



Knowledge of critical care nurses about the process of brain death diagnosis

Conhecimento de enfermeiros intensivistas acerca do processo de diagnóstico da morte encefálica

Agnes Claudine Fontes de la Longuinere¹, Márcio Pereira Lobo¹, Paula Lacerda Leite¹, Rita de Cássia Santos Barros¹, Alécia Nunes Souza², Sheylla Nayara Sales Vieira³

Objectives: to understand the knowledge of critical care nurses about the process of brain death diagnosis. **Methods:** qualitative study conducted with nurses who work in the Intensive Care Unit. Data were collected through interviews and analyzed based on the Discourse of the Collective Subject technique. **Results:** as regards the concept of brain death, there was predominance of lack of brain activity. Regarding the procedures to confirm the diagnosis of brain death, the speeches brought up two stages composed of clinical tests and follow-up protocol. As for the nurses' role in this process, the statements highlight the importance of informing the Intra-Hospital Committee of Organ and Tissue Donation and assisting the donor. **Conclusion:** participant nurses presented knowledge on the diagnosis of brain death and the role of nurses as part of the multidisciplinary team, revealing the importance of the performance of these professionals for achieving the organ donation and the need for constant improvement.

Descriptors: Brain Death; Nursing; Intensive Care Units.

Objetivos: compreender o conhecimento de enfermeiros intensivistas acerca do processo de diagnóstico da morte encefálica. **Métodos:** estudo qualitativo, realizado com enfermeiros que atuam em Unidade de Terapia Intensiva. Dados obtidos por meio de entrevistas e analisados a partir da técnica do Discurso do Sujeito Coletivo. **Resultados:** acerca da conceituação de morte encefálica, predominou a falta de atividade cerebral; sobre os procedimentos para confirmação do diagnóstico de morte encefálica, os discursos trazem duas etapas compostas por testes clínicos e seguimento de protocolo; a respeito da função do enfermeiro neste processo, o discurso traz a importância de comunicar a Comissão Intra-Hospitalar de Doação de Órgãos e a assistência ao doador. **Conclusão:** os enfermeiros participantes apresentaram conhecimento sobre o diagnóstico da morte encefálica e o papel do enfermeiro como membro da equipe multiprofissional, demonstrando a importância da atuação deste profissional para efetivação da doação de órgãos e a necessidade de constante aperfeiçoamento. **Descritores:** Morte Encefálica; Enfermagem; Unidades de Terapia Intensiva.

¹Universidade Estadual do Sudoeste da Bahia. Jequié, BA, Brazil.

²Universidade Federal da Bahia. Salvador, BA, Brazil.

³Faculdade de Tecnologia e Ciências. Jequié, BA, Brazil.

Corresponding author: Sheylla Nayara Sales Vieira
Rua Antônio Orrico, 357, São José. CEP: 45.204 – 010. Jequié, BA, Brazil. E-mail: enfsheylla@gmail.com

Introduction

Death is part of the biological development of human beings, an event that ends the material life, considered for some as something natural, inevitable, perfectly acceptable, while for others it is as an extension, a continuation of life on another plane, furthermore, there are still those who see death as something complex, cruel, unacceptable in any circumstance.

The concept of death has evolved in the course of time, being initially defined when the cessation of heartbeat occurred. Nevertheless, with the advent of technology, the definition of death has changed, there are situations when the individual has passed away, but some vital signs remain when connected to equipment, such as heart rate, however being deprived of the vital function, the brain⁽¹⁻²⁾.

In this context, technological advances helped in the development of a new concept of death, brain death. From this change, different ethical, psychological, legal, spiritual, cultural, and social dilemmas arose, besides raising questions regarding the possibility of saving the lives of others through organ donation⁽¹⁻²⁾.

According to the Federal Council of Medicine, brain death consists of unresponsive coma, absence of supraspinal motor activity, and apnea, resulting from irreversible damage and of known cause. Along with these clinical findings, additional tests must demonstrate the lack of electrical brain activity or brain metabolism, or even cerebral blood perfusion, excluding hypothermia, metabolic disorders, and the use of central nervous system depressants⁽³⁾. Thus, this regulation of brain death diagnosis brings the possibility of organ and tissue donation for transplantation and the need for intensive care to maintain potential donors, hence enabling to save lives.

For the process for brain death certification, the patient must be in an intensive care unit, assisted by competent and qualified multidisciplinary team,

since the late recognition of this process may lead to hemodynamic instability or cardiac arrest, hindering the organ donation, in case they are potential donors. Therefore, it is essential that professionals who work in Intensive Care Units are able to perform complex activities and have the scientific technical competence needed to perform the assistance comfortably and safely, showing confidence in their practices, demanding the awareness and continuing education of the team⁽⁴⁻⁵⁾.

Brain death should be diagnosed and registered by the medical staff according to the criteria defined by the Federal Council of Medicine⁽⁶⁾. Nonetheless, for a comprehensive and quality care, it is crucial that all staff know the standardized procedures for carrying out the steps to confirm this diagnosis, since the multidisciplinary team working in Intensive Care Units will collaborate in conducting these tests.

In that regard, nursing has been characterized as a profession that constantly evolves to conquer new spaces and perspectives, highlighting the nurse as key professional at all stages of care, especially involving the care during the process of brain death diagnosis, organ and tissue donation, and transplantation. Resolution No. 292/2004 of the Federal Council of Nursing represents the legal basis for this care, establishing that nurses are accountable for planning, implementing, coordinating, supervising, and evaluating the nursing procedures provided to brain dead patients, potential organ and tissue donors⁽⁷⁾.

For this reason, nurses working in these services must have adequate knowledge and training in order to provide dignified care and necessary information to the families and identify a possible donor, collaborating with the procedures for brain death certification and perform nursing interventions for maintaining the individual's life for subsequent donation. In this perspective, the technical-scientific, legal, ethical, and humanistic knowledge of nurses and the performance of their exclusive activities will lead to appropriate behaviors to brain dead patients, contributing to organ donation, seeking to help those

who need the transplant to maintain life⁽⁸⁾.

Thus, this study aims to understand the knowledge of critical care nurses about the process of brain death diagnosis.

Methods

This is a qualitative study conducted with nurses who worked in the Adult Intensive Care Unit of a General Hospital in the State of Bahia, Brazil. Inclusion criteria were: to work in the Intensive Care Units and be in active service during data collection.

Data collection occurred through semi-structured interview, using an interview guide containing sociodemographic and objective questions on the subject, namely: definition of brain death, procedures for its certification, and the role of nurses in the process of brain death diagnosis. The study had the following guiding question: which knowledge do critical care nurses have on the process of brain death diagnosis?

Data collection took place during the shifts of professionals from October 1 to November 15, 2015. The study comprised 8 of the 13 nurses working in the Intensive Care Unit. These were assigned gemstone names.

Data analysis was performed using the Discourse of the Collective Subject, a method that enables to express the social representation, as if this community were the issuer of a speech, making statements that represent the speech of all, thus allowing an analysis of the situation experienced by respondents, expressing a collective reality⁽⁹⁾.

The study complied with the formal requirements of the national and international regulatory standards for research involving human subjects.

Results

Collected data enabled the construction of collective discourses that represent the understanding of critical care nurses about the process of brain

death. The main ideas taken from the interviewees' statements and the speeches built from these are presented.

In the answers to the question that sought to conceptualize brain death, the main ideas highlighted were the complete absence of brain activity and complete and irreversible loss of brain function, resulting in the construction of the following speech: *When brain death occurs* (Crystal). *That is, the complete and irreversible loss of brain function* (Diamond). *State of complete lack of brain activity* (Tourmaline). *In those situations, the individual evolves to absence of brain stem reflexes, resulting in clinical death* (Emerald). *Maintaining the activity of other organs artificially through medical resources, that is, the body without the central control of its activities and functions, resulting into total failure* (Sapphire).

The speech introduces the concept of brain death as the lack of brain activity. In this state, nurses understand that there is a loss of brain reflexes consistent with the life condition, for them, brain death is characterized as a state of death in which all organs of the human body are kept functioning by equipment and drugs, but the irreversible loss of brain function characterizes the person as clinically dead. Within this context, people diagnosed as brain dead may have their organs functioning through technological apparatus for a limited period of time, since the degradation of bodily functions will perpetuate, leading to multiple organ failure and cardiac arrest.

The questionnaire on the procedures for brain death certification brings as central ideas: brain death diagnosis occurs in two stages composed of several clinical tests and must follow regulated protocol of brain death, resulting in the following discourse: *Brain death diagnosis happens with two clinical tests and one additional examination* (Sapphire). *In which one of the tests has to be performed by a neurologist or neurosurgeon* (Crystal). *Assessing the reflexes of central nerves that when absent indicate brain inactivity* (Diamond). *And additional examination demonstrating absence of cerebral blood flow* (Emerald). *Conducted only after the first positive clinical evidence for brain death. Complementary tests comprise palpebral sensitivity, Doppler blood test for cerebral blood flow* (Tourmaline).

Painful sensitivity, cough stimulation, and imaging (Jade). Such as the electroencephalogram and computed tomography scan, and laboratory tests, such as gas analysis (Rubi). Thus following the regulated protocol for brain death of the Ministry of Health, from the case opening to its closure (Pearl).

Statement shows that nurses knew most diagnostic examinations and tests to be performed by physicians in the care provided to suspected brain dead people. When verbalizing the need to follow the protocol for brain death diagnosis, they referred to the legislation in force relating to rules and behaviors that the health team should perform.

The question concerning the role of nurses in the process of brain death diagnosis allowed to extract the following central ideas: inform the Intra-Hospital Committee of Organ and Tissue Donation for Transplantation and nursing care of the potential donor, resulting in the speech: *Nurses' role when facing a brain death situation represents the early identification during the physical examination of the absence of reflexes (Pearl). Keep the patient monitored and organ viable (Cristal). Help the physician/multidisciplinary team to conduct clinical tests (Diamond). Request and accompany the visit and assessment of the Intra-Hospital Committee of Organ and Tissue Donation for Transplantation (Tourmaline). Provide emotional support to the families facing this process, as well as take care of the patient in the perspective of becoming a potential organ donor, identifying and communicating potential donors to the sector responsible (Emerald). Pay attention to their various alterations that are common (polyuria, dysautonomia, sudden changes in temperature, dryness of mucous membranes, arrhythmias), which if not well managed can compromise the quality of potential organs to be donated, thus ensuring the potential donor a comprehensive, humanistic, and dignified care until the situation outcome (Rubi).*

According to the interviewees, the role of nursing transcends technicalities provided directly to the suspected brain dead patient. Nurses' role is crucial in this process, according to the informants' speeches, as it collaborates with the actions of the multidisciplinary team that can identify early signs suggesting severe brain impairment consistent with

brain death situation. Furthermore, nurses assume the role of service provider for maintaining the organs of potential donors, contributing to the quality of the transplant.

Additionally, according to informants, nurses are closely linked to the family welcoming process, providing support to them and becoming an important link between the family and the potential donor, since they have direct contact with relatives.

Finally, critical care nurses demonstrated to know their job when dealing with suspected brain dead patients, being unanimous in the interviews the nurse's role in informing the Intra-Hospital Committee of Organ and Tissue Donation for Transplantation of the suspected brain death and follow the case together with the commission, besides providing patient care, collaborating with the physician in performing clinical examinations and tests in order to confirm or refute the diagnosis of brain death.

Discussion

For the team working in the Intensive Care Unit and Emergency Unit, it is imperative to understand the process of brain death diagnosis, since by early identifying suspected brain dead patients it is possible to optimize opening and closing brain death protocols, allowing these patients to have a confirmed diagnosis of their causa mortis and their families to opt for the donation of the loved one's organs, which will help reduce the transplant waiting list, as well as enable the access of others to the Intensive Care Unit by releasing the beds occupied by brain dead patients.

In this sense, it is utterly important to incorporate program contents on brain death and organ donation and transplantation process in undergraduate and graduate disciplines in the area of nursing practice in hospitals, especially in Intensive Care Unit, so that these (future) professionals may have previous knowledge on the subject, besides being consistently trained by the institutions where

they provide care.

Given the above, the results of this study reveal that among the eight nurses composing the sample survey, most were female and aged 20-29 years, thus corroborating the profile of other national and international studies that had nursing professionals working in Intensive Care Unit as informants, in which there is a predominance of female and aged 21-30 years⁽¹⁰⁻¹¹⁾.

The presence of young professionals working in Intensive Care Unit allows us to assume that they had recent academic training, and such fact becomes very important when it comes to emerging issues like brain death and donation and transplantation process, since mastering this information comes from recently added content in undergraduate and graduate courses.

Nonetheless, study conducted with nursing students (n=21) identified that only 9.8% could conceptualize brain death, and 29.5% of the students mentioned only one component of the curricular structure as a source of knowledge on the topic discussed. As regards the diagnosis, 77.0% are unaware of who must perform it, 78.7% do not know how to conduct it, and only 19.7% presented knowledge on the nurses' assignments for the organ maintenance of potential donor patients for transplant⁽¹²⁾.

In contrast with the reality presented in the abovementioned study, it is noticed that all professionals participating in the research have satisfactory knowledge on brain death, demonstrating knowledge and experience to answer questions, allowing the construction of speeches with consistent content on the topic discussed, evidencing a different profile from those reported in literature⁽⁵⁾. Such fact might be explained by the existence of an Intra-Hospital Committee of Organ and Tissue Donation for Transplantation in the hospital where the research took place, which develops health education activities on brain death and other topics related to organ donation.

With regard to the concept of brain death, the speech presented reflects the current literature^(1,11).

Brain death is defined as a complete and irreversible loss of brain function, in which becomes impossible to maintain the vital signs without the aid of equipment, similar to what the resolution No. 1,480/97 of the Federal Council of Medicine states: brain death is defined as a total and irreversible loss of brain and brainstem activity, in which the patient maintains, temporary and artificially, the cardiorespiratory function^(3,8).

The discourse on the diagnosis of brain death allows to understand the need to perform two steps consisting of several clinical tests and one additional examination in order to identify the absence of brain stem reflexes and the absence of cerebral blood flow. Those tests comprised pupillary photoreaction, painful sensitivity, cough and apnea stimulus, and the additional tests reported were electroencephalogram, computed tomography, blood gas analysis, and transcranial Doppler ultrasound. Among the additional tests mentioned, only the transcranial Doppler ultrasound and electroencephalogram correspond to tests used to diagnose brain death, showing speech divergence with the brain death protocols⁽⁹⁾ based on Resolution No. 1,480⁽³⁾, thus revealing inappropriate knowledge about the additional tests to confirm the brain death diagnosis.

Nevertheless, all the tests mentioned by nurses are part of the brain death protocol in phases different from the related to complementary examination, such as imaging, computed tomography that is used to assess the extent of brain damage and may be used in the opening phase of suspected brain death protocol, and blood gas analysis used during the apnea test, providing the basis for assessing the clinical conditions that allows opening the brain death protocol^(3,9).

Clinical tests required to confirm the brainstem failure are quick and highly efficient, being essential to the evolution of diagnostic evaluation, in which the following reflexes should be tested: photomotor, corneal-palpebral, oculocephalic, oculo-vestibular, tracheal or cough, and apnea test⁽¹¹⁾.

Complementary tests must assess the absence of

electrical brain activity through electroencephalogram or absence of cerebral blood flow by transcranial Doppler ultrasound, cerebral scintigraphy, Xenon computed tomography, and arteriography, or absence of cerebral metabolic activity through positron emission tomography, cerebral oxygen extraction⁽³⁾.

For the collective, these clinical tests and examinations should be performed by a neurologist or neurosurgeon, assessing the central nerves in order to verify brain inactivity, which can count on the help of nurses working in the Intensive Care Unit. In the literature, after suspected brain death, the patient must undergo two neurological tests in order to verify the brainstem functionality, being performed by two different physicians, one of which is a neurologist, neurosurgeon, or child neurologist. These doctors cannot be involved in the organ procurement nor in organ transplant teams⁽¹³⁾.

It is also possible to identify in the aforementioned speech the existence of a brain death protocol⁽¹¹⁾, though it is not evident how its opening and closing occurs, being remembered only as a procedure for the diagnosis of brain death.

Resolution of the Federal Council of Medicine states that for opening the brain death protocol the patient must present unresponsive and apperceptive coma with known cause through history and examination, Glasgow Coma Scale three (deep coma), apnea and with mechanical ventilation. The vital structures of the damaged encephalon may not have the vegetative capacity or consciousness, being detected in complementary imaging tests. Furthermore, we must exclude the use of drugs that depress the central nervous system and cause coma, hypothermia (temperature lower than 32° C), and hypotension or metabolic disorders⁽³⁾.

Speeches of participating nurses highlight the act of informing and monitoring with the Intra-Hospital Committee of Organ and Tissue Donation for Transplantation patients with brain death as one of the duties of nurses who work in the Intensive Care Unit and handle brain dead patients. Such

fact can represent a positive aspect, since it reveals the concern of the staff to inform the committee responsible for facilitating the process of brain death diagnosis, seeking to enable the organ donation and thus save lives.

The collective reveals very important and unique functions in the care process of brain dead patients, such as nursing care, performing physical examination, emotional support to the family, besides collaborating with the physician during clinical examination, which requires knowledge of changes, physiology, and ethical aspects about the whole process. Therefore, not only the technique can be identified in the discourse but also the psychological contribution to the family, revealing the importance of health education on brain death to enable the organ donation.

The care offered to brain dead patients or potential donors, under the responsibility of the nursing staff, consists in controlling all hemodynamic data, requiring a deep knowledge about prescription drugs and physiology of brain death from the team in order to provide appropriate assistance⁽¹⁴⁾. Moreover, it is crucial that these nurses expand their perspective in relation to brain dead people, seeing them as critically ill patients and establishing meaning to care interactions with this unique and different being⁽¹⁵⁾, since brain dead patients have specific characteristics of being alive but at the same time present others that determine their death^(2,10,16).

When nurses know the physiological changes of brain death, they can act positively in the brain death diagnosis, saving time and facilitating the process, hence enabling the organ maintenance, transplantations, and saving others' lives.

In the speeches, the subjects reported some changes found in brain dead patients, such as polyuria, dysautonomia, sudden changes in temperature, dryness of mucous membranes, arrhythmias, and reminded the importance of quick action and proper care, so the professional facilitates the organ donation and thus save lives.

Nurses must be able to identify the possible thermal changes, because the extreme vasodilation typical of Cushing's syndrome associated with the inability of shivering to produce heat and the infusion of large volumes of unheated fluid results in a sudden drop in temperature. Hypothermia induces many deleterious effects, such as cardiac dysfunction, arrhythmias, coagulopathies, deviation of hemoglobin dissociation curve, and diuresis induced by cold, such phenomena could jeopardize the viability of the structures to be donated⁽¹²⁾.

With this purpose, it is essential to reflect on the need to create spaces of permanent education facing the donation and transplantation process among nurses working in intensive care, so the discourse of scientific and protocol compliance reliability does not generate insecurity among professionals involved in the process, as well as society in general who will be directly responsible for carrying out the donation process when involved in situations that require their consent to authorize the organ donation from their dead relatives, as provided for by legislation^(9,11).

In this perspective, it is fundamental to find, in the Intensive Care Unit, qualified and experienced professionals with knowledge in this area, allowing the early identification of suspected brain dead patients (potential multiple organ donors), perform proper maintenance of the potential donor, focusing on optimizing time and facilitating the transplants, thus collaborating with organ donation.

Conclusion

Given the results, it was found that nurses who worked in the Intensive Care Unit approached had adequate knowledge about the definition of brain death and knew their job as an important element for the diagnosis and procedures to verify brain death, though presented some misconceptions about the additional tests.

Collaborations

Longuiniere ACF, Nunes AS and Vieira SNS contributed to the project design, data collection, analysis and interpretation, drafting of the article, critical review of relevant content, and final approval of the version to be published. Barros RCS, Leite PL and Lobo MP contributed to the drafting of the article and final approval of the version to be published.

References

1. Lima C. Do conceito ao diagnóstico de morte: controvérsias e dilemas éticos. *Rev Soc Port Med Interna*. 2013; 12(1):6-10.
2. Rodrigues CFA, Stychnicki AS, Boccalon B, Silva GC. Morte encefálica, uma certeza? O conceito de "morte cerebral" como critério de morte. *Rev Bioethikos*. 2013; 7(3):271-81.
3. Conselho Federal de Medicina. Resolução CFM nº 1.480, 8 de agosto de 1997. Institui as diretrizes sobre Morte Encefálica [Internet]. 1997 [citado 2016 jan 26]. Disponível em: http://www.saude.ba.gov.br/transplantes/documentos_tx/CFM1480.pdf
4. Pestana AL, Santos JLG, Edmann RH, Silva EL, Erdmann AL. Lean thinking and brain-dead patient assistance in the organ donation Process. *Rev Esc Enferm USP*. 2013; 47(1):254-60.
5. Barros ERS, Ellery AEL. Inter-professional collaboration in an Intensive Care Unit: challenges and opportunities. *Rev Rene*. 2016; 17(1):10-9.
6. Presidência da República (BR). Lei nº 9434 de 04 de fevereiro de 1997. Dispõe sobre a remoção de órgãos, tecidos e partes do corpo humano para fins de transplantes e tratamento [Internet]. 1997 [citado 2016 mar 6]. Disponível em: http://www.planalto.gov.br/ccivil_03/leis/L9434.htm
7. Conselho Federal de Enfermagem. Resolução COFEN nº 292 de 07 de janeiro de 2004. Normatiza a atuação do Enfermeiro na Captação e Transplante de órgãos e Tecidos [Internet]. 2004 [citado 2016 jan 24]. Disponível em: http://www.cofen.gov.br/resoluo-cofen-2922004_4328.html

8. Freire ILS, Oliveira MAE, Freitas MB, Melo GSM, Costa IKF, Torres GV. Compreensão da equipe de enfermagem sobre morte encefálica e a doação de órgãos. *Enferm Global*. 2014; 13(4):179-92.
9. Lefèvre F, Lefèvre AMC. O discurso do sujeito coletivo: um novo enfoque em pesquisa qualitativa (desdobramentos). Caxias do Sul: Educs; 2005.
10. Freire ILS, Mendonça AEO, Pontes VO, Vasconcelos QLDAQ, Torres GV. Morte encefálica e cuidados na manutenção do potencial doador de órgãos e tecidos para transplante. *Rev Eletr Enf [Internet]*. 2012 [citado 2016 jan 17]; 14(4):903-12. Disponível em: https://www.fen.ufg.br/fen_revista/v14/n4/pdf/v14n4a19.pdf
11. Ministério da Saúde (BR). Agência Nacional de Vigilância Sanitária. Comissão Intra-hospitalar de doação de órgãos e tecidos para transplantes 2013. Brasília: Ministério da Saúde; 2013.
12. Ferreira MMM, Nunes NDT, Reis RM. Knowledge of nursing students about the brain. *Rev Enf Contem [Internet]*. 2013 [cited 2016 mar 26]; 2(1):52-69. Available from: <http://www.bahiana.edu.br/revistas>
13. Martini M, Fernandes MFO, Martins SA, Guerino SR, Nogueira GP. O papel do enfermeiro na manutenção do potencial doador de órgãos. *R Bras Ci Saúde*. 2013; 6(18):34-48.
14. Schirmer J, Leite RF, Kian FM, Lemos MC, Carrara FSA, Silva AS, et al. Legislação sobre doação de órgãos e tecidos: o que pensam os profissionais de UTI? *J Bras Transpl [Internet]*. 2006 [citado 2016 maio 26]; 9:469-73. Disponível em: <http://www.abto.org.br/abtov03/Upload/file/JBT/2006/1.pdf>
15. Pestana AL, Erdmann, AL, Sousa FGM. Emerging the complexity of nursing care facing a brain death. *Esc Anna Nery*. 2012; 16(4):734-40.
16. Guetti NR, Marques IR. Assistência de enfermagem ao potencial doador de órgãos em morte encefálica. *Rev Bras Enferm*. 2013; 61(1):91-7.