An Exploratory Study to Assess the Cognition of Staff Nurses Regarding Brain Death working in Critical Care Units of Christian Medical College and Hospital, Ludhiana, Punjab.

ABSTRACT

An irreversible, catastrophic brain injury, which causes total cessation of all brain functions (the upper brain structure and brain stem) is known as "brain death." The present study was conducted with the purpose of assessing the cognition of staff nurses regarding brain death working in critical care units of Christian Medical College and Hospital, Ludhiana, Punjab. The aim of the study was to gain insight into the staff nurses' cognition regarding brain death with a view to exploring specific deficits in cognition and conducting a teaching on brain death to increase their level of cognition. The objectives of the study were to assess the level of staff nurses' cognition regarding brain death and to identify the relationship of staff nurses' cognition with personal & professional factors. A cognition assessment tool on brain death was developed and used. The conceptual framework was based on the basis of **Miller's Pyramid of Clinical Competence (1990).** The pilot study was conducted to ensure the reliability of the tool and feasibility of the study. By using the non-probability, purposive sampling technique, the data was collected from 100 staff nurses who were working in critical care units of Christian Medical College & Hospital, Ludhiana, Punjab. The data was analyzed by using descriptive and inferential statistics. The results showed that the maximum number of staff nurses, i.e., 57%, had an average level of cognition regarding brain death. The staff nurses had the highest mean knowledge score in the area of knowledge and the lowest in the area of application. Age, gender, and present area of work had a significant impact on the level of cognition of staff nurses regarding brain death. The 'Teaching on Brain Death' was prepared and validated and was conducted to enhance the cognition of staff nurses so that they can understand, assess, and provide necessary care to the brain-dead patient.

Key word- Cognition, Staff Nurses, Brain Death, Critical Care Units

INTRODUCTION

Brain death, also known as death by neurologic criteria, is the irreversible loss of brain activity caused by catastrophic brain damage, such as head trauma, brain hemorrhage, stroke, or lack of blood supply to the brain following cardiac arrest. A patient is pronounced dead when brain death has been diagnosed. The minimal threshold for diagnosing brain death in adults is a single brain death test, including the apnea test. Unless the patient is a candidate for organ donation or pregnant and a choice to prolong support for the fetus is made, organ support, including mechanical breathing and drugs to maintain normal blood pressure, may be continued after brain death is declared. **(Walter Kristin, 2020) 1**

NEED OF STUDY

A cross-sectional analytical research study was conducted with 90 ICU nurses who were chosen using a stratified random sample method. A questionnaire was used to collect data on aspects like understanding, perspective, and practices on their roles in the management of brain-death clients. Nurses' understanding, perspective, and practices had an average score of 49.13, 21.49, and 3.66, respectively. Eighty percent of nurses had only a basic understanding of their roles in the process, and 97 percent practiced poorly. As a result of the study, nurses were found to lack appropriate understanding, perspective, and practice in their roles. ICU nurses play an important role in the treatment of brain-dead patients as well as assisting their families in making decisions. As a result, nurses' understanding, perspective, and practices in this area are critical. Nurse training should be included in the programs to familiarize nurses with their duties in the treatment of brain-dead patients and the organ donation procedure. **(S T MasoumianHoseini, 2015)2**

Data was acquired through a qualitative conventional analysis by conducting 28 semi-structured and in-depth interviews with ICU nurses. These interviews resulted in the identification of themes that reflected nurses' perspectives on the difficulties they confront when dealing with brain-dead patients. "Confusion and problems in accepting the circumstances" and "faults in an efficient and successful care system" were the topics. According to the report's findings, faults in training and managerial difficulties are among the elements that contribute to nurses' stress levels in care and management. Because these obstacles impair nurses' effectiveness in the care of brain-dead patients, it's critical to figure out what's going on. **(H. YazdiMoghaddam, 2018) 3**

MATERIAL AND METHOD

After approval from the College of Nursing, Christian Medical College & Hospital, Ludhiana, Punjab, ethical committee and permission were taken from the College of Nursing. The structured questionnaire was provided to staff nurses. By enrolling 100 staff nurses working in critical care units Using Non-Probability, Purposive Sampling Technique to select the sample. A Self-Structured Cognition Assessment Tool on Brain Death was developed and validated by 11 experts in the fields of Medical Surgical Nursing, Community Health Nursing, Obstetrical & Gynaecological Nursing, Child Health Nursing, Mental Health Nursing and ICU consultation and faculty of the department of Neurology and Opthalmology.. Reliability of the tool was checked by Karl Pearson's Coefficient and Spearman's Brown Prophecy Formula. was "r" = 0.7. The tools were divided into two sections. **Section A:** Personal & Professional Characteristics of Sample consists of 7 items: Age, Gender, Professional Qualification, Professional Experience, Present Area of Work, Training Institute & Source of Information.**Section B:** Questionnaire on Brain Death, **B1**: Items related to Knowledge,consisted of 14 items for assessing knowledge ,**B2**: Items related to Comprehension, consisted of 14 items for assessing comprehension. **B3**: Items related to Application consisted of 12 items for assessing the application of the knowledge of staff nurses related to brain death in the given scenarios. After the data collection, the Excel sheet was filled. One mark is given for the right answer and zero for the wrong answer . Criterion Measure for the tool were Excellent >32, Good 27-32, Average 20-26, and Below Average <20. Prior permission to conduct the study and to collect the data was obtained; the researcher developed a good interpersonal relationship with the subjects and explained the purpose of the study. They were assured that their responses and scores would be kept confidential and would be used only for research purposes. The anonymity and confidentiality of the participants are about findings while reporting the study. Data was

analyzed by using Excel for descriptive statistics. The use of percentage, mean, median, and SD was calculated.

Results

SECTION 1-Percentage Distribution of Personal & Professional Characteristics of Sample

SECTION -II-Assessment of Level of Cognition of Staff Nurses Regarding Brain Death

SECTION -III-Analysis of Cognition Score of Staff Nurses According to Personal and Professional Characteristics

SECTION -IV- Identification of Deficit Areas of Cognition

SECTION 1-Percentage Distribution of Personal & Professional Characteristics of Sample

Table No.1-Frequency and Percentage Distribution of Staff Nurses according to Personal & Professional Characteristics

N=100

Personal and Professional Characteristics	Staff Nurses	
	f	Percentage (%)
1. Age (in years)		
a) 21-30	45	45
b) 31-40	40	40
c) >40	15	15
2.Gender		
a) Male	40	40
b) Female	60	60
3.Professional Qualification		
a) B.Sc. Nursing	40	40
b) GNM Course	49	49
c) Post Basic B.Sc. Nursing	11	11
d) Post graduation (M.Sc. Nursing)	-	-
4.Professional Experience		
a) 6 months – 1 years	9	9
b) 1.1 years- 3 years	23	23
c) 3.1years - 5 years	16	16
d) > 5 years	52	52
5.Training Institute		
a) CON, CMC & H, Ludhiana	54	54
b) Other than CON, CMC & H,	46	46

Ludhiana		
6.Source of Information		
a) Books	54	54
b) Clinical Practice	14	14
c) Internet	32	32
d) Workshop	-	-
7.Present Area of Work		
a) Critical Care Units of Medicine	55	55
b) Critical Care units of Surgery	34	34
c) Emergency / Trauma	11	11

Table No. 1 depicts the distribution of subjects according to Personal and Professional Characteristics. Most of the staff nurses were 21-30 years 45% and the majority of staff nurses are females 60%. The maximum number of staff nurses had done GNM, 49%. Most of the staff nurses had more than 5 years of working experience 52%.Majority of staff nurses were trained at CON, CMC&H, Ludhiana (54%). Most of the staff nurses got information from books (54%).

SECTION -II-Assessment of Level of Cognition of Staff Nurses Regarding Brain Death

.**Table 2-Frequency and Percentage Distribution of Staff Nurses According to Level of Cognition regarding Brain Death.**

N=100

Levels of Cognition	**Score**	**Staff Nurses**	
		n	**%**
Excellent	>32	0	0
Good	27-32	11	11
Average	21-26	57	57
Below average	<20	32	32

Maximum score = 40
Minimum score = 0

Table 2 -Hence, it can be concluded that majority of staff nurses (57) had average level of cognition regarding Brain Death.

SECTION -III-Analysis of Cognition Score of Staff Nurses According to Personal and Professional Characteristics

Table 3 (a)

Mean, Standard deviation, ANOVA & t-test of Cognition Score of Staff Nurses regarding Brain Death according to the Age

N=100

		COGNITION SCORE		
Age (in years)	**n**	**Mean**	**SD**	
a) 21-30	45	22.86	3.76	
b) 31-40	40	21.92	3.89	
c) >40	15	19.66	5.45	
Sources of Variables	**df**	**sum of square**	**MS**	**F**
Between groups	2	115.68	57.84	3.44*
Within Groups	97	1635.30	16.85	
Total	99			
-	**df**	**'t'**		
(a & b)	83	2.05*		
(a & c)	58	2.01*		
(b & c)	55	1.95		

Maximum Score = 40 ***Significant at p<0.05 level**
Minimum Score = 0

Table 3 (a)revealed that the mean cognition score was highest at 22.86 among staff nurses in the age group of 21-30 years, followed by 21.92 in the age group 31-40 years, followed by 19.66 in the age group of >40. Based on ANOVA, the difference in the mean cognition score was found statistically significant at the $p < 0.05$ level. It was further analyzed by t-test and found statistically significant between (a & b) and (a & c). Hence, age had a significant impact on the cognition score of staff nurses regarding brain death.

Table 3(b)

Mean, Standard Deviation and 't' test of Cognition Score of Staff Nurses regarding Brain Death according to Gender

N=100

	COGNITION SCORE				
Gender	**n**	**Mean**	**SD**	**df**	**'t'**
Male	40	20.98	4.52	98	3.11*
Female	60	23.55	3.13		

Maximum Score = 40 ***Significant at p<0.05 level**

Minimum Score = 0

Table 3 (b) depicts that the highest mean cognition score regarding brain death, i.e., 23.55, was among females, followed by 20.98 in males. Based on 't' test, the mean cognition score was found statistically significant at $p < 0.05$ level.Hence, gender has a significant impact on the cognition score of staff nurses regarding brain death

Table 3(c)

Mean, Standard deviation & ANOVA of Cognition Score of Staff nurses regarding Brain Death according to Professional Qualification

N=100

COGNITION SCORE					
Professional Qualification	**n**	**Mean**	**SD**		
B.Sc. Nursing	40	22	4.13		
G.N.M.	49	21.74	4.15		
Post Basic B.Sc. Nursing	11	23.45	4.76		
M.sc Nursing	-	-	-		
Sources of variable	**df**	**sum of squares**	**MS**	**F**	
Between the groups	2	27.076	13.53	2.762 NS	
Within groups	97	1723.91	17.77		
total 99 3500.98					

Maximum Score = 40 **Non-Significant at p<0.05 level**

Minimum Score = 0

Table 3(c) revealed that, mean cognition score was highest 23.45 among those staff nurses whose professional qualification was Post Basic BSc (N) followed by 22 among staff nurses with B.Sc. Nursing as professional qualification and 21.74 among staff nurses with G.N.M as professional qualification; no staff nurse had the professional qualification of MSc (N). Based on ANOVA, the calculated value is statistically non-significant at the $p<0.05$ level.

Hence, professional qualification has no significant impact on the mean cognition score of staff nurses regarding brain death.

Table 3(d)

Mean, Standard Deviation & ANOVA of Cognition Score of Staff Nurses Regarding Brain Death according to Professional Experience

N=100

COGNITION SCORE

Professional Experience	**n**	**Mean**	**SD**
6 months- 1 years	9	22.89	3.88
1.1 years- 3 years	23	22.13	4.10
3.1 years- 5 years	16	22.5	3.48
>5 years	52	21.65	4.55

Source of Variation	**SS**	**df**	**MS**	**F**
Between groups	17.72	3	5.9	1.32^{NS}
Within groups	1733.26	96	18.0	
Total 1750.99	99			

Maximum Score = 40 **Non-Significant at p< 0.05 level**
Minimum Score = 0

Table 3(d)revealed that the mean cognition score was highest 22.89 among the staff nurses with 6 months to 1 year of Prof. experience, followed by 22.5 among staff nurses with 3.1 years to 5 years of Prof. experience, followed by 22.13 among staff nurses with 1.1- 3 years of Prof. experience, and lowest (21.65) among staff nurses with >5 years of Prof. experience. Based on ANOVA, the calculated value is statistically non-significant at the level $p < 0.005$.

Hence, Professional Experience has no significant impact on mean cognition score of staff Nurses regarding Brain Death.

Table 3(e)

Mean, Standard deviation, 't' test of Cognition Score of Staff Nurses regarding Brain Death according to Training Institute

N=100

COGNITION SCORE					
Training Institute	**n**	**Mean**	**SD**	**df**	**t-value**
CON, CMC & H, Ludhiana	54	22.16	4.3		
				98	$.259^{NS}$
Other than CON, CMC & H, Ludhiana	46	21.82	4.0		

Maximum Score = 40 **Non-Significant at p<0.05 level**
Minimum Score = 0

Table 3(e) revealed that the highest mean cognition score, 22.16, was among those who were trained from CON, CMC & H, Ludhiana followed by 21.82 among staff nurses who were trained from other than CON, CMC & H Ludhiana. Based on 't' value, the mean cognition score was found statistically non-significant at p<0.05 level.

Hence, the training institute had no significant impact on the cognition score of staff nurses regarding brain death.

Table 3(f)

Mean, Standard deviation & ANOVA of Cognition Sore of Staff Nurses regarding Brain Death according to the Source of Information

N=100

COGNITION SCORE					
Source of Information		**n**	**Mean**	**SD**	
Books		54	23.64	4.44	
Workshop		-	-	-	
Internet	32	22.19	3.99		
Clinical practice		14	21.64	3.78	
Source of Variation		**SS**	**df**	**MS**	**F**
Between groups		53.42	2	26.71	2.9^{NS}

Within groups		1697.57	97	17.50	
Total	1750.99	99			

Maximum Score = 40 **Non-Significant at p< 0.05 level**
Minimum Score = 0

Table 3 (f) revealed that the mean cognition score was highest 23.64 among the staff nurses who got information from books, followed by 22.19 among staff nurses who got information through the internet, and followed by 21.64 who learned from clinical practice no staff nurse has attended any workshop on brain death. Analysis of variance was used and found statistically non- significant at the level of $p<0.05$.

So, the Source of information had no effect on the cognition score of staff nurses regarding brain death.

Table 3(g)

Mean, Standard Deviation and ANOVA of Staff Nurses Cognition Score regarding Brain Death according to Present Area of Work

N=10

COGNITION SCORE

Working Area	**n**	**Mean**	**SD**	
a) Critical Care Units of Medicine	55	24.4	3	
b) Critical Care Units of Surgery	34	21.6	2.7	
c) Emergency/ Triage	11	20	2.6	
Source of Variation	**df**	**SS**	**MS**	**F**
between groups	9	432	26.2	2.9*
within groups	90	146.3	8.5	
total 99 1897.3				
a& b	87	2.1*		
a& c	64	2.03*		
b& c	43	1.87		

Maximum Score =40 **Significant at p< 0.05 level**
Minimum Score = 0

Table.3 (g) depict that the staff nurses working in medicine intensive care units had the highest mean cognition score, i.e., 24.4, while a 21.6 mean cognition score was among the staff nurses working in surgical critical care units, followed by 20 mean cognition score among staff nurses working in emergency/triage. Based on ANOVA, the difference in mean cognition score was found statistically significant at the $p<0.05$ level. It was further analysed by t-test, which showed statistical significance between (a&b) (a&c)

SECTION -4 Identification of Deficit Areas of Cognition

Table 8 (a)-Mean, Mean Percentage & Rank Order of Cognition Score of Staff Nurses regarding Brain Death according to Deficit Area.

N=100

Areas of Cognition	Max. score	Mean score	Mean %	Rank order
Knowledge	14	8.5	60%	3
Comprehension	14	07	50%	2
Application	12	5.8	48.3%	1

Maximum score=40
Minimum score= 0

Table 4indicates that, according to the area of cognition, the mean percentage of the cognition score of staff nurses was the lowest, 48.3% (Ranked 1) regarding the application of the knowledge of brain death, followed by 50% (Rank 2) regarding Comprehension & 60% (Rank 3) regarding knowledge of brain death.

Hence, it can be concluded that the staff nurses had the lowest cognition score in the area of Application which was considered Ranked 1 and highest mean percentage of cognition score in area of Knowledge which was considered Rank 3. So there is need for enhancement of cognition of staff nurses by preparing and conducting a class on brain death.

Discussion

The findings of the present study reveals that, 57% staff nurses had average level of cognition and 32 % staff nurses had below average level of cognition, followed by 11% staff nurses having good level of cognition which are supported by the findings of (**Alarcon Martinez L,2019)**[40] who assessed the knowledge of nursing students in a multicenter study including 721 students from 3 universities which revealed that 70% understood the concept of brain death correctly, 27% had doubts and 3% believed in the recovery from brain death.

The findings of the present study depicts the relationship of Personal and Professional Characteristics with cognition of staff nurses regarding brain death.

- According to age, the mean cognition score was highest 22.86 among staff nurses in the age group of 21-30 years, followed by 21.92 in the age group 31-40 years, followed by 19.66 in the age group of >40. Based on ANOVA, the difference in the mean cognition score was found statistically significant at p< 0.05 level which shows, age had a significant impact on level of cognition of staff nurses regarding brain death. The study done by (**Zsolt Kanyari,2021)**[35] who assessed the knowledge and attitude of health care professionals in relation to brain death and organ donation in hungary where a survey was done among 56 ICU doctors, 76 ICU nurses, 188 medical students which revealed that, age had significant impact knowledge score of staff nurses regarding brain death.

- According to gender, highest mean mean score regarding brain death i.e. 23.55 was among males followed by 20.98 in females. Based on 't' test, the mean cognition score was found statistically significant at p <0.05 level which shows that gender had significant impact on level of cognition score of staff nurses regrading brain death. The findings is similar with the findings of the study done by (**Rivera P,2017)**[15]who assessed the level of knowledge regarding the concept of brain death among nurses using survey method. A sample of 488 nurses were taken which revealed that gender had significant impact on the mean cognition score of staff nurses regarding brain death.

- According to Professional Qualification mean cognition score was highest 23.45 among those staff nurses whose professional qualification of Post Basic BSc (N) followed by 22 who has done B.Sc. Nursing and 21.74 among staff nurses with G.N.M as professional qualification. Analysis was done with analysis of variance, which found statistically non-significant at p<0.05 level which shows professional qualification had no significant impact on cognition score of staff nurses regarding brain death. The findings is similar with findings of (**Rivera P ,2017)**[15] who assessed the level of knowledge regarding the concept of brain death among nursesusing survey method. A sample of 488 nurses were taken which showed that professional qualification had no impact on the mean cognition score of staff nurses regarding brain death.

- According to Professional Experience, the mean cognition score was highest 22.89 among the staff nurses with 6 months – 1 year of Prof. Experience followed by 22.5 among staff nurses with 3.1 years- 5 years of Prof. Experience, followed by 22.13 among

staff nurses with 1.1- 3 years of Prof. Experience and least 21.65 among staff nurses with >5 years of Prof. Experience. Analysis was done with analysis of variance. It was found statistically non-significant at the level $p<0.05$. which shows that, the Professional Experience had no significant impact on cognition score of staff nurses regarding brain death. The findings of the present study is consistent with the study done by (**K O Jean**) who assessed the knowledge regarding brain death which reveals that level of experience had no significant impact on the cognition of staff nurses.

- According to Present Area of Work, the highest mean cognition score i.e. 24.4 among staff nurses working in medical critical care units, while 21.6 mean cognition score was among the staff nurses working in surgical critical care units followed by 20 mean cognition score among staff nurses working in emergency/triage. Based on anova, the difference in mean cognition score was found statistically significant at $p<0.05$ level. Which shows that, Area of Work had significant impact on cognition score of Staff Nurses regarding Brain Death. The findings of (**Agnes ClauidneFontes de LA,2018)**[37] who assessed the staff nurses knowledge working intensive care units interviewing them revealed that the area of work had significant impact on knowledge score of staff nurses.

- According to Training Institute, the mean cognition score was highest 22.16 among staff nurses who trained from C.O.N, C.M.C & H, Ludhiana, and least mean cognition score 21.82 among staff nurses who trained other than C.O.N, C.M.C & Hospital. Analysis was done with 't' test and found statistically non-significant at $p<0.05$ which shows that training institute had no significant impact on cognition score of staff nurses regarding brain death. The findings of the present study is compatible with a study done by (**Alarcon Martinez L)**[40]who assessed the knowledge of nursing students in a multicenter study including 721 students from 3 universities which revealed that training institute had no association with the cognition score of staff nurses regarding brain death.

- According to Source of Information, the mean cognition score was highest 23.64 among the staff nurses who got information from books, followed by 22.19 among staff nurses who got information through internet followed by 21.64 who learned from clinical practice no staff nurse has attended any workshop on Brain Death. Analysis of variance was used and found, statistically non- significant at the level of $p<0.05$. Thus, it shows that, the Source of Information had no effect on cognition cognition score of staff nurses regarding brain death. The findings of **(Ahmet Karman, 2019)**[28] who assessed the role

of intensive care nurses on guiding patient's family for the brain dead patient which revealed that source of information had no association with the cognition of staff nurses regrading brain death.

- **Conclusion**

On the basis of research findings, it can be concluded that most of the staff nurses working in various adult critical care units of Christian Medical College & Hospital, Ludhiana, Punjab had average level of cognition regarding brain death. Most of the staff nurses had deficit in the area of application. Therefore, investigator conducted a teaching for staff nurses posted in adult critical care unit on brain death which was appreciated by all.

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