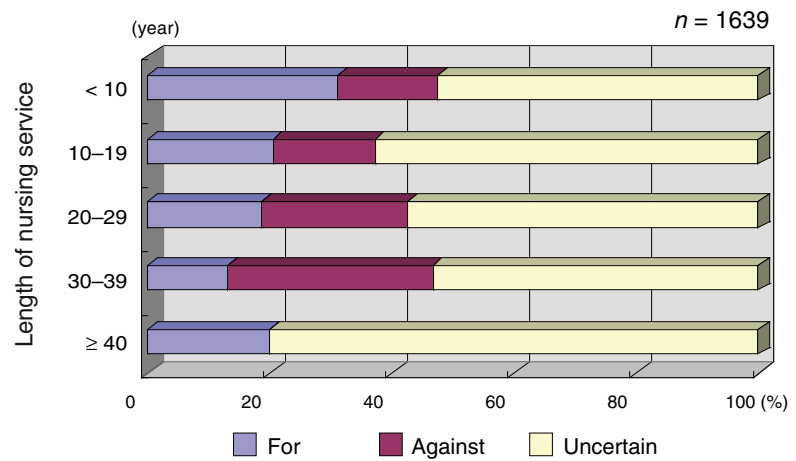


Fig. 5. Attitude for organ donation in a cardiac-dead state by the length of nursing service. Of 1683, 1639 answers were given to this issue.

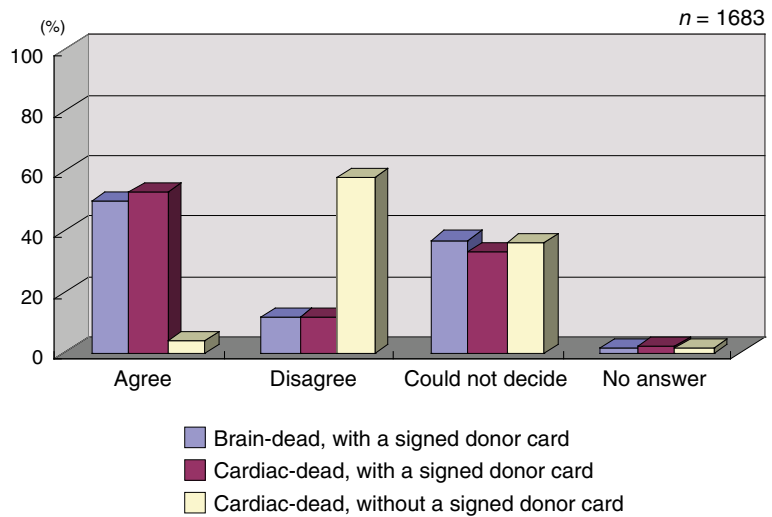


Fig. 6. Donation of family member’s organ by difference states of death. The responses were from all subjects.

Undergoing organ transplantation

As shown in Fig. 7, undergoing organ transplantation as a recipient when he or she was suffering from an incurable disease, 29.1% of subjects [$n = 490$] said they would undergo organ transplantation and 25.0% of subjects [$n = 421$] said they would not: 44.1% of subjects could not decide whether they would undergo organ transplantation or not. On the other hand, in the case where a subject’s family member was suffering from an incurable disease, many more subjects (51.0%, $n = 858$) approved of their family member undergoing organ transplantation.

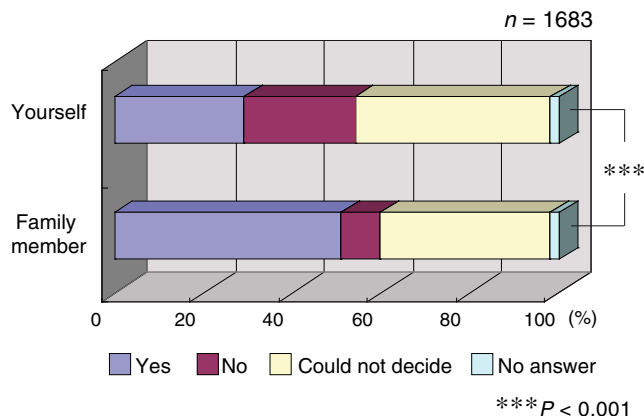


Fig. 7. Undergoing organ transplantation. The responses were from all subjects.

Correlations between questions

Pearson’s correlation coefficient analysis was applied to identify significant correlations among all the questions in Table 2. However, before applying Pearson’s, there was some difficulty because 4 choices were prepared for Questions 3 and 4 while 3 choices were prepared for the rest in Table 2. Therefore, when Pearson’s was used in this study, the 4 choices were recalculated as 3 choices. For instance, in Question 3 (Are you for organ transplantation from a brain dead donor?), the 4 choices, “for strongly”, “for carefully”, “against” and “cannot decide”, were changed to 3 of “for”,

“against” and “cannot decide”. Question 4 was done the same way. Many small but significant correlations were identified because of the size of the number of subjects (1683). However, several findings were identified as shown in Table 3. Subjects who agreed that brain death was the death of a human being had a positive reaction regarding the view of organ transplantation from both brain-dead ($r = 0.226, P < 0.001$) and cardiac-dead donors ($r = 0.178, P < 0.001$). They also expressed a wish to donate their organs when they are in both a brain-dead state ($r = 0.137, P < 0.001$) and a cardiac-dead state ($r = 0.084, P < 0.001$). Further, they agreed on donating their family

Table 2. Contents of the questionnaire: 11 questions

Q 1	Do you have any knowledge of the criteria for brain death?
Q 2	Do you agree with the idea that a individual who is brain dead is dead as a human being?
Q 3	Are you for organ transplantation from a brain dead donor?
Q 4	Are you for organ transplantation from a cardiac dead donor?
Q 5	If you are in a brain dead state, would you wish any of your organs donated?
Q 6	If you are in cardiac dead state, would you wish any of your organs donated?
Q 7	Would you agree with a family member having an organ donated in a brain-dead state if he/she holds a signed donor card?
Q 8	Would you agree with a family member having an organ donated in a cardiac-dead state if he/she holds a signed donor card?
Q 9	Would you agree with a family member having an organ donated in a cardiac-dead state if he/she does not hold a signed donor card?
Q10	Do you wish to undergo organ trasnplantation if you are suffering an incurable disease?
Q11	Would you wish that your family member undergo an organ transplantation if he/she is suffering incurable disease?

Table 3. Correlations between questions

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q 1	1	0.166**	0.099**	0.091**	0.076**	0.062*	0.076**	0.067**	0.01	0.017	0.009
Q 2		1	0.226**	0.178**	0.137**	0.084**	0.155**	0.124**	0.046	0.085**	0.055*
Q 3			1	0.694**	0.065**	0.028	0.159**	0.139**	0.049*	0.093**	0.125**
Q 4				1	0.057*	0.081**	0.127**	0.184**	0.026	0.093**	0.117**
Q 5					1	0.82**	0.186**	0.134**	0.106**	0.108**	0.08**
Q 6						1	0.179**	0.209**	0.122**	0.152**	0.094**
Q 7							1	0.737**	0.151**	0.133**	0.096**
Q 8								1	0.142**	0.181**	0.134**
Q 9									1	0.075**	0.048
Q10										1	0.489**
Q11											1

Pearson’s correlation coefficient was applied to identify significant correlations among 11 questions in Table 2.

* $P < 0.05$.

** $P < 0.01$.

member’s organs in both brain death ($r = 0.115$, $P < 0.001$) and cardiac death ($r = 0.124$, $P < 0.001$) if their family member had expressed a wish to do so beforehand. The highest correlation coefficient was identified between the variable for Question 5 (If you are in a brain dead state, would you wish any of your organs donated?) and the variable for Question 6 (If you are in cardiac dead state, would you wish any of your organs donated?) ($r = 0.820$, $P < 0.001$).

Need of education for organ transplantation

Concerning the period appropriate to provide education regarding organ transplantation according to each educational stage, the findings are shown in Fig. 8. Only 37.6% of subjects expressed the view of need for education about organ transplantation in elementary school, and 24.4% of subjects expressed the view of no need for education about organ transplantation at that stage. On the other hand, more than 60% of subjects expressed the

view that there is a need for education about organ transplantation in junior high school (64.1%), high school (76.9%) and university (77.3%). Interestingly, the perception of the need for education about organ transplantation in each educational stage develops in proportion to the level of each educational stage.

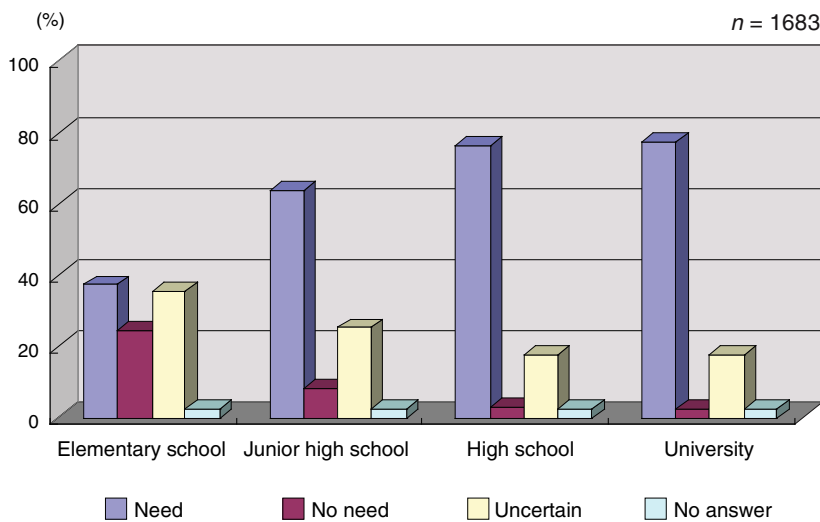


Fig. 8. Need of education for organ transplantation. The responses were from all subjects.

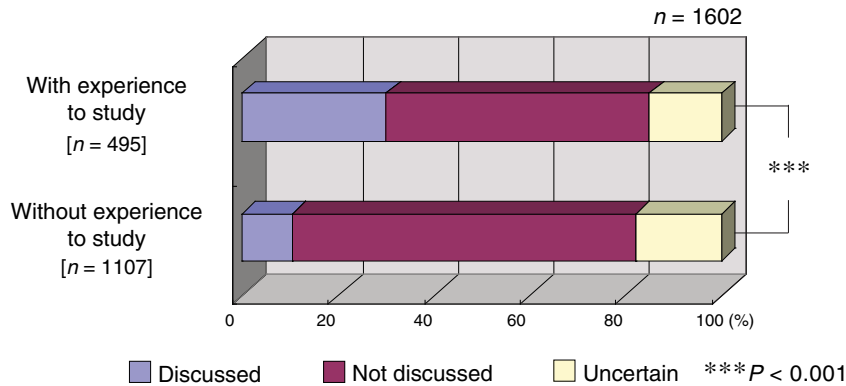


Fig. 9. Discussion about organ transplantation at work. Of 1683, 1602 answers were given to this issue.

The Current situation regarding organ transplantation in workplaces

In order to examine the current situation regarding organ transplantation in workplaces, one simple question was asked: “Do you ever talk about organ transplantation in your workplace?” Only 15.9% of subjects said “yes”, 64.5% said “no”, and 16.5% were “uncertain”. Figure 9 shows the findings expressed by the differences between subjects who had some experience in studying organ transplantation in the past and subjects who had no experience. Subjects who had experience tended to discuss organ transplantation much more than subjects who had no experience. In any case, over 50% of subjects in both categories said they did not discuss organ transplantation in their workplaces.

Discussion

One of the most important findings in this study was that there were only 22.8% of subjects holding donor cards among nursing professionals, and only 54.2% of subjects who held donor cards showed a willingness to donate their organs to others. In a study on Canadian nursing professionals [$n = 102$], 62% of Canadian nurses held donor cards and 90% of them said they were willing to donate their organs to others (Kiberd and Kiberd, 1992). In Canada, the wish to donate organs in critical

circumstances can be expressed on driving licenses, the license doubling as a donor card in case of accident-related death. So it is considered that the rate of people who hold the donor cards is higher in Canada than in Japan. This study, however, reveals that the issue is not only the rate of the people who hold donor cards, but also the low level of positive attitude towards donating their organs to others.

There was no significant difference found between nursing experience in critical care units and the attitude towards organ donation in this study. O’Connell (1991) asserts that nursing professionals, especially working in critical care units, must take responsibility in making their own decision regarding donating organs. Therefore, nursing professionals, especially in critical care units, should be educated more about organ donation and primarily explore their own attitudes towards organ donation.

A significant difference was found between the knowledge of the criteria for brain death and the attitude in which brain death could be recognized as the death of a human being. Subjects who had knowledge about the criteria of brain death had more positive attitudes regarding the opinion recognizing brain death as human death than subjects who had no knowledge. This finding showed that learning about criteria for brain death could lead to a more positive attitude on the criteria for brain death in general. Further analysis revealed that subjects who had a positive attitude on the criteria for brain death tended to

agree with the view for organ donation and organ transplantation. Kim et al. (2004) asserted that lack of clarity in the definition of death was one of the major barriers on organ donation. Therefore, there is a need to provide education to clarify the definition of death in the current legislation for a better understanding of circumstances surrounding organ donation and transplantation.

The length of nursing service does not produce an improvement in knowledge regarding the criteria for brain death. This study also discloses that the length of nursing service tend to develop negative attitudes instead of positive attitudes in nursing professionals regarding donation of their organs in both brain death and cardiac death. However, a study regarding nurses' knowledge and attitudes to organ donation and transplantation in the United States conducted by Matten et al. (1991) reported that the more experienced nurses tended to be willing to donate their organs in critical circumstances and undergo organ transplantation when they suffered an irreversible organ failure disease. They also asserted that education on the subject of organ donation and organ transplantation was essential to nursing professionals, and it should be included in the training programs in hospitals. Furthermore, they expressed a view that it was important that educational programs on organ donation and transplantation should be repeated periodically (Matten et al., 1991). Another study revealed that nursing professionals' attitudes towards organ donation were positively correlated with their knowledge (Bidigare and Oermann, 1991). They also suggested that education of nursing professionals should be provided in all areas of the organ donation and organ transplantation process. Van Da Walker (1994) maintained that detailed information such as the current success rate of organ transplantation needed to be provided in educational programs. In Japan, the educational system should be organized in each hospital and educational programs should be provided for the improvement of attitudes to organ donation and organ transplantation.

We observed another interesting finding by Pearson's correlation coefficient analysis for

significant correlations among the results of questions. The highest correlation coefficient was identified between the attitude to donate organs in a brain-dead state and the attitude to donate organs in a cardiac-dead state. In other words, subjects who were willing to donate organs to others in cardiac death had an inclination to do so in brain death as well. This finding raises the issue that brain death as the definition of human death does not make a significant difference to people who are willing to donate their organs in critical circumstances. Similar findings were presented by a study conducted in Kagoshima Prefecture, Japan (Mulvey, 2003). Mulvey asserted that the definition of brain death as the death of a human being was not a key factor for people in expressing their attitude regarding organ donation in a brain-dead state.

The present study also examined the need to provide education regarding organ transplantation at certain educational levels—elementary school, junior high school, high school and university. It was revealed that there were fewer responses to the need for education regarding organ transplantation in elementary school. On the contrary, more responses were gained regarding the need for education in junior high school, high school and university. The consideration of providing education regarding organ donation and transplantation in junior high school may be appropriate. Chabalewski et al. (2002) maintained that education regarding organ donation and transplantation should be referred to not only by clear explanation of the process of donation and transplantation, but also by the ethical issues surrounding it. It may be necessary to proceed with the education step by step according to the level of understanding of this issue.

Overall, we attempted to explore the knowledge of criteria for brain death and the current attitudes to organ donation and organ transplantation among nursing professionals at hospitals in Tottori Prefecture, Japan. We also provided some meaningful general suggestions for improvement regarding the situation of organ transplantation in Japan. However, further research needs to be carried out on nursing professionals to more clearly

identify the barriers against the improvement of the situation surrounding organ transplantation. Subjects might need to be focused on in order to acquire more concrete information for the development of organ transplantation status, particularly in the clinical area of hospitals.

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