# Hospital Nurses' Knowledge and Attitude toward Brain-dead Organ Donation

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#### Abstract

The purpose of this study was to investigate hospital nurses' knowledge and attitude toward brain-dead organ donation and determine the relationship between the two. Data were collected from 210 hospital nurses with structured self-administered questionnaires from May 15, 2015 until May 30 and analyzed using SPSS Version 21.0. First, the means and standard deviations of hospital nurses' knowledge and attitude toward brain-dead organ donation were  $12.66\pm 2.01$  out of 17 and  $3.56\pm 0.44$  out of 5, respectively. Second, there were no significant differences in hospital nurses' knowledge and attitude toward brain-dead organ donation by working departments (ward) and organ donation education experience. Third, knowledge toward brain-dead organ donation played an important positive role in forming a positive attitude toward brain-dead organ donation. The development of education program on brain-dead organ donation, the evaluation system on educational performance and hospital nurses' enhanced interests in brain-dead organ donation are needed in order to improve the knowledge and positive attitude toward brain-dead organ donation.

Keywords: Brain death, Organ donation, Hospital nurses, Knowledge, Attitude

### **1. Introduction**

#### 1.1. Study Methods

Currently, many diseases which were previously regarded as incurable are curable due to the development of new diagnosis methods and treatment options based on advanced medicines. However, still many end-stage organ failure patients even can not receive appropriate treatment and finally meet the end of their lives because of lack of organ donation [1].

When some organs are no longer treatable, organ donation means that the organs are partially or totally transplanted into another patient according to wishes of the deceased or family of the deceased without any condition and reward. Thus, it is the last way for patients with an incurable disease to prolong their lives [2].

Brain death means that irreversible loss of brain function despite cardiopulmonary functions artificially maintain. A brain-dead patient is declared brain death, the irreversible cessation of the whole brain functions according to brain death criteria and determination procedures [3].

The number of brain-dead donors was 416 in 2013 in Korea. However, when we look at the list of organ replacement, patients on the waiting list have rapidly increased as

follows: 2,840 patients in 2000, 14,595 patients in 2010, and 21,901 patients in 2013, respectively. On the other hand, the actual numbers of organ transplants were 1,782 cases in 2000, 2,472 cases in 2010, 3,227 in 2012, and 3,156 cases in 2013, respectively (Korean Network for Organ Sharing [KONOS], 2013) [4].

Like this, due to the imbalance of supply and demand, in the past, illegal trafficking of human organs was rampant and even many Koreans often flew to China for illegal organ transplants. In the case of foreign nations, in order to tackle the shortage problem of organ donations, they have developed and operated a wide-range of programs such as reporting system for potential organ donors, active organ procurement program, support for the family of organ donors, and public education. Therefore, the number of deceased donors has been on the rise [5].

Recently, Korea has promoted organ donation with various methods (promotion of registering organ donation by celebrities and entertainers, hosting organ donation campaign, and issuing a card for registration on the list of organ donation) in order to activate organ donation. As a result, the number of organ donors has been increasing in Korea but the number of organ donors is far less than the demand of organ transplant.

Foreign countries have implemented education of organ donation stage by stage according to the priority of educational objectives to spread the culture of organ donation. In relation to the order of education, the following educational subjects have received the education in the order listed below: relevant staff and medical workers in a hospital including departments of neurosurgery, emergency room (ER), and intensive care unit (ICU), employees of schools, family members of organ donors, and the general public[6]. Moreover, It is known that people receiving the education are influenced by an organ donation expert's knowledge, attitude, and beliefs among various factors related to organ donation and transplant. Therefore, they can make a decision whether they execute an action or not accordingly [7].

In Korea, a total 69% of the latent deceased donor is reported by medical staff-Members. Thus, for facilitating organ donation, it is necessary to educate the medical staffs about the importance of organ donation [6]. Especially, it is very important to evaluate nurses' knowledge level regarding organ donation, because they directly communicate with stakeholders of organ donation and might affect their decision.

Knowledge for deceased donation indicates specific knowledge about its definition, criteria, confirmation committee, and detail process which is learned by education or recognition. The purpose of this study is to investigate nurses' knowledge for deceased donation, specifically focusing on differences in level of knowledge by subjects' demographic characteristics including working departments and level of education.

Dictionary meaning of attitude is that "external posture to express opinions or feelings with regard to a thing" (Dong-a New Korean Dictionary, 2015) [8]. Thus, attitude about deceased donors is that the attitude of people who are brain dead, in relation to organ donation.

When reviewing relevant previous studies, Kang (2004)[9] studied that knowledge of nurses related to deceased donors. This study reported that although nurses had higher levels of medical knowledge (94.6%) for organ donation, it turned out that they had little knowledge of brain-dead business and the committee of brain-dead determination (21.7%). Bang (2012)[10] surveyed 300 nurses working in general and university hospitals and found that knowledge accuracy rate about brain-dead organ donors was 76.8%.

According to results of Song and Lee[3] measured attitude scores in relation to organ donation from 196 nurses working in university hospitals, the mean attitude score was 3.30 points out of 5 points. Bang[10] performed a survey with 300 nurses working in general and university hospitals and the subjects had the mean score of  $3.75 \pm 0.39$  out of 5 points.

Like these examples, many precedent studies investigated nurses' knowledge and attitude about deceased donors, have reported [3,11,12]. However, there have been little

studies attempted to explore direction and the needs of education for organ donation, meanwhile investigating the difference between knowledge and attitude between nurses in general words and nurses, required higher levels of knowledge and a positive attitude towards brain-dead organ donation and working in ICUs and hemodialysis (HD) rooms.

In addition, most previous studies have primarily focused on the descriptive research of knowledge and attitude so it is hard to find research investigating the relationship between knowledge and attitude of brain-dead organ donation. Gallenbeck and Smith (1950), and the Hovland school argued that knowledge has a significant impact on attitude. According to them, wrong knowledge towards attitude an object leads to negative stereotypes. Therefore, they concluded that improving knowledge about facts can eliminate negative beliefs and bring a change to have a positive attitude (Choi, 2012)[13].

In accordance with this argument, enhancement of the level of knowledge related to the brain-dead organ donation is expected to contribute to the cultivation of positive attitude towards organ donation. Based on the above discussion, this research focused on the comparison between nurses working in general units, and in ICUs and HD rooms. Thus, the research aimed at investigating knowledge and attitude related to brain-dead organ donation, meanwhile exploring the impact of knowledge about the brain-dead organ donation on the attitude of that.

#### **1.2.** The Objectives of study

The purpose of this study is to investigate the relationship between nurses' knowledge and attitude towards brain-dead organ donation. Detailed objectives are as follows:

Firstly, to examine differences in knowledge on brain-dead organ donation by general characteristics of subjects, including their working departments and whether they received an education of organ donation or not.

Secondly, to investigate differences in attitude towards brain-dead organ donation by general characteristics of subjects, including their working departments and whether they received an education of organ donation or not.

Lastly, to examine the impact of knowledge about brain-dead organ donation on attitude towards brain-dead organ donation.

### 2. Study Methods

#### 2.1. Study Design

This study is a descriptive research using a structured questionnaire to investigate the effects of nurses' knowledge related to organ donation on their attitudes through centering on a comparison between nurses in general units, and nurses in ICUs and HD rooms in a tertiary general hospital.

#### 2.2. Subject of study

A questionnaire was distributed 210 subjects who understood of the purposes of this study and agreed with the study among nurses working in a tertiary general hospital in Seoul.

#### 2.3. Data Collection Method

This study received an approval from K hospital IRB committee (2015-04-016). Data were collected by structured questionnaires after receiving a written agreement from participated nurses. Researchers promised that the collected data will not be only used for any other purpose except for research purpose. The subjects were asked to fill the questionnaires out and voluntarily submit it in a box for retrieval.

From 21<sup>st</sup> to 30<sup>th</sup> May in 2015, total 210 questionnaires were collected, 9 unusable ones were excluded, and a total of 201 questionnaires were used for analysis.

## 2.4. Data Analysis Method

Collected data were analyzed with PASW Statistics 21.0 and the statistical significance level was 0.05.

First, data were analyzed by real numbers and percentage of subjects to determine their general characteristics.

Second, T-test and ANOVA analysis were conducted to compare knowledge and different levels of attitude by subjects' demographic characteristics.

Thirdly, regression analysis was performed to analyze the impact of the subjects' knowledge about organ donation on their attitudes.

### 2.5. Study Tool

**2.5.1.** Knowledge of the Brain-dead Organ Donation: For measuring nurses' knowledge regarding deceased donation, 17 item questionnaires were developed by Ju[14] and Bang[10], modified, and used. The score ranged from 0 (minimum) to 17 (Maximum), and a higher score represents a higher level of knowledge. The mean score was 12.66 (SD 2.01), and accuracy rate for answer was 74%.

**2.5.2.** Attitude of the Brain-dead Organ Donation: To measure the deceased donors' attitude regarding organ donation, original 45 questions from the following previous research Park (2001)[15] for general adults' attitude towards brain death and organ donation; Ha et al (2001)[16] studied medical workers; and Bang(2012)[10] studied nurses), which consists of 30 questions for positive attitudes and 15 questions for negative attitudes, were used.

Scoring the questions was done by 5-point Likert scale from 'not at all'(1) to 'strongly agree'(5), and the negative questions were scored reversely. Summing the score from all questions divided by the number of questions was used for item score for attitude regarding organ donation. Thus, the score for each item ranges from 1 to 5, and the higher score means the positive attitude towards organ donation. The mean of the subjects' attitude for the brain-dead organ donation was 3.56 out of 5 with a standard deviation of 0.044. The Cronbach's alpha for this tool was 0.916 so it showed a satisfactory level.

# 3. Study Results

### **3.1. General Characteristics of Subjects**

General characteristics of the subjects are as follows: As for demographic characteristics, 49.3% were aged  $25 \sim 30$  years, 68.2% were college graduate, and 82.1% were unmarried. Regarding clinical experiences, 28.9% had  $5\sim10$  years of clinical experiences. A total of 58.2% subjects answered 'No' in term of organ donation education, and 76.1% answered 'Don't Know' in term of organ donation processes (Table 1).

Variables	Categories	Frequently	%
Age(year)	25 years <	48	23.9
	25~30years	99	49.3
	30~35years	33	16.4
	35years >	21	10.4
Level of education	College	50	24.9

### Table 1. General Characteristics of the Study Subjects

	University(BSN)	137	68.2
	Graduate school(MSN)	14	7
Marrital status	Single	165	82.1
Waritar status	Married	36	17.9
Clinical experience	< 2years	57	28.4
(year)	2~5years	55	27.4
	5~10years	58	28.9
	10years >	31	15.4
	Both alive	181	90
Survival of parents	Father alive	6	3
	Mother alive	14	7
	Buddhism	31	15.4
Daliaian	Christianity	55	27.4
Kengion	Catholicism	27	13.4
	No religion	88	43.8
	Medical ward	91	45.3
Working department	Surgical ward	60	29.9
	Other ward	50	24.9
Chronic disease / terminally ill	Yes	47	23.4
Patients' presence	No	154	76.6
Experience of organ	Yes	84	41.8
donation education	No	117	58.2
Organ donation procedures	Know	48	23.9
	Do not know	153	76.1
Organ donation	Yes	71	35.3
discussion experience	No	130	64.7

#### 3.2. Background Variables Difference Analysis

**3.2.1. Background Variables Difference Analysis Of The Knowledge Of Organ Donation:** When t-test and ANOVA analysis were conducted for comparing knowledge differences by demographic variables, a significant difference was only found in education. Nurses in HD rooms or ICUs were expected to present higher level of knowledge than those in general wards. Also, nurses who received organ donation education were assumed to present higher level of knowledge than those who did not received an education. However, no significant differences were observed between these groups(Table 1).

T-test and ANOVA analysis were conducted for comparing knowledge level differences by subjects' demographic characteristics.

Analysis results are shown in (Table 2). In table 2, "Level of education" only showed a significant difference among variables related to organ donation knowledge. Specifically,

when the subjects have a higher level of education, they tend to have a higher level of knowledge about organ donation.

However, contrary to expectations, the levels of knowledge were not higher among nurses from HD Room(Hemo Dialysis Room)s or ICU(Intensive Care Unit)s and nurses who received organ donation education, when comparing with nurses from general wards or nurses who did not received an education.

In addition, there were no significant differences in the following other variables: age, marital status, clinical experience, survival of parent, religion, immediate family members with chronic/ terminal illnesses, and discussion experience related to organ donation.

Variable	Categories	Mean $\pm$ S. D.	t/F	р	Remark
Age(year)	25years <	12.81±1.82			
	25~30 years	$12.34 \pm 2.26$	1 0 2 2	140	
	30~35 years	$13.00 \pm 1.48$	1.833	.142	
	35years >	13.24±1.67			
	1 College	$12.20\pm 2.32$			
Level of	2 University(BSN)	12.72±1.91	3 376	.036	3\1)
education*	③Graduate school(MSN)	13.71±1.14	5.570		(J)/(I)
Marital status	Single	$12.53 \pm 2.08$	1 979	.062	
	Married	$13.22 \pm 1.55$	-1.070		
Clinical experience (year)	< 2 years	$12.68 \pm 1.86$			
	2~5 years	$12.35 \pm 2.60$	1 299	280	
	5~10 years	$12.62 \pm 1.68$	1.200	.280	
	10  years >	$13.23 \pm 1.52$			
education about organ donation	Yes	$12.82 \pm 1.90$	086 325		
	No	$12.54 \pm 2.08$	.900 .525		
donation procedures	Know	$13.10 \pm 1.65$	1 790 077		
	Do not know	$12.52 \pm 2.09$	1.780 .077		

Table 2. Analysis of Difference-of-Means in Organ Donation Knowledge by
Demographic Variables(n=201)

\* p<.05, \*\* p<.01

**3.2.2. Background Variables Difference Analysis of Organ Donation Attitude:** T-test and analysis of variance were conducted to examine the differences per each background variable. Analysis results are shown in (Table 3). In table 3, there were significant differences in 4 variables (age, marital status, clinical experience, and discussion experience related to organ donation) for organ donation attitude.

Specifically, as the subjects are older, married, and have more clinical experience and discussion experience related to organ donation, it is shown that they had more positive attitudes towards organ donation than others.

On the other hand, there were no significant differences in working departments and education about organ donation although we had expected that nurses who have worked in HD rooms and ICUs and received an education of organ donation might have more positive attitudes than those working in general departments without receiving the education of organ donation. In addition, it turned out that there were no significant differences in the following variables: survival of parents, religion, and immediate family members with chronic/ terminal illnesses.

Variable	Categories	Mean $\pm$ S. D.	t/F	р	Remark
Age(year)*	(1)25 years $<$	$3.52 \pm .39$			
	(2)25~30 years	$3.52 \pm .47$	2749	.012	(4)>(1),
	(3)30~35 years	3.56±.36	3.748		<u>(4</u> )> <u>(2</u> )
	(4)35years >	$3.85 \pm .37$			
	(1) College	$3.46 \pm .45$			
Level of	(2)University(BSN)	$3.58 \pm .44$	2 541	.081	
education	③Graduate school(MSN)	3.74±.35	2.5 11		
Marital	Single	$3.53 \pm .44$	-2.501	013	2>1
Status*	Married	$3.72 \pm .38$		.015	
	(1) < 2 years	$3.49 \pm .39$			
Clinical experience (year)*	(2)2~5 years	$3.56 \pm .51$	0.044	.038	<u>(4)</u> >(1)
	(3)5~10 years	$3.53 \pm .39$	2.866		
	(4)10years>	$3.76 \pm .42$			
education about organ donation	Yes	$3.61 \pm .44$	1 298 196		
	No	$3.53 \pm .43$	1.290	.170	
donation discussion experience*	Yes	$3.64 \pm .46$			(
	No	$3.52 \pm .42$	1.977	.049	(1)>(2)
donation procedures	Know	$3.64 \pm .43$	1.400 .163		
	Do not know	$3.54 \pm .44$			

Table 3. Background Variable Analysis of differences in Organ Donation
Attitudes (N=201)

\* p<.05, \*\* p<.01

**3.2.3. Regression Analysis:** Regression analysis was performed to analyze the impact of knowledge related to organ donation on attitude towards organ donation. The demographic variables were used as control variables. In the regression model, the level of education was converted into two dummy variables [education1 (graduating college: 1 / others: 0); education2 (graduating graduate school or above: 1 / others: 0), and these two variables were put in the regression model. Likewise, marriage status (married: 1 / single: 0), survival of parents (survival of two parents: 1 / survival of only one parent: 0), and religion (having a religion: 1 / no religion: 0) were converted into the dummy variable and put in the regression model.

Moreover, working department variable was converted into 2 dummy variables [working department1 (medical ward: 1 / others: 0); working department2 (surgical ward: 1 / others: 0)], and the 2 dummy variables were put in the regression model. Chronic disease / terminally ill patients (yes=1 / no=0), experience of organ donation education (yes=1 / no=1), organ donation procedures (know=1 / doesn't know = 0), and discussion experience related to organ donation (yes=1 / no=1) were added in the regression model as a dummy variable. Clinical experience was added in the regression model as a continuous variable, and age was excluded in the regression model due to multicollinearity, which is that the variable has a high correlation with clinical experience (r=.96). The result from the regression is displayed in Table 4.

Variable	b	beta	t	р
Demographic variables				
Constant	2.89		12.05	<.001
Education1(BSN)	0.087	0.093	1.216	0.113
Education2(MSN)	-0.005	-0	-0.033	0.487
Marital status (Married)	0.058	0.051	0.587	0.279
Clinical experience*	0.001	0.178	1.769	0.04
Survival of parents (Both alive)	-0.044	-0.03	-0.434	0.333
Religion (Yes) *	-0.113	-0.13	-1.841	0.034
Working department1(Medical ward)	-0.094	-0.11	-1.253	0.106
Working department2(Surgical ward)	-0.081	-0.09	-0.966	0.168
Chronic disease / Terminally ill patients (Yes)	-0.035	-0.03	-0.464	0.322
Experience of organ donation education(Yes)	0.066	0.074	1.006	0.158
Organ donation procedures (Know)	-0.014	-0.01	-0.183	0.428
Discussion experience related to organ donation(Yes)*	0.133	0.147	1.962	0.026
Theoretical variables				
Knowledge of organ donation**	0.051	0.233	3.286	0.001
	.156(.092)			
$R^2(\Delta R^2)$	F=2.447, <i>p</i> =.003			

Table 4. Regression Results for Organ Donation Attitude (N=201)

In Table 4, in relation to the effects of demographic variables on organ donation attitude, clinical experience ( $\beta = .178$ , p < .05) and discussion experience ( $\beta = .147$ , p < .05) had a significantly positive effect while religion ( $\beta = .129$ , p < .05) had a negative effect on organ donation attitude. That is, as the nurses have more clinical experience, they have more positive attitudes; the nurses with the discussion experience have more positive attitudes compared with those without the discussion experience while the nurses with religion have less positive attitudes compared with those without the religion. On the other hands, working departments, experience of organ donation education, levels of education, marital status, survival of parents (both alive), and chronic disease / terminally ill patients have no significant effect on the organ donation attitude.

On the other hand, when it comes to the impact of knowledge on attitudes about organ donation, as Gallenbec and Smith(1950), and the Hovland school claimed, this study showed that knowledge about organ donation had a significantly positive effect on attitudes towards organ donation. It means that when people are more knowledgeable about organ donation, their positive attitudes towards organ donation are enhanced accordingly.

#### 4. Discussion

This study is a descriptive research utilizing structured questionnaires to understand the impact of nurses' knowledge about organ donation on attitude. Thus, data of the study were collected from 201 nurses working in a tertiary general hospital in Seoul.

Major findings in this study are as follows:

First, the mean of nurse' knowledge score for deceased donation was 12.66 out of 17, and accuracy rate for answer was 74%. The accuracy rate in this study was higher than Park[15] (accuracy rate 57%, with the general population) or Sung et al[11] (accuracy rate 61%, with clinical nurses), whereas lower than Bang[10] (accuracy rate 76%).

Meanwhile, the average score on attitude toward brain-dead organ donation among the subjects was shown to be  $3.56 \pm 0.44$  out of 5 points in this study. This score was higher than the scores of the studies conducted by Kim and Lee (2011)[7] (3.34 points) and Sung et al., [11] (2006) (3.33 points) among nurses; however, it was lower than the score obtained in the study of Kim (2002)[17] (3.75 points) that was conducted for nurses or the study of Yu (2004)[18] (3.61 points) that were promoted among the ICU nurses.

Second, when different levels of knowledge were analyzed by nurses' demographic characteristics, a group with a higher level of education presented a higher level of knowledge regarding organ donation. Moreover, when the subjects are older, married, and have more clinical experience and discussion experience related to organ donation, it is shown that they had more positive attitudes towards organ donation than others.

However, contrary to the expectations, nurses in HD Room or ICU and nurses who received organ donation education did not presented a higher level of knowledge regarding organ donation, when comparing with nurses in general wards and nurses who did not receive organ donation education.

Thirdly, analysis results of the relationship between knowledge and attitude in relation to organ donation showed that knowledge of organ donation had a positive impact on organ donation-related attitude as the same as the theoretical predictions. This means when nurses have a higher level of organ donation knowledge, organ donation-related attitudes are more enhanced.

Such study results imply provision of practical measure to improve the nurses' knowledge and attitude toward brain-dead organ donation and cultivation of their positive attitude. According to the results, the nurses' knowledge toward brain-dead organ donation served a significant role in formation of positive attitude on organ donation.

### **5.** Conclusions

In order to improve nurses' knowledge and positive attitudes for organ donation, above all, related education is needed. However, the results of this study revealed that current education on organ donation has not contributed to foster positive attitudes and levels of knowledge related to brain-dead organ donation.

However, contrary to expectations, the knowledge level was not higher among nurses from HD Room(Hemo Dialysis Room)s or ICU(Intensive Care Unit)s and nurses who received organ donation education, when comparing with nurses from general wards or nurses who did not receive an education.

It is considered that the results were caused by a combination of the inefficiency of current education program, inadequate evaluation after training, and nurses' lack of interest. Therefore, development of customized teaching materials and curriculum should be carried out base on the following efforts: a reflection of nurses' educational needs, applying to characteristics of individual working department, review of existing education programs, quality & contents of the education, and teaching methods. Moreover, instead of theories focused education, it will need to offer various educational programs including case-based education, lectures from experts, and etc.

In addition, current organ donation and training programs related to transplantation

don't include compulsory education. Furthermore, sufficient educational opportunities through refresher training and clinical training in hospitals have not been provided for nurses. Therefore, we need to reconsider carefully in association with compensation systems like salary increase and promotion, while offering adequate training opportunities for nurses, reconsidering the interest in education, and reviewing evaluation methods after education to enhance knowledge and attitude about organ donation.

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