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A Rural Hospital's Organ Donation Referral Pattern : A Pilot Study

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A RURAL HOSPITAL'S ORGAN DONATION REFERRAL PATTERN:
A PILOT STUDY

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Chris F. Carter
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ABSTRACT

A Rural Hospital's Organ Donation Referral Pattern: A Pilot Study

Chris F. Carter

It is unclear if hospitals correctly refer all potential organ donors to Organ Procurement Organizations. Unidentified or mis-referred patients may be present in rural acute care Appalachian hospitals. A one-year nonexperimental retrospective descriptive study was used to review medical records in one rural Appalachian hospital. Data from the chart review indicated that of the total ($n = 34$) patients, sixty-eight percent ($n = 23$) were properly referred as cardiac standstill and six percent ($n = 2$) were properly reported as brain dead. However, nine percent ($n = 3$) were not referred to the OPO (unidentified). Eighteen percent ($n = 6$) were found to be potentially suitable for organ donation but reported as cardiac standstill (mis-referred). Findings indicate potential brain death patients are misidentified or un-referred to the Organ Procurement Organization in this rural Appalachian acute care hospital. Potential organ donor and brain death educational development opportunities were identified.

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Chapter One

Introduction

This study will describe the organ donor referral pattern of patients in a rural Appalachian acute care hospital. The intention of this chapter was to describe the purpose for this investigative study, provide background information about organ donation referral patterns, and report the significance of the problem. Additionally, the research questions will be explained, operational terms will be defined, and the importance of this study identified in terms of nursing administration, practice, and education will be stated.

Purpose of the Study

For successful organ donation to take place, several important factors have to be completed in an appropriate and timely fashion. One of the earliest and most important steps is the recognition of the patient as a potential organ donor by the medical and nursing personnel in the Emergency Department (ED) or Intensive Care Unit (ICU). Due to the nature of the injury, those patients diagnosed with intracranial bleeds, hypoxic injuries (including cardiac arrest), cerebral edema, and traumatic injuries are potentially suitable for organ donation (Klassen, 1999). If these patients are appropriately identified early in the treatment process, then the Organ Procurement Organization (OPO) notification criteria should be properly implemented providing an opportunity for donation to take place.

This study will describe the organ donor referral pattern of patients in a rural Appalachian acute care hospital. Specifically, the identified medical records in the study hospital were compared with the local OPO criteria to determine if unrevealed or mis-referred patients were present. If there is an opportunity to further develop organ donation

referral patterns, then the number of patients receiving life-saving organs for transplant may be increased.

Background

The number of people choosing organ transplantation as treatment for organ failure is at an all time high (Ingram, Buckner, & Rayburn, 2002). Influencing these decisions is the increasing success rate of organ transplantation and the growing numbers of medical conditions amenable to organ transplantation. A major obstacle to organ transplantation is the scarcity of donated organs. In the United States, the United Network for Organ Sharing (UNOS) website (2003) reports that over 81,000 patients are on the waiting list and 16 of those will die every day while awaiting a life-saving organ transplant.

In the United States, approximately 14,000 of the people who die annually are potential organ donors (Gortmaker & Beasley, 1996). If each of those individuals donated his or her organs the current waiting list could be dramatically reduced. However, in the year 2000, there were 5,984 cadaveric donors resulting in 17,660 transplants, UNOS website (2003). Every additional realized donor could potentially help several patients who desperately need a life-saving transplant.

It is clear that the need for donated organs is growing much faster than society is able to currently supply. According to the Organ Procurement Transplant Network (OPTN) website (2003) in 1996 –1997 the average waiting time to receive an “O” blood group liver transplant was 534 days. However, just four years later in 2000 – 2001 the average wait time had increased to 1,140 days, OPTN website (2003). As the waiting time continues to expand, more patients will succumb to their illness.

The problem of increasing the amount of organs available for transplant is a multifaceted one. Ethical and moral dilemmas complicate some of the more obvious solutions; therefore, we continue to rely upon altruism, which has not met the growing demand for transplantable organs.

One measure of potentially increasing organ donation that can be accomplished, is examining the referral system in every type of health care organization to determine if all potential organ donors are correctly identified and reported. Even though this can be a daunting task, it is a vitally important step in expanding the number of organs available for transplant.

Most OPO's have highly developed referral procedures in larger hospitals with designated trauma centers and neurosurgery services. However, some smaller rural acute care hospitals may not receive that same level of referral development (Shafer, Durand, Hueneke, Wolff, Davis, Ehrle, Van Buren, Orłowski, Reyes, Gruenenfelder, and White, 1998). Looking toward these smaller rural hospitals and examining the types of patients referred to the OPO may discover additional organ donor resources.

In examining the referral systems of all types of health care organizations, one of the areas of concerns arises around rural hospitals in the Appalachian area. Do these hospitals receive the same amount of education about potential organ donors and the need for early and accurate referrals? Also, are the referrals that originate from this type of facility scrutinized for accuracy and appropriateness at the same level of larger designated trauma centers?

Investigating and confirming the accuracy of all referrals from every hospital is a time consuming and labor intensive proposition. Most OPO's, being modest non-profit

organizations, have limited economic and organ procurement coordinator resources and therefore focus their chart review efforts on the hospitals that have historically produced potential organ donors in their region.

It would be insightful to study one rural Appalachian acute care hospital to ascertain if there are potential organ donors that do not make it into the referral system of the local OPO. If the patient is not properly referred to the OPO then there is no chance for the organ donation process to take place.

According to the West Virginia Department of Health (WVDH) website (2003), Appalachian residents were found to be at significantly higher risk of obesity, diabetes, hypertension, heart failure, and Chronic Obstructive Pulmonary Disease (COPD) related to cigarette smoking and coal-mine dust (black lung) than non-Appalachian residents. These disease processes, and their co-morbidity illnesses, often lead to end-stage organ failure, which frequently necessitates the need for organ transplantation.

Currently, the process and procedures of distribution for organs recovered in the geographic region of the OPO tends to favor those patients listed at the local transplant centers, UNOS website (2003). Not investigating and reviewing each potential organ donor case in the rural hospital setting could negatively affect the patients in need of transplants in these rural communities.

In order to provide life-saving organs for transplant, a process of recognition and referral should be developed in all individual hospitals (Shafer et al., 1998). Organ procurement organizations, working with assigned hospitals, must develop policies and procedures with detailed actions and a clear understanding of all requirements.

The traditional organ donation results from a brain damaged or injured patient who still has an effective heartbeat and has been determined to have no chance for survival. Verble & Worth (2000) explains that, ideally, a qualified physician should make the diagnosis of brain death before the option of donation is presented to the family by experienced organ donation coordinators who have extensive training in communication and grief counseling. In most conventional cases, if the patient suffers a cardiac arrest and blood/oxygen supply is terminally interrupted to the organs, organ donation is no longer an option due to subsequent hypoxic organ damage.

Identification and referral of potential organ donors by hospital staff is the essential first step toward offering a family the option to donate. According to Shafer et al., (1998) unidentified potential donors or mis-referrals to the OPO could potentially have a significant impact on the number of organs donated. The nurses and physicians in the ED and ICU setting have a critically important role of classifying patients as potential organ donors and implementing the OPO referral process.

Ideally, rural acute care hospitals would transfer patients with intracranial bleeds, conditions resulting in anoxia (including cardiac arrest), cerebral edema, and traumatic brain damage to a larger referral center that could potentially care for the injury. The larger center, through established policies and procedures, would then notify the OPO of a potential organ donor candidate. But, a possible problem arises if a patient is seen in the ED or ICU of the rural hospital and the physician determines that further treatment is futile or the family of the patient requests withdraw-of-care. In these types of difficult cases, the death of that patient may be reported incorrectly and not recognized as a potential organ donor.

In order to meet the needs of the grieving family and successfully recover organs for transplant, the OPO staff must carefully coordinate the donation process. If the referral is not made until the patient has suffered terminal cardiac arrest or has been taken off the ventilator, the resulting hypoxic injury to the organ eliminates the chance of successful traditional organ donation. It is critically important for the OPO to receive the referral accurately and early in the recognition process in order to coordinate a positive approach process.

In an effort to simplify the referral process and eliminate missed referrals, federal regulations were implemented on August 21, 1998. The Center for Medicare and Medicaid Service (CMS) is empowered by the federal government to enforce the Medicare conditions of participation for hospitals. The website for CMS (2003), states that all hospitals, with the exception of those operated by the US military or Veteran's Administration, must comply with these conditions of participation in order to receive Medicare reimbursement. The standards state that hospitals must report all deaths that occur at their facility regardless of age or disease process, CMS website (2003). The CMS requirement to notify the OPO of all deaths and imminent deaths is directed at increasing the referral of potential organ donors, CMS website (2003).

There is currently no single reporting agency that compiles organ donation statistics and their compliance with OPO criteria on potential organ donors. It is difficult to keep the hospitals reporting mechanisms updated and personnel trained to comply with OPO criteria at a consistently high level. Smaller rural acute care hospitals, which do not normally experience organ donors on a routine basis, are at a disadvantage in maintaining

the level of training and education needed to accurately refer potential organ donors (Evanisko, Beasley, Brigham & Capossela, 1998).

Significance of Problem

This study is important because even though there is limited research literature that examines organ donation referrals patterns in the context of an urban trauma center, there is a distinct paucity of information that describes the organ donation referral patterns in the rural Appalachian acute care hospital.

The results of this research study can be used to provide education to nurses and physicians in the ED and ICU settings in the rural acute care hospital setting. The OPO could implement training programs to address the proper organ donation referral patterns and speak to any other weakness identified in the study.

The disparity between those who need organ transplants and availability of organs for transplant continue to widen. Because there is no easy or definitive answer to this problem, OPO's must examine all health-care institutions in their service area for sources of organ donation referrals. Every realized organ donor can potentially supply up to seven life-saving organs for transplant, AOPA website (2003). Therefore, to help alleviate this crisis, it is fundamentally important that every available potential organ donor be accurately identified and referred to the local OPO for evaluation.

Very little information exists that identifies the expected potential organ donation role of the smaller rural acute care hospital, especially in the Appalachian region. The actions that need to take place when a seriously injured or impaired patient presents to the ED or is identified in the health care setting are often vague and uncertain. This study

will focus on the issue of accurate and timely referral patterns of potential organ donors in this setting.

Problem Statement

After an extensive search, no instrument or direct data was identified that will measure if hospitals are not identifying or mis-referring patients when completing the required referral to the OPO. Therefore, it is unclear if rural Appalachian acute care hospitals are in compliance with local OPO criteria that expect accurate and appropriate referral of potential patients for organ donation. This study examined a rural Appalachian hospital to determine if the hospital staff correctly and properly identifies potential organ donor patients utilizing the local OPO criteria.

Research Question

This researcher developed the following research questions to analyze the information gained from this descriptive retrospective chart review study.

1. What is the relationship between the reported potential organ donor referrals to the OPO criteria based on the results of the medical record review? (Measurement of an unidentified referral).
2. What is the relationship between potential brain deaths identified by the hospital and number of deaths reported to the OPO? (Measurement of a mis-referral).
3. What are the common referral errors identified that can lead to improvements in the potential organ donation referral process of a hospital in a rural Appalachian setting?

Operational Definitions

Potential Organ Donor: is defined as a patient that, due to a neurological insult, potentially progresses to brain death and one or more of the following organs are donated for transplant to another individual: heart, lungs, liver, pancreas, kidneys, or small bowel, UNOS website (2003).

Any patient that is identified as meeting the OPO criteria as a potential organ donor will be considered a potential organ donor. This broad criterion is: the patient must be declared brain dead, between the age range of 0 – 75 years of age, and not have documented active sepsis or communicable disease, AOPA website (2003).

Organ Procurement Organization: an Organ Procurement Organization is defined as a government regulated non-profit organization designated to recover human organs and tissues for the purpose of transplantation from one individual to another (Frezza, 1999).

Measurement of an OPO was accomplished by examining the designated certification by the federal government. This certification qualifies the organization as an OPO for a specific geographic region.

Rural Appalachian Hospital: a rural Appalachian hospital is identified as a health-care organization serving a rural population base located in the eastern United States situated in the designated Appalachian corridor, CMS website (2003).

This study measures a rural acute care hospital as a health-care institution that meets the definition and has a bed capacity of 150 or less.

Unidentified referral: an unidentified referral describes a patient who has died at the hospital and meets the OPO's criteria for potential organ donation, but was not referred or reported to the OPO, UNOS website (2003).

An unidentified referral is measured as a referral that was not reported to the OPO but was identified in the chart review. The researcher developed data-gathering assessment tool will be utilized in the measurement of this topic.

Mis-referral: the UNOS website (2003) identifies a mis-referral as a patient that died at the study hospital and was referred to the OPO but the referral diagnosis and/or neurological assessment was not properly reported.

Reviewing the medical records and assessing the accuracy of the referrals will measure this definition. The researcher developed data-gathering assessment tool will be utilized in the measurement of this issue.

Brain Death: a patient who is diagnosed with brain death is defined as one who has suffered irreversible brain damage and has no chance for recovery. Ingram, Buckner, & Rayburn, (2002) describes brain death as a complete cessation of blood to the brain and brain stem associated with the cerebral edema due to a neurological insult or injury.

Brain death can be measured by several clinical and ancillary tests. Beecher (1968) states that in the absence of paralytics or neurological depressant medication, a thorough neurological clinical exam by a physician can be acceptable to declare brain death (some states require two collaborating physicians). Also, several radiological tests can be employed to examine the absence of blood flow to the brain (Beecher, 1968)

Importance of the Study

Nursing Administration

The organ donation procedures at each hospital is developed at the administrative level and disseminated to all nursing departments. Guidelines on referral criteria are determined with the assistance of the OPO and based on established procedures as determined by the CMS and other federal and state legislation.

The Joint Commission for Accreditation of Hospital Organizations (JCAHO) is designated by the CMS to inspect for compliance of the Medicare Conditions of Participation act of 1998, CMS website (2003). Nursing administration personnel have historically been responsible for overseeing and guiding the JCAHO inspection process. Having the policies and procedures to support the compliance of their organization as it relates to organ donation is vitally important to gain continued conformity of regulations.

All hospitals have different methods of complying with these important CMS regulations. As a rule, nursing administration is responsible for staffing the nursing personnel who identifies and potentially approaches the families of likely organ donors. If it is found that these responsible parties need further education or that policies and procedures need to be altered to meet the organization and OPO needs, then the time commitment of nurses and nursing administration will be altered. Nursing administration should support staff training through paid education time, compensatory time off, or other compensatory mechanism or through continuing education credits.

Nursing Practice

All health care practitioners are affected by the shortage of donated organs and the potential negative impact on those patients in our Appalachian communities that

desperately need organ transplants. The United States Public Health Commission website (2003), sites an example that the rural Appalachian population has a higher incidence of adult onset diabetes which, if not properly treated, often lead to complicating factors such as kidney failure necessitating the need for donated organs for transplant.

Early referral is the key to success in recovering transplantable organs for potential recipients. If the OPO receives a referral from the nurse well after brain death has occurred, decreases in the end-organ function will have already taken place. If the OPO is called in only well after the signs of brain death are present, the donor who might have had 5 to 7 organs suitable for donation and transplantation may by that time have only 1 or 2 suitable organs (Frezza, 1999). Therefore, any patient with a significant and potentially life-threatening injury to the head, whether caused by trauma, an intracerebral hemorrhage, or an anoxic event, should be referred to the OPO as early as possible for evaluation as a potential organ donor.

Referral systems should be automatic and simple. McNamara (1997) indicates that hospital staff members and physicians consistently do not recognize certain patients as potential organ donors and thus do not notify the OPO so that a thorough evaluation can be done. Donors are lost when hospital staff with limited knowledge of the acceptance criteria for organ donors inappropriately “rule out” potential organ donors as medically unsuitable.

Nursing practice should be consistent with established policies and procedures on the potential organ donor process. Areas of development that are identified should be addressed and the nursing environment can be altered to promote the accurate referral patterns.

Nursing Education

Miss-identified or unidentified potential organ donors in the rural acute care setting will require an assessment of learning needs and instruction of ideal referral process based upon those needs. Rural hospitals do not routinely experience prospective organ donation or transplant issues as an urban hospital or trauma center (Wendler, 2001). Maintaining the education level at a consistently high level is difficult and requires constant awareness and development.

Most OPO's have education divisions and /or Organ Procurement Coordinators that have hospital development responsibilities for larger urban hospitals and, to a lesser degree, for rural acute care institutions. With the knowledge of improvement opportunities, nurse educators in the rural Appalachian hospitals and OPO personnel can jointly undertake an instruction program to meet the needs of the organization while also meeting the federal and state regulations that govern the hospitals involvement in the donation process.

Nursing school education curricula have lagged behind the need to introduce students early into the importance of organ donation (Ingram, 2002). Often it is not included as curricular component in nursing schools even though it could be discussed as part of acute care medical surgical content. With changing technology and trends for the successful transplantation of numerous organs as lifesaving procedures, there is rationale for routine inclusion of this content. The emphasis on the importance of the role of the nurse in identifying possible donors and proper notification of OPO's makes the early and effective education of nurses a priority.

Summary

The problem of increasing the amount of organs available for transplant is a multifarious one. This study investigates the organ donor referral pattern of patients in a rural Appalachian acute care hospital in order to determine if there is potential to increase the amount of organs available for transplant to patients in the Appalachian area.

The background and significance of the problem was reviewed and the problem statement was identified. This chapter addressed the issue of: Do rural Appalachian acute care hospitals accurately and appropriately refer potential patients for organ donation?

Referral procedures in larger hospitals with Trauma centers and Neurosurgery services are more developed and the staff is better equipped to identify and refer patients for potential organ donation. Smaller rural acute care hospitals in the Appalachian area may not receive that same level of referral development. Looking toward these smaller rural hospitals and examining the types of patients referred to the OPO may realize additional organ donor resources.

Chapter Two

Introduction

The purpose of this chapter is to provide a comprehensive review the literature relevant to this study. After an exhaustive search, there was no research found that is directed at the topic of rural Appalachian acute care hospitals and their organ donation referral patterns. There were several related studies and non-research articles that have some bearing on the investigation that is reviewed in this chapter.

The theoretical framework of Imogene King Conceptual Framework and Theory of Goal Attainment was reviewed as it is interrelated to this study. King (1989) summarizes that her three framework systems, along with identified concepts, provide a way of organizing one's knowledge, skills, and values. Increasing the knowledge of those who are responsible for organ donation referrals, increases the opportunity for those who need an organ transplant, to receive that life-altering transplant. Ultimately the patient is directed toward the goal of health and productivity.

Literature Review

Ehrle, Shafer, & Nelson, (1999) authored an article to review the referral, request and consent for organ donation process to identify a best practice for success in obtaining consent for organ donation. In the authors' view, the article was important because the struggle to eradicate the organ shortage continues regardless of the efforts that have been expended to try to increase organs for transplant. It was felt that the two most limiting factors in organ donation are: (1) failure to determine which patients are potential organ donors and lack of referral of those patients to the OPO and (2) refusal of patients' families to consent to donation.

The number of medically suitable potential donors is estimated at 13,700. However, in the year 2000, there were 5,984 cadaveric donors resulting in 17,660 transplants, UNOS website (2003). Data from UNOS indicate that organ donation in the United States did not increase from 1996 to 1997 and the numbers of transplants increased only 1% during that period. Consent rates nationwide are 40% to 60%, with an average of 50%. Some OPO's have markedly increased organ recovery by increasing their consent rate to 70%. These successes are achieved by expert and experienced critical care nursing staff determining which patients are potential organ donors, referring those patients early to the OPO early in the process and by the use of best practices by OPO staff, in conjunction with nursing staff, in the consent process.

The article concluded that the role of the nurse in referring potential donors is of key importance in actualizing potential donors that present to hospitals. Once it has been determined that a patient has not had a survivable neurological event and that brain death is imminent, the OPO must be contacted. Critical care and ED nurses are the key ingredients to a hospital's successful donation program. They must work closely, collaboratively, and effectively with the OPO staff if the ever-widening gap between organ supply and organ demand is to be decreased.

Holmquist, Chabalewski, Blout, & Edwards (1999) performed a study exploring the critical pathway for guiding care for organ donation, that caring for and organ donor can be challenging both physically and emotionally. Those health care workers in smaller ICU's and ED's that do not consistently deal with the rigors of performing clinical donor management and addressing the unique emotional needs of the family may find the issue

of organ donation over-taxing. By providing a clinical pathway, some of these issues can be addressed.

Guidelines for recognizing and referring potential organ donors can be included in the pathway along with information on how to provide multidisciplinary support. Through enhanced communication and education, both physicians and nurses can become more familiar, and hopefully more comfortable, with the process of organ donation. If the hospital lacks the resources or expertise to complete a donation case and the hospital chooses not to keep the patient at their facility, then these smaller hospitals can contact the OPO early in the process and elect to transfer to a larger referral center.

A 1998 study by Evanisko, Beasley, Brigham, & Capossela explored the readiness of critical care physicians and nurses to handle requests for organ donation. It was shown that the staff support, knowledge and training levels correlate with the consent rates for these health care professionals. Over 1061 critical care staff personnel from 28 hospitals in four separate regions of the United States were involved in this large study.

It was found that 34% of the respondents did not know or were unsure whether the respondents' hospitals had written protocols for organ referral or recovery. It was also shown that staffs at larger hospitals were more experienced with organ donation issues than staff in smaller hospitals. Composite training scores were significantly correlated with donation rates ($r = .40$; $p = .03$). The higher the mean score on the training index for a hospital's staff, the higher the organ donation rate at the hospital.

Conclusions of this study showed that the training of the hospital staff about protocols for organ donation is significantly associated with superior rates of organ donation and current levels of training about organ donation are inadequate. Less than a

third of respondents had received training in recognizing and explaining brain death. A large number of critical care staff, therefore, is not prepared to handle organ donation events effectively in their hospitals (Evanisko, Beasley, Brigham & Capossela, 1998).

Shafer et al., (1998) authored an article that studied a project to increase organ donation in Texas community and rural hospitals. They surmised that identifying and recovering donors from community and rural hospitals presents a challenge to OPO's.

A study of non-donor hospitals in the United States was undertaken at John Hopkins University, which identified 31 hospitals (in one service area) with the facilities to accommodate organ donation, through an organ donor had not been produced in 3 years. The purpose of the study was to determine whether donors could be produced from these rural non-organ producing hospitals. A large geographically dispersed OPO initiated a program consisting of (1) in-house coordinators, and (2) routine notification of all hospital deaths.

Following implementation of this program, organ donation increased 387% among the targeted 25 hospitals. The number of hospitals producing at least 1 organ donor increased 133%. The number of organs recovered in the project increased 449%. In-house coordinators, by identifying potential donors and facilitating an organ donor awareness program, can increase the number of organ donors in hospitals with low, but real, donor potential.

A study completed by Klassen, Arnoff, Hall & Braslow (1999) examined the organizational characteristics of solid-organ donor hospitals and nondonor hospitals. The objective was to identify organizational characteristics that distinguish hospitals

producing organ donations from those that do not, and to estimate the number of nondonor hospitals with donor potential.

The data from the American Hospitals Association's (AHA) survey of hospitals were matched to Organ Procurement and Transplant Network information from the United Network for Organ Sharing regarding the number of solid organ donors in 1992 and 1996. Hospitals with donation capability were identified, based on bed size and factors necessary to produce successful donor maintenance and organ recovery. Based on statistical analysis, organizational characteristics distinguishing donor hospitals from nondonor hospitals were identified.

This study also compared the number of donors and the number of donor hospitals in 1992 and 1996 in the United States. Of the 5604 hospitals affiliated with the AHA, 1214 (22%) were identified as donor hospitals (≥ 1 donation in the calendar year). Of the 2333 hospitals with procurement capability, 1268 (54%) produced no donors in the year.

Based on a multiple logistic regression model, donor hospitals differed from nondonor hospitals by hospital ownership, with municipally owned hospitals more likely and federally owned hospitals less likely to produce donation, compared with for-profit and not-for-profit hospitals. Other organizational characteristics associated with donor hospitals were level of trauma services and whether the hospital had a transplant surgery program.

Trauma level was strongly associated with donor status. Hospitals reporting level I trauma facilities were almost five times more likely to be donor hospitals, whereas those

with level II or III trauma services were more than twice as likely to be donor hospitals, compared to hospitals without a trauma service.

The analysis shows that, among hospitals not producing organ donors in 1992, there is a subgroup of hospitals with the potential to become donor institutions. These 1286 nondonor hospitals are reasonable targets for further exploration. The results of the multivariate analysis point to some significant differences between donor and nondonor hospitals, which suggest some areas of intervention.

Theoretical Framework

Imogene King developed a conceptual model for nursing in the mid 1960's with the idea that human beings are open systems interacting with the environment. King's Conceptual Framework and Theory of Goal Attainment focuses on the belief that man is a dynamic human being whose perceptions of objects, persons and events influence his behavior, social interaction and health. According to King (1998), the framework includes three interacting systems with each system having its own distinct group of concepts and characteristics. These systems include the personal systems (individuals), interpersonal systems (groups), and social systems (society).

When applying King's Framework to the process of organ donation and the consent process, we see a surprising amount of overlap and understanding. The first interacting system, the personal system, is primarily focused on the individual. Tomey & Alligood (1998) believe that in King's personal system framework, it is necessary to understand the concepts of body image and perception.

These principles are also true when approaching a family about organ donation. Body image and how the organ donation process may alter their loved ones appearance is

often a concern with families. It's important that the requestor explores any of these concerns and assures the family that the donation of any organ or tissue will not affect the body image and the type of funeral arrangements they prefer.

Families are also often concerned with the perception of others after their decision to donate is made. As a requestor, it's important to support the family in their decision and make them aware that as in life, every decision will not be unanimous. The next-of-kin must feel secure in their decision regardless of others perceptions.

This personal interaction system also applies to the health care professional who is responsible for recognizing and accurately reporting a potential donation situation in the institution. According to Flick (2002), the nurse's personal feelings and beliefs can have a tremendous influence, either positive or negative, on the donation process.

Nurses, in particular, contribute a great deal to the donation process especially in the early phase. Their personal interaction with the OPO is vital in determining the correct identification of a potential donor which can lead to a life-saving transplant for one of the many waiting patients.

King's second interacting system is the interpersonal system. Groups are formed when two or more individuals interact. Comprehension of the interpersonal system requires an understanding of the concepts of communication, interaction, role, stress and transaction (King, 1981).

When approaching a family about organ donation, knowledge of communication, interaction, role, stress and transactions are vitally important. This type of expertise is gained through learning, observing and actual repeated involvement in donor request processes. A physician or nurse in a smaller rural acute care hospital may not have had

the opportunities to participate in these types of discussions and thus lack the knowledge base to answer questions and address the families concerns.

This system is especially vital to the communication process between the physician, nurse, OPO, and family. Understanding the severity and seriousness of the injury and expeditiously translating that information to the appropriate parties can ultimately increase donor referrals.

The third interacting system in King's System Framework is the social system. This system consists of groups such as religion, educational and health care. Tomey (1994) summarized that the influential behavior of an extended family on growth and development of the members in society is an important function of a social system.

Suffering a loss in the family is usually a very negative experience. But families often explain to members of the health care field that by consenting to organ donation, they have the knowledge that something positive came from their loss. Society benefits from the decision to donate, thus potentially saving the lives of many people.

Small rural hospitals can be instrumental in increasing potential organ donors. Education is the foundation for reaching the involved parties in the institution. Increasing awareness in the professional setting can enhance the comfort level with current policies and procedures in the hospital.

King's Systems Framework is relevant in understanding the organ donation procedure. King (1981) clearly states "the concepts in the framework are not limited to only one of the dynamic interacting systems but cut across all three systems." All three systems must be understood and utilized before approaching a family about their option

of organ and tissue donation. This is best accomplished in a larger referral center where more resources can be employed.

Summary

The literature does not specifically speak toward the investigative issue of rural Appalachian acute care hospitals and the referral patterns of potential organ donors. However, it is clear that these smaller hospitals do not receive the same support as urban-based larger trauma and Neurosurgery centers. It is also clear that there is a potential to increase organ donation by researching and examining patients that expire from neurological related injuries in these smaller facilities.

These literature review studies also indicate that education and awareness is important in giving nurses, physicians, hospital administrators, and hospital staff the information needed to identify, refer and approach families about the option of donation. The timing of the family approach process, some procedures, and the complex clinical management are difficult and demand a certain amount of expertise that comes with experience.

The theoretical framework of Imogene King was reviewed and its relevance to this study was clarified. King summarized that man is a dynamic human being whose perceptions of objects, persons and events influence his behavior, social interaction and health (King, 1981). Organ donation is dynamic and the need for donated organs demands investigation of all avenues of potential donation.

Chapter Three

Introduction

Nursing research involves a systematic search for and validation of knowledge about issues of importance to the nursing profession Polit & Hungler (1995). This chapter examines the overview of the research study and examines the content, steps, procedures, and strategies for gathering and analyzing the data in a research investigation.

Methodology

A descriptive research design was used to study the referral patterns rural acute care hospital in the Appalachian area. This researcher has developed a data-gathering instrument named; Organ Procurement Assessment Tool (OPAT) (Appendix A) to gain information from the medical record review relevant to this research study. The instrument is comprised of twenty-five-item data markers for use in assessing the referral patterns and accuracy of the included patients.

Design

This was a nonexperimental descriptive design research study. The design was chosen because retrospective descriptive research observes, describes, and documents a situation (Polit & Hungler, 1995). There are no manipulations of variables in this study.

This study used a retrospective medical record review investigation to study the number of deaths that were reported to the OPO. The study focused on identifying missed potential organ donors and the accurateness of those patients that were referred to the OPO over the period of one calendar year.

Descriptive statistics will be used to describe the study sample using mean, standard deviation, and ranges. Inferential statistics will be used to compare data using

the OPAT Tool. Chi-square analysis will be used to determine differences in whether criteria have been met or not.

A composite scale in this study will utilize the Glasgow Coma Score to determine the predicted neurological outcome. The GCS can be measured by Pearson's r statistics.

Sampling

The sampling design will be nonprobability with a convenience sample. All patients in the rural Appalachian study hospital who have had a diagnosis of intracranial bleeds, hypoxic injuries that includes cardiac arrest, cerebral edema, or traumatic injuries will be included in the study. Because these are the only diagnosis that ultimately leads to brain death, this was the focus of the medical record review. It is estimated that 50 patients will meet the inclusion criteria in the calendar year 2002 study time frame. All other causes of death will not be reviewed because they are not used by the OPO criteria.

Inclusion criteria: Patients who are: (a) between the ages of 0 to 75 years (b) patients who have died from an intracranial bleed, hypoxic injuries (including cardiac arrest), cerebral edema, or traumatic injuries. These patient records were chosen because they meet the OPO criteria for organ donation. This broad criterion is: the patient must be declared brain dead, between the age range of 0 – 75 years of age, and not have documented active sepsis or communicable disease, AOPA website (2003).

Exclusion criteria: Patients who were (a) are 76-years of age will be excluded regardless of diagnosis (b) died from a diagnosis other than intracranial bleed, hypoxic injuries (including cardiac arrest), cerebral edema, or traumatic injuries. These patients were excluded due to the current criteria of the local OPO that: only severe

neurologically impaired individuals with an intact heart rhythm can progress to brain death and become potential organ donors.

Setting

A rural Appalachian, non-academic, acute care hospital with a bed capacity of 150 was the setting for this research study. The hospital offers 24 hour ED service and has a 14 bed general ICU; however, the hospital does not perform complex Neurosurgery interventions nor is it designated as a trauma center.

This study hospital is a non-profit facility with a catholic religious affiliation in a community of approximately 25,000 inhabitants within a 15-mile radius of the institution. It is situated in the southeastern section of the United States in the designated Appalachian region.

Health Insurance Portability and Accountability Act (HIPPA) regulations regarding patient confidentiality were closely followed. The site of the chart review and all data collection was on-site at the study hospital. A private area was requested to review the medical charts. No records were removed from the study hospitals.

Instruments

The tool that was utilized to determine the seriousness of neurological insult was the Glasgow Coma Score (GCS) (Appendix B). The GCS is a standardized neurological assessment tool utilized since 1989 as a guide in evaluating the patient with a neurological injury or increased intracranial pressure associated with neurovascular or anoxia. The components of this assessment tool are eye opening, verbal response and motor responses.

According to Hartshorn, Lamborn & Noll (1993), “the score range is 3 – 15. A consistent stimulus is applied, either a verbal command or a painful stimulus, and the responsiveness of the patient is expressed as a number. A high number (approaching 15) indicates normal functioning, whereas a lower number (approaching 8) suggests impaired functioning.”

Most OPO’s suggest that the referring hospital alert them when the GCS reaches four or less. This GCS number must be obtained in the absence of narcotics or paralytics. The GCS score of four or less is associated with a 100% mortality rate (Hartshorn et al., 1993).

It is clear that not all reviewed medical charts will have a recorded GCS value. In the absence of the GCS score, the researcher will use the written and documented findings from the physicians and nurses in the medical chart to reconstruct the GCS score.

The OPAT instrument (Appendix A) was also used to collect information in this study. This tool was used to assess the accuracy of organ donation referral patterns at the study hospital to determine if unrevealed or mis-referred patients are present. This is an untested instrument developed by the researcher.

Measures

Descriptive statistics will be used to describe the study sample using mean, standard deviation, and ranges. Reliability testing will be documented by using Cronbach’s Coefficient Alpha. Inferential statistics will be used to compare data using the OPO Assessment Tool. Pearson r will be used to determine differences in whether criteria have been met or not.

A twenty-five-question assessment tool was developed by the researcher to evaluate the patient medical record and to determine if the patient did or did not meet the OPO criteria. By reviewing the medical records, the patient will be determined to be either suitable or not suitable for organ donation based upon the current criteria that is being used by the local OPO. This broad standard is: the patient must be declared brain dead, between the age range of 0 – 75 years of age, and not have documented active sepsis or communicable disease. Any sepsis and communicable disease criteria is based upon the individual patient history and is not generalized to all patients.

Procedures

An Internal Review Board (IRB) proposal was developed and submitted to the study hospital (Appendix C). Permission for this research study was obtained at the study hospital in conjunction with input from the medical record department.

A Gantt chart depicts the scheduling of activities in the research study and highlights the sequencing and interrelationships among activities (Polit & Hungler, 1995). A timeline for this research study was developed (Appendix D).

The following steps were utilized in gathering the research data.

Step 1: A computer-generated report from the medical records department in the study hospital was requested that includes all deaths, both in-patient and ED, during the calendar 2002. Element line items included in this report will contain the name, age, gender, admitting diagnosis, cause of death, admitting/ED physician, time of patient arrival, time of death, and unit reporting death.

Step 2: A computer-generated report was requested from the government designated local OPO of all the deaths reported from the study hospital. By cross

referencing these two reports, the researcher can determine if any hospital deaths were not reported or misreported.

Step 3: The researcher utilized both reports to determine if a patient is outside the accepted OPO age criteria of 0 to 75 year of age. Those patients outside the age criteria will be eliminated from the study. The researcher will then use the reports to examine the diagnosis of the remaining patients. All patients who have had a diagnosis of serious intracranial bleeds, hypoxic injuries (including cardiac arrest), cerebral edema, or traumatic injuries was identified and included in the study. Because these are the only diagnosis that ultimately leads to brain death, they will be the focus of the study. All other causes of death will be ruled out of the study.

Step 4: Identified cases had a complete retrospective chart review. By examining the documentation of the physicians and nurses in the medical chart, and completing the OPAT instrument, a picture of the neurological status and reported information was determined. The GCS and the medical chart documentation of neurological status were used to define any potential missed organ donation.

Limitations

One of the limitations of the study was the non-randomized convenience sampling. Also, the modest size of the research does not lend itself to generalized extrapolation to all rural hospitals in all regions. The geographical settings of this study may not compare well with other culturally diverse regions and various rural hospital settings in the United States.

Due to the absence of a proven data-gathering instrument to measure referral patterns, this researcher created an assessment/data-gathering tool (OPAT) for this

project. The unproven reliability and validity of this tool is also a limitation of this research.

Another limitation of this study revolves around the medical cases that do not have a reported GCS scale. Depending upon the quantity and quality of the physician and nursing documentation, constructing a GCS number may be difficult. Using one researcher to perform the data collection and GCS documentation will be a bias of this study. One researcher will use consistent decision making patterns but the lack secondary confirmation of documentation will be a limitation.

Summary

This was a descriptive retrospective medical record review study that focused on the referral patterns at a rural acute care hospital. The setting was in the Appalachian area situated in the southeastern portion of the United States. This non-experimental study used a convenience sample to recover the medical records selected for review. Inclusion and exclusion criteria were examined and the instrument utilized in this research was explained. Measures, procedures, and limitations of this study were discussed.

Chapter Four

Introduction

This chapter will review data analysis and interpretation, study results, and documentation of statistical procedures and tables for displaying results. All data collected were analyzed through the use of a statistical computer program. A discussion of the results will be documented along with limitations, implications, and recommendations for future study. The conclusions of the study will be assessed and reported.

Data Analysis

The purpose of this study was to describe the organ donor pattern of patients in a rural Appalachian acute care hospital. Specifically, the identified medical records in the study hospital were compared with the local OPO criteria to determine if unrevealed or mis-referred patients were present.

Information requested from the study hospital was supplied to the researcher by the medical records department. A computer-generated report revealed the total number of deaths ($N = 274$) that occurred in the hospital during the calendar year 2002. This total included cardiac standstill and brain deaths from both ED and inpatient admissions. Fifty-nine percent ($n = 163$) of patients met the age criteria to be reviewed for inclusion in the study. A review of diagnosis from the 163 patients revealed only twenty-one percent ($n = 34$) met the criteria to be included in the study.

A retrospective chart review was used to collect information from each patient record. A complete chart review of physicians, nursing, and allied health-care personnel documentation including ED records were analyzed. Biophysiological measurement

information was gathered during the last 12 hours prior to pronouncement of cardiac or brain death. Two ED cases had less than 12 hours of data charted because of their relatively short span of treatment; however, because of their importance to the study, these two cases remained in the sample.

The researcher designed Organ Procurement Assessment Tool (OPAT) and the Glasgow Coma Scale (GCS) were used to accumulate specific study data. Data were analyzed using the SPSS computer program (Statistical Package for the Social Sciences, version 11.0 for Windows). Using frequency distributions and aggregate percentages, data were used to answer three research questions proposed by this study.

1. What is the relationship between the reported potential organ donor referrals to the OPO criteria based on the results of the medical record review? (Measurement of an unidentified referral).
2. What is the relationship between potential brain deaths identified by the hospital and number of deaths reported to the OPO? (Measurement of a mis-referral).
3. What are the common referral errors identified that can lead to improvements in the potential organ donation referral process of a hospital in a rural Appalachian setting?

Demographic Data

Results of the demographic analysis (Table 1) from the study ($N = 34$) revealed a gender sample consisting of fifty-nine percent males ($n = 20$) and forty-one percent females ($n = 14$).

The age range of the sample was between 19 to 76 years of age. The ages of patients were divided into seven groupings. The 70 to 76 years of age group was the most

frequently reported grouping at thirty-two percent ($n = 11$). The mean age of the sample was 58 years (Table 1).

Patient diagnosis of the sample was examined and categorized into a subscale. Intracranial Bleed and Hypoxic injury were the two most common diagnoses, ($n = 23$; 67%), (Table 1).

Demographic data reporting unidentified referrals showed that of the total sample ($N = 34$), ninety-one percent ($n = 31$) were referred to the OPO and nine percent ($n = 3$) were not referred (Table 1).

Examination of mis-referred patients from the sample showed that eighty-one percent ($n = 25$) were accurately referred to OPO. Nineteen percent ($n = 6$) were improperly reported to the OPO. Three patients were not referred to the OPO and were excluded in this sub-sample (Table 1).

Correlation Data

Pearson Product Moment Correlation Coefficients were used to assess relationships between the OPAT subscales. Blood Pressure was intercorrelated with Heart Rate ($r = .40, p = 0.5$) and Respiratory Rate ($r = .42; p = .05$), indicating the physiological relationships among these body functions.

Blood Pressure was correlated with Verbal Response ($r = .69$), Eye Opening Response ($r = .71$), Motor Response ($r = .72$), Focal Motor Response ($r = .60$), and Pupil Reaction ($r = .66$), indicating the perfusion needed to maintain brain, sensory, and motor functions (Table 2).

Pearson Product Moment Correlation Coefficient was used to examine relationships between the GCS tool subscales. Eye Opening was intercorrelated with

Motor Response ($r = .83$), Verbal Response ($r = .86$) and Motor Response ($r = .90$).
(Table 3)

Reliability Data

Reliability of the OPAT was examined using Cronbach's Coefficient Alpha. Cronbach's Coefficient Alpha for the total scores on the OPAT yielded a reliable coefficient ($\alpha = .92$). Examination of subscales that yielded a reliability coefficient above the acceptable .70 were Blood Pressure ($\alpha = .74$), Verbal Response ($\alpha = .89$), Eye Opening Response ($\alpha = .87$), Motor Response ($\alpha = .88$), Focal Motor Response ($\alpha = .85$), and Pupil Response ($\alpha = .82$). Heart rate ($\alpha = .40$) and respiratory subscales ($\alpha = .52$) did not meet the acceptable criteria most likely because of the low sample size. (Table 2)

Reliability of the GCS was assessed using Cronbach's Coefficient Alpha. Subscale reliability for Eye Opening ($\alpha = .90$), Motor Response ($\alpha = .94$), and Verbal Response ($\alpha = .96$) yielded acceptable coefficients, as did the Cronbach's Coefficient Alpha for total scores on the GCS ($\alpha = .97$). (Table 3)

Results

Results of this study provided information about one rural Appalachian hospital referral pattern as it relates to potential organ donation. Addressing the three research questions proposed by this study yielded the following results.

1. What is the relationship between the reported potential organ donor referrals to the OPO criteria based on the results of the medical record review? (Measurement of an unidentified referral).

Chi-square analysis was calculated comparing the proportion of potential organ donor cases reported to the OPO with the current sample ($n = 34$) based on the OPO

criteria. A significant interaction was found ($X^2 = 895.53$, $df = 1$, $p = .0001$), indicating the hospital did not appropriately identify potential organ donation referrals. Based on OPO criteria, thirty-one (91%) of potential organ donors were referred and three (9%) patients were not referred. (Table 4)

2. What is the relationship between potential brain deaths identified by the hospital and number of deaths reported to the OPO? (Measurement of a mis-referral).

A chi-square test comparing the proportion of potential brain death referrals identified by the hospital and the number of deaths reported to the OPO was calculated. A significant interaction was found ($X^2 = 3938.72$, $df = 1$, $p = .0001$), indicating six (19%) patients were inappropriately identified as cardiac standstill death rather than potential brain death (Table 5).

3. What are the common referral inaccuracies identified that can lead to improvements in the potential organ donation referral process of a hospital in a rural Appalachian setting?

Chi square analysis comparing the proportion of the most common reporting inaccuracy was performed and found to be significant ($X^2 = 1390.54$, $df = 3$, $p = .0001$). Not alerting the OPO early in the potential brain death process ($n = 3$) was the most common reporting error. OPO policy dictates hospitals notify them of “pending” deaths if the patient diagnosis has a neurological component.

The second most common inaccuracy was withdrawing biophysiological maintenance support for the patient ($n = 2$), often at the family’s request, prior to notifying OPO of the potential brain death patient (Table 6).

Discussion

The purpose and focus of this study was to describe the OPO referral patterns of all patient deaths in a rural Appalachian acute care hospital. This study was important because it offered insight into current OPO reporting patterns and provided information for future goals and objectives.

The study suggests that rural Appalachian hospitals should use OPO's criteria more rigorously. By using OPO's criteria precisely, hospital's can become more effective in referring potential brain death patients. Using the criteria appropriately and effectively, positive results could lead to an increase in organ donation referrals; thus, potentially providing more transplants to patients with end-stage organ disease.

This study also analyzed overall compliance rates of both cardiac and brain death referrals as mandated by government reporting standards. Total hospital reported deaths ($N = 274$) for calendar year 2002 were cross-referenced with OPO reported deaths ($n = 255$). Chart review revealed nineteen cases (7%) were unidentified by the hospital and therefore were not reported to the OPO. Overall compliance rate for unidentified referral rate was ninety-three percent (93%) and should be 100%.

Hospital personnel identified one percent ($n = 2$) of all reported deaths as brain death cases. The remaining ninety-nine percent ($n = 253$) were reported to the OPO as cardiac standstill cases.

Results revealed six cases (2%) as potential brain deaths based upon the GCS score, the OPAT, and current OPO criteria. These cases are in addition to the two properly identified brain death cases documented. This finding indicates potential brain death patients misidentified or un-referred to the OPO.

Three cases of the six potential brain death cases identified by chart review were hypoxic injury cases associated with cardiac arrest. All three cases were the result of Myocardial Infarction (MI), where perfusion of blood to the brain was compromised. Limited or withdrawn maintenance of respiratory support, heart rate, and blood pressure did not allow the patient to potentially progress to brain death. Two of these three cases were mis-referred as cardiac standstill deaths. One case was unidentified by the hospital and therefore not referred to the OPO.

One case was identified as a trauma case that had massive head, chest, and, abdominal injuries. This patient was seen in the ED and did not respond well to treatment. Policy dictates that these patients should have been referred to the OPO very early into their treatment; however, the OPO was not notified of the case early enough to make a judgment on the potential for brain death and organ donation. This case was unidentified by the hospital and was not referred to the OPO.

The remaining two cases of six were intercerebral bleeds with resulting neurological insult. Review of these charts demonstrated that biophysical support for these patients was not aggressive and treatment was withdrawn due to family member concerns. Of these two cases, one case was not referred to the OPO (unidentified) and one case was incorrectly reported to the OPO as a cardiac standstill (mis-referred).

The hospital-generated report and OPO report revealed an unidentified referral rate of seven percent ($n = 19$) and a two-percent ($n = 6$) mis-referral for 2002. This finding indicates un-referred and improperly identified potential donors are present in the hospital.

Imogene King's framework and theory of goal attainment was shown to be applicable to this research project. King's interpersonal and social systems were predominantly important when assessing patients for potential organ donation.

Interpersonal interaction was shown to be integral for nurses in facilitating the referral process and coordinating communication between families, OPO personnel, and fellow health-care professionals. Increasing the educational focus on the appropriate referral process and improving the interpersonal relationships was a key concept to increase referrals to the OPO.

King's social system framework was important in this research for the potential to impact society in such a positive way. The accurate and timely referral of patients can potentially lead to increased organ donation that can increase transplants to those patients in the Appalachian community that desperately need organ transplants.

Implications

To decrease the number of unidentified and mis-referred patients in rural Appalachian acute care hospitals, the OPO and hospital must work in a collaboration to improve referral systems. The OPO is responsible for supplying the hospital with educational offerings and material that focuses on referral system processes and how to best operate in unique hospital settings.

Instructing physicians and nurses to identify potential organ donors early in the treatment process and alerting OPO coordinators of the patient status would be a focus for an educational topic. Applying OPO criteria to every patient death and accurately referring patients will be an important instructive issue to address.

The hospital would be responsible to construct accurate policies and procedures and provide these guidelines to staff members. Commitment of hospital and nurse administration to staff education would be an important factor for this success. Hospital administration, physicians, and nurses must set compliance goals and enforce agreements for OPO criteria to be met.

Hospitals need to be familiar with referral processes and the information required when patients are referred to the OPO. Simple 1-800 number access and flow chart diagrams should be provided to physicians and nurses with the ideal referral processes displayed. Continued open dialogues between OPO, hospital, physicians, and nurses are essential to improving appropriate referral outcomes.

A key educational goal is realizing that patients with low GCS totals should be referred to the OPO prior to cardiac standstill. This provides OPO coordinators time to assess for potential brain death and organ donation options.

If referrals are not made until patients have suffered terminal cardiac arrest or have been removed from ventilator support, resulting hypoxic injury to organs eliminates chances of successful traditional organ donation. It is critically important for the OPO to receive referrals accurately and early in the recognition process in order to coordinate a positive outcome.

Organ Procurement Organization's distribution of timely hospital referral performance data every three to six-months would allow hospitals to track and perform quality assurance on potential organ referral standards. Feedback is a very powerful tool to help OPO's and hospitals improve and maintain referrals at designated goal levels.

In all activities, including potential organ donation referral, if a specific group is assigned responsibility for an action, then the experience factor will result in a higher comfort level and ultimately higher compliance. Hospitals should assign a specific group such as nursing supervisors, designated requestor teams, charge nurses, or pastoral care to the position of reporting every death that occurs in the hospital including potential brain death cases.

After educational efforts are performed and policies and procedures solidified, unidentified or mis-referred patients should be immediately reported to the OPO. Direct follow-up with involved hospital personnel to assess areas of misunderstanding or unclear referral criteria is recommended. This information guides further learning needs and future in-services for the hospital. Administrative follow-up is also recommended with a report generated outlining curative actions.

Implications for Nursing Practice

Implications for nursing practice are centered around the proper process for identification and referral, especially the early referral of any potential brain death case on a consistent basis. Nurse administration should be actively involved in policy and procedure formation for proper OPO referrals of all hospital deaths. Nurse administrators, in collaboration with OPO coordinators, should direct organ donation referral education of directors, managers, and staff nurses. For potential organ donation to increase, nursing administrators must allocate adequate staff training time.

Limitations

A limitation to this study was that it is only generalizable to this rural acute care hospital in an Appalachia area. This study should be repeated in other rural hospitals located in different geographical areas for comparison and testing outcomes.

The reliability coefficient of the OPAT was very high ($\alpha = .92$); however, further use in various settings should be repeated to examine reliability in other samples.

Recommendations and Conclusions

The purpose of this study was to describe the organ donor referral patterns of patient's in a rural Appalachian acute care hospital. This study was important because the findings offers insight into current reporting patterns and provides information for future goals and objectives development

This study revealed important results with implications for future research however; this study could have been enhanced by using a randomized sampling design and by measuring hospital staff education levels before and after an informative teaching intervention.

The modest size of the study sample does not lend itself to be generalized to all rural hospitals. The OPAT was reliable in this sample; however, the tool needs to be used in other settings and samples.

Results of this study indicated that the OPAT and GCS instruments demonstrated excellent internally reliability. Cronbach's Coefficient Alpha for the OPAT and GCS yielded good results, but confirmation is needed for both tests in a variety of settings and samples.

Future research should focus on examining larger samples in rural Appalachian hospitals and hospital settings outside the Appalachian area. A broader research project with an educational intervention to measure pre and post outcomes would be insightful.

This study has broad implications for human organ transplants. National data shows that sixteen people die every day waiting for a life-saving organ transplant (UNOS website, 2003). Every potential organ donor, regardless of the hospital setting, should be properly identified and referred to the designated OPO. The OPO's success depends upon the physicians and nurses reporting potential donor cases in an appropriate and timely manner.

One additional organ donor per OPO per year could extrapolate to potentially 120 additional organ transplants performed each year. Minimal educational efforts for each acute care hospital in the OPO's service area could make a significant difference in increasing the number of organs available for transplant.

Unidentified and mis-referred patients in a rural Appalachian acute care hospital were recognized as a significant problem. Correcting this problem requires on-going communication, education, and training to inform designated administrators, physicians, and nurses about properly referring potential organ donors.

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Table 1
Demographic Data of the Study Sample (N = 34)

Variable	Frequency (<i>f</i>)	Percentage (%)
Gender		
Male	20	59
Female	14	41
Age		
0 to 19 years	1	3
20 to 29 years	2	6
30 to 39 years	2	6
40 to 49 years	3	9
50 to 59 years	6	18
60 to 69 years	9	26
70 to 76 years	11	32
Admission Diagnosis		
Intercranial Bleed	13	38
Hypoxic Injury	10	29
Cerebral Edema	4	12
Traumatic Brain Injury	6	18
Unknown	1	3
Unidentified Referrals		
Referred	31	91
Not Referred	3	9
Mis-referred Patients		
Accurately Referred	25	81
Improperly Referred	6	19

Table 2
Inter-correlations of the Organ Procurement Assessment Tool (OPAT) (N = 34)

Subscale:	Blood Pressure	Heart Rate	Respiratory Rate	Verbal Response	Eye Opening Response	Motor Response	Focal Motor Response	Pupil Reaction	Subscale Alpha
Blood Pressure	1.00								.74
Heart Rate	.40*	1.00							.40
Respiratory Rate	.42*	.28	1.00						.52
Verbal Response	.69**	.29	.55**	1.00					.89
Eye Opening Response	.71**	.28	.48**	.87**	1.00				.87
Motor Response	.72**	.34	.43*	.87**	.88**	1.00			.88
Focal Motor Response	.60**	.49**	.40*	.82**	.82**	.85**	1.00		.85
Pupil Reaction	.66**	.27	.51**	.81**	.78**	.77**	.78**	1.00	.82

* p = .05

** p = .01

Table 3

Inter-correlations of Glasgow Coma Scale (GCS) (N = 34)

Subscale:	Eye Opening	Motor Response	Verbal Response	Subscale Alpha
Eye Opening	1.00			.90
Motor Response	.83**	1.00		.94
Verbal Response	.86**	.90**	1.00	.96

**p = .01

Table 4

*Unidentified Referrals (Non-reported cases by the hospital)
Observed Frequencies for Chi-Square Analysis*

Referred to OPO	Observed	Expected	Residual
Yes	31 (91%)	34	-3.0
No	3 (9%)	0	3.0
Total	34 (100%)		

Statistics

Unidentified Referrals

Chi-Square $X^2 = 894.54$

DF $df = 1$

Significance $p = .0001$

Table 5
Mis-Referred Referrals (Inaccurately referred by hospital)
Observed Frequencies for Chi-Square Analysis

Accurate referral	Observed	Expected	Residual
Yes	25 (81%)	31	-6.0
No	6 (19%)	0	6.0
Total	31 (100%)		

Three cases not referred to the OPO. (Not included in statistic) ($N = 34$)

Statistics
Mis-referred Referrals

Chi-Square $X^2 = 3938.72$

DF $df = 1$

Significance $p = .0001$

Table 6

*Most Common Reporting Errors
Observed Frequencies for Chi-Square Analysis*

Subset	Observed	Expected	Residual
Late Referral	3 (50%)	0	3.0
Support Withdrawn	2 (33%)	0	2.0
Unrecognized	1 (17%)	0	1.0
Total	6 (100%)		

Statistics

Most Common Reporting Errors

Chi-Square $X^2 = 1390.54$

DF $df = 3$

Significance $p = .0001$

Appendix A

**ORGAN PROCUREMENT ORGANIZATION ASSESSMENT TOOL
(OPAT)**

Hospital Name _____

Name of Reviewer _____

Date / Time of Review _____

- | | | | | |
|--------------------------------|---|--------|--|-----------|
| 1. Identifying # | _____ | | | |
| 2. Age | _____ | | | |
| 3. Gender | male | female | | |
| 4. ED Arrival Date | _____ | | | |
| 5. Time of ED Arrival | _____ | | | |
| 6. OPO Referral Date | _____ | | | |
| 7. Time of OPO Referral | _____ | | | |
| 8. Diagnosis | Intracranial Bleed
Cerebral Edema
Unknown | | Hypoxic Injury
Traumatic Brain Injury | |
| 9. Referred Cardiac Standstill | yes | no | | |
| 10. Pt. on Ventilator | yes | no | | |
| 11. Documented Sepsis | yes | no | | |
| 12. Communicable Disease | yes | no | | |
| 13. Depressant Medication | yes | no | | |
| 14. Admitted to Hospital | yes | no | | |
| 15. Blood Pressure | WNL | low | high | supported |
| 16. Heart Rate | WNL | low | high | supported |
| 17. Respiratory Rate | WNL | low | high | supported |

Cont.

18. Verbal Response (if intubated = estimate)	oriented	inappropriate	incomprehensible	none
19. Eye Opening Response	spontaneous	command	pain none	
20. Motor Response	obeys	localizes	flexion/extension	none
21. Focal Motor Response	normal	delayed	purposeful	none
22. Pupil Reactivity	brisk	sluggish	absent	
23. Unidentified Referral	yes	no		
24. Mis-referred Patient	yes	no		
25. Common Error	late referral	support withdrawn	unrecognized	

* Result is abnormal if outside the expected normal response

Appendix B

Glascow Coma Scale (GCS)

Eye Opening	<i>Examiner</i>	<i>Patient Response</i>	<i>Score</i>
	Spontaneous speech	Opens eyes on own	4
		Opens eyes when asked to in a loud voice	3
	Pain	Opens eyes when pinched	2
	Pain	Does not open eyes	1
Best Motor Response	Commands	Follows simple commands	6
	Pain	Pulls examiner's hand away when pinched	5
	Pain	Pulls part of body away when examiner pinches patient	4
	Pain	Flexes body inappropriately To pain – decorticate posturing	3
	Pain	Body becomes rigid in an extended position when pinched. – decerebrate posturing	2
	Pain	Has no motor response to pinch	1
Verbal	Speech	Carries on conversation correctly & tells examiner where he is, who he is, and the month and year	5
	Speech	Seems confused or disoriented	4
	Speech	Talks so examiner can understand, but is inappropriate	3
	Speech	Makes incomprehensible sounds	2
	Speech	No response	1

Scores are determined as response is tested. Total score is determined by adding the three categories. Highest possible score is 15. This score would indicate a person who is awake, oriented, and follows commands. Lowest score is 3. This score would indicate a person deeply unconscious. A score of 8 or lower generally indicates a person with a severe Brain Injury.

Appendix C

IRB Proposal**Title: A Rural Hospital's Organ Donation Referral Patterns**

The number of people choosing organ transplantation as treatment for organ failure is at an all time high. Influencing these decisions is the increasing success rate of organ transplantation and the growing numbers of medical conditions amenable to organ transplantation. A major obstacle to organ transplantation is the scarcity of donated organs. In the United States, the United Network for Organ Sharing (UNOS) website (2003) reports that over 80,000 patients are on the waiting list and 16 of those will die every day while awaiting a life-saving organ transplant.

This study will describe and explore the pattern of patients diagnosed with intracranial bleeds, hypoxic injuries, cerebral edema, and traumatic injuries for organ donation in an Appalachian acute care hospital. It is projected that approximately fifty medical records in the study hospital will be compared with the local Organ Procurement Organization (OPO) criteria to determine if unidentified or mis-referred patients were present. If organ donation referral patterns can be improved, then the number of available organs for transplant can be increased. Opportunities for further education of health care personnel about the organ donation criteria and referral process may be indicated.

The specific aims (objectives) are to:

1. Review medical records of patients who have died from intracranial bleeds, hypoxic injuries, cerebral edema, or traumatic injuries from a rural Appalachian hospital for using the OPO criteria.
2. Compare the results of the medical record review to determine if the OPO criteria were met or not met.

This study will reveal if the organ donation referral patterns, as determined by medical record review, of a rural Appalachian hospital is consistent with current OPO referral criteria. This is a nonexperimental retrospective descriptive designed study and does not involve patient risk or intervention. Target date for completion of this research project is June 2003.

Submitted by:

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Appendix D

Timeline

Activities to be Completed:	Date of Completion:
Submit to Thesis Committee for approval	February, 2003
Approval of Thesis committee	February, 2003
Complete and submit IRB	February, 2003
Obtain IRB approval	February, 2003
Contact Hospitals & OPO to obtain reports	March, 2003
Reports obtained and reviewed	April, 2003
Data collection complete	May, 2003
Data analysis complete	May, 2003
Thesis manuscript completed	June, 2003