

NURSES' PERCEPTIONS OF CLINICAL COMPETENCY AND INDIVIDUALIZED CARE IN
RELATION TO SOLID ORGAN TRANSPLANTATION

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DEDICATION

To my mother, brothers, extended family members, and dear friends, especially

Della Mathew. Thank you, Della, for your never-ending encouragement
and the time you frequently took to listen to me through my dissertation journey.

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ABSTRACT

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NURSES' PERCEPTIONS OF CLINICAL COMPETENCY AND INDIVIDUALIZED CARE IN RELATION TO SOLID ORGAN TRANSPLANTATION

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This cross-sectional, descriptive correlational study examined nurses' perceptions of transplant nursing competency (TNC) and individualized care (IC) levels for solid organ transplant (SOT) recipients, living donors, and their families while also exploring the relationships among nurse characteristics, TNC, and IC. Three hundred ninety-one participants, comprising U.S. nurses caring for SOT recipients, living donors, and their families, completed the survey. A TNC survey was developed based on Standards of Practice for Transplant Nurses and 88 items on a scale of 5-point Likert (1 = strongly disagree to 5 = strongly agree). The ICS-Nurse A & B survey measured the perception of IC, with 34 items on a 5-point Likert (1 = strongly disagree to 5 = strongly agree). The TNC and ICS-Nurse A & B are reliable instruments measuring transplant nurses' perceptions of clinical competency and individualized care in relation to SOT recipients, living donors, and their families, as demonstrated by their reliability values falling within the range of (.827 - .990). The total TNC mean score was good ($M = 334.48$, $SD = 67.74$), and the total IC mean score was low ($M = 64.96$, $SD = 13.07$). There was a strong positive correlation between TNC and IC levels ($r = .969$, $p < 0.05$). The nurse characteristics (age, gender, highest education level, scope of practice, years as an RN, years as an APRN, years in direct care for transplant patients, type of nursing setting, primary language, race, and ethnicity) predicted a 42.6% variation in the TNC levels ($p < .001$), and a 42.0% variation in the IC levels ($p < .001$). The nurse characteristics, age, gender, years as an RN, type of nursing setting, ethnicity, and race significantly influenced IC levels. Also, the TNC level was significantly influenced by the nurses' age, gender, years as an RN, type of nursing setting, and ethnicity. This study provides new evidence to explore transplant nursing practice, education/training, and research.

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CHAPTER I

INTRODUCTION

Advancements in transplantation and treatments have increased the number of solid organ transplantations (SOTs) in patients with end-stage organ dysfunction, resulting in increased life expectancy and chronic disease survival (Black et al., 2018). According to the Organ Procurement and Transplantation Network (OPTN, 2022c), there are more than 30,000 SOTs, and 41,355 SOTs were performed in 2021(OPTN, 2022c).

SOT affects recipients, living donors, and their families in diverse aspects, including physical, functional, psychosocial, emotional, cognitive, sexual, cultural, environmental, and spiritual experiences. In addition, post-transplantation experiences and healthcare needs of living donors, recipients, and their families vary by age, gender, race, ethnicity, and socioeconomic status (Cupples et al., 2017; Sen et al., 2019). Nurses are expected to provide evidence-based, individualized care to transplant recipients, living donors, and their families through all phases of the transplant process to optimize health, functional ability, and quality of life (American Nurses Association [ANA] & International Transplant Nurses Society [ITNS], 2016). Therefore, assessing transplant nurses' perceived clinical competency and individualized care is essential. Identifying weak areas in transplant nurses' clinical competency and individualized care will shed light on the need for nurses' training to perform quality individualized care for SOT recipients, living donors, and their families.

Problem Statement

Care Needs of SOT Recipients, Living Donors, and Their Families

The heart, lungs, kidney, liver, and pancreas are the organs of SOTs (Scheuher, 2016). SOT has emerged from the experimental approach in the 1960s for the survival and quality of life in patients with end-organ dysfunction (Black et al., 2018; Rana et al., 2015). Since then, SOT has evolved with technical advancements, pharmacological development, and standardization of transplantation practices (Black et al., 2018; Rana et al., 2015; Sen et al.,

2019). Therefore, the survival rate becomes high, although the rates vary by organ. For example, survival rates after kidney-pancreas transplantation are the highest, with 1-year, 3-year, and 5-year survival rates of 96%, 89%, and 81%, respectively. The corresponding survival rates after heart-lung transplantation are the lowest, with 1-year, 3-year, and 5-year survival rates of 80%, 58%, and 49% (Bentley & Ortner, 2020).

Nevertheless, patients who undergo transplantation are extremely ill and endure a long recovery process. Post-transplant recipients are most vulnerable to viral, bacterial, fungal, and parasitic infections (Sen et al., 2019; van Delden et al., 2020). A prospective study by van Delden et al. (2020) found that 50% of SOT recipients suffered infections within the first-year post-transplantation. Bacterial infections accounted for 63%, viral infections 51%, fungal infections 60%, and parasites 6% (van Delden et al., 2020). Recipients are subject to organ rejection because the new organ is viewed as a foreign substance, and the body will activate the immune system to destroy it. Thus, transplant recipients live on a continuum of having an infection versus rejection trajectory. Furthermore, transplant recipients risk long-term neurological, cardiovascular, gastrointestinal, and renal complications exacerbated by immunosuppression therapies (Cupples et al., 2017; Sen et al., 2019). These post-transplant complications increase the morbidity and mortality of SOT recipients (Black et al., 2018; Rana et al., 2015; Sen et al., 2019). The mortality rate for SOT recipients ranges from 13 to 30%; the mortality rates are likely to be higher in patients with older age, diabetes mellitus, obesity, frailty, chronic heart problems, kidney dysfunction, and lung disease (Azzi et al., 2021).

The recovery process of SOT recipients can be extensive and necessitate frequent hospital readmission (Cupples et al., 2017; Sen et al., 2019). The length of hospital stay for heart transplantation in 2017 was 49.2 days, 23.4-31.4 days for single or double lung transplantation, 21.1 days for liver transplantation, 10.4 days for pancreas transplantation, and 6.7 days for kidney transplantation (Bentley & Ortner, 2020; Guertin et al., 2021; Hamadi et al., 2022). Also, the 30-day readmission rates across different organ transplantations have been

high. The 30-day readmission rate after kidney/pancreas transplantation was 74%, 45% after liver transplantation, 29.8%-45.4% after lung transplantation, 31% after kidney transplantation, and 18.8% after heart transplantation; these readmissions were due to pneumonia, rejection, acute renal failure, gastrointestinal disorder, and various other complications (Darmoch et al., 2019; Dols et al., 2018; Li et al., 2016; Simanovski & Ralph, 2020).

In addition, SOT recipients, living donors, and their families have diverse experiences with transplantation, including but not limited to physical, functional, psychosocial, emotional, cognitive, sexual, cultural, environmental, financial, and spiritual experiences. Pre- and post-transplantation experiences and healthcare needs of SOT recipients, living donors, and their families vary by age, gender, race, ethnicity, and socioeconomic status, as presented in the following studies.

Older age transplant recipients are subject to infectious complications and frailty, leading to a significant decline in physical, psychosocial, emotional, social, and cognitive function (Kobashigawa et al., 2019; National Academies of Sciences, 2021). Females have a higher risk of acute rejection than males (Aufhauser et al., 2016; Walters et al., 2020; Yoneda et al., 2017). African-American and Hispanic/Latino patients have lower survival rates than Caucasian and Asian patients (Morris et al., 2016). The expense of transplant care, socioeconomic status, and access to healthcare are the major contributing factors to worsening post-transplant outcomes in African Americans and Hispanic/Latino patients (Morris et al., 2016).

Furthermore, mental health problems such as anxiety, mood disorder, psychosis, mania, substance misuse, and depression affect a recipient's decision-making ability or risks post-transplantation (Bailey et al., 2021). Several studies across all SOTs have shown that mental health problems are associated with poor post-transplant health (Bailey et al., 2021; Dew et al., 2015). The high mortality risks, graft failure, rejection, infections, and readmission have contributed to depression among SOT recipients (Dew et al., 2015; Simanovski & Ralph, 2020). For example, a meta-analysis of 27 studies in heart, liver, kidney, lung, and pancreas transplant

recipients found depression to increase the risk of post-transplant mortality (Dew et al., 2015). Other studies with kidney and liver recipients found the prevalence of depression varying from 22.2% to 31% (Buganza-Torio et al., 2019; Robiner et al., 2022). Cultural beliefs also influence post-transplantation care, such as receiving a blood transfusion or willingness to donate organs (Chisholm-Burns et al., 2018).

It has been found that 9% to 72% of transplant recipients had low health literacy (Chisholm-Burns et al., 2018; Doerry et al., 2022; Taylor et al., 2018). Low health literacy has resulted in inappropriate healthcare utilization (Taylor et al., 2018), adverse patient outcomes, and hospital readmissions (Chisholm-Burns et al., 2018; Dols et al., 2018). Also, families/caregivers of SOT recipients experience uncertainties, ambiguity, stress, and fear in their role as caregivers and challenges during the transplantation process (Cupples et al., 2017; Glaze et al., 2021; Li et al., 2017).

The presence of social support affected SOT recipients' medication adherence and survival rate. A systematic review of 32 studies concluded that liver transplant recipients with social support had higher medication adherence ($OR = 1.34$, 95% CI [1.01, 1.77]; Ladin et al., 2018). Patients with a spouse as a caregiver had a 5-year survival rate of 69% after lung transplantation (Mollberg et al., 2015). Patients with a support system had a 15% absolute improvement in their 5-year survival after heart transplant surgery (Tam et al., 2011).

SOT recipients experience significant financial challenges of high healthcare costs (Robiner et al., 2022; Tucker et al., 2019). The average bills charged by transplants range from \$408,800 (total pancreas transplantation) to \$1,664,800 (total heart transplantation; Bentley & Ortner, 2020). The cost may vary by various factors, such as type of transplants, insurance coverage, transplant centers, underlying diagnosis, or disease status (Bentley & Ortner, 2020).

Living kidney and liver donors have reported experiencing unexpected pain post-operatively (29.8%) and surgical complications (38.3%; Li et al., 2017). These living donor experiences can be different depending on the type of solid organ. For example, living liver

donors experience more surgical risks than living kidney donors (LaPointe Rudow & Warburton, 2016). Furthermore, studies reported ongoing fatigue, pain, and decreased physical quality of life in living donors requiring additional time off work (Butt et al., 2018; Li et al., 2017). Some living kidney donors reported fatigue lasting up to two years post-donation (Butt et al., 2018). Living donors experience mental health disorders, including anxiety, depression, and posttraumatic stress disorder (LaPointe Rudow & Warburton, 2016; Thys et al., 2015). Therefore, nurses need to assess the living donor's mental health, including their emotional and behavioral well-being (Cupples et al., 2017; LaPointe Rudow & Warburton, 2016; Thys et al., 2015).

In the recent decade, precision medicine has allowed for early diagnosis of rejection, immunosuppressive therapy monitoring, and treatment responses in SOT (Maldonado et al., 2021; Sirota & Sarwal, 2017). For example, genetic variations have resulted in a change to the dosing of immunosuppressant requirements to correlate with the transplant recipient's race and gender (Sirota & Sarwal, 2017). Biomarkers provide precise and non-invasive methods of monitoring the function of a recipient's organ or the status of organ rejection (Fu & Zarrinpar, 2020; Kawashima et al., 2022). Transplant nurses need to be aware of the advancements in precision medicine and provide appropriate education and care to SOT recipients and their families. While precision medicine stems from the medical disciplines, nurses should consider all physio-psycho-social determinants to provide individualized care for solid-organ transplant recipients.

To summarize, transplant nurses should be able to assess and address the needs of SOT recipients, living donors, and their families in a systematic and ongoing process, including but not limited to physical, functional, psychosocial, emotional, cognitive, sexual, cultural, age-related, environmental, and spiritual experiences (ANA & ITNS, 2016; Mendes et al., 2012; Scales & Bentley, 2020). Also, to honor the uniqueness of the individual transplant patient and their families, transplant nurses must elicit their values, preferences, expressed needs, and

knowledge of their healthcare situation (ANA & ITNS, 2016). Assessing nurses' perceived transplant clinical competency and ability to provide individualized care is crucial in enhancing their competencies in individualized care for SOT patients and their families.

Current Issues in Nursing Education and Training for Promoting Transplant Nurses' Competencies

Approximately 1,100 transplant nurse coordinators are certified in the United States, and the exact number of transplant nurses is not readily available (Coleman et al., 2015). As of May 31, 2022, there are 252 active transplant centers in the United States (OPTN, 2022c). The ITNS (2022) promotes education and clinical practice for the 221,900 additional nurses entering the nursing profession (American Association of Colleges of Nursing [AACN], 2019).

The ANA and ITNS published *Transplant Nursing: Scope and Standards of Practice* in 2016. It provides competencies to direct transplant nurses in the nursing practice, organizational development, and teaching-research dimensions required to provide transplant excellence. As represented in competencies, nurses' knowledge and skills significantly influence the quality of transplant care and patient/family outcomes. Yet, it has not been well known how the current nursing curriculum includes transplant care topics and educates nursing students. There are few published reports on training nurses interested in organ donation and transplantation.

Jawoniyi and Gormley's (2015) and Jawoniyi et al.'s (2018) review of the literature concluded that the effectiveness of nurses' roles in organ donation and transplantation was linked to nurses' level of understanding and knowledge about this area of practice. In other words, adequately trained and educated nurses on transplantation can significantly enhance the process. These authors emphasized that the development of competencies for assessing potential organ donors should be through continued training and education (Jawoniyi & Gormley, 2015). Such training and education would positively change nurses' attitudes, impact (role), and knowledge of organ donation and transplantation (Jawoniyi et al., 2018). However,

these studies were conducted with nurses working in acute and critical care units in hospitals only, not with nurses in transplant centers or other types of clinical care settings.

Mendes et al. (2012) reviewed 248 empirical studies of health personnel's views of organ donation and transplantation to define nurses' roles and responsibilities with organ donation and transplantation. This review synthesized that transplant nurses provide specialized healthcare that protects, promotes, and rehabilitates living donors, recipients, and their families throughout their life cycle. Advanced practice registered nurses (APRNs) and transplant coordinators require specific knowledge and skills with clinical experience and continuing education. Also, they need to develop critical thinking skills for decisions making. Mendes et al. (2012) concluded that the development of nurses' competency needs to respond to the physiological, pathophysiological, and psychosocial needs of living donors, recipients, their families, and the community. Ariburnu et al. (2022) found through a qualitative study exploring 17 nurses' perspectives and experiences when caring for living donors and transplant recipients that nurses reported a need for informal training, hands-on experience, and formal in-service education to improve their knowledge of the transplant process. These studies imply that nurses must continuously update their knowledge, skills, and attitudes, as there are constant changes and challenges in SOT. Also, the studies support the need to assess transplant nurses' competencies to facilitate the development of nursing education and training on SOT.

The Institute of Medicine (2011) has long acknowledged patient-centered care as respectful of and responsive to an individual's preferences, needs, and values while prioritizing the patient's role in guiding clinical decisions (HealthStream, 2022). The National Quality Forum (NQF, 2014) has pointed out that healthcare professionals should prioritize measuring and implementing person-centered care. The American Association of Critical Care Nursing (AACN) synergy model for patient care suggests that the best patient outcomes are achieved when nurses' competencies align with the needs of their patients (Swickard et al., 2014). Transplant nurses need to become knowledgeable and understand the dynamic, challenging, and complex

care required for SOT recipients, living donors, and their families. However, research studies on transplant nurses' clinical competency and individualized care are lacking. Therefore, assessing the competency level and individualized care perceived by transplant nurses is fundamental. Knowing the current transplant nurses' competency level and individualized care practices will contribute to developing educational strategies and training.

Research Questions

The study aimed to describe nurses' perceptions of transplant nursing competency and individualized care when caring for SOT recipients, living donors, and their families. It also examined the relationship between nurses' perceived transplant nursing competency level and individualized care. The study's findings can guide appropriate nurse education and training to provide quality transplant nursing care that reflects individualized care among SOT recipients, living donors, and their families. The following specific research questions were addressed:

1. What are nurses' perceived transplant nursing competency levels for solid organ transplant recipients, living donors, and their families?
2. What are nurses' perceived individualized care levels for solid organ transplant recipients, living donors, and their families?
3. What is the relationship between nurses' perceived transplant nursing competencies levels and individualized care levels for solid organ transplant recipients, living donors, and their families?
4. To what extent are nurse characteristics associated with their perceived transplant nursing competency level and individualized care level for solid organ transplant recipients, living donors, and their families?

Significance of Study

Individualized care recognizes the uniqueness of an individual, is intended to meet an individual's needs, and is a crucial feature of nursing care (Charalambous et al., 2012; Suhonen et al., 2012; Suhonen et al., 2019). Quality nursing care is the practice of individualized care,

which involves considering a patient's characteristics, personal values, health beliefs, clinical conditions, personal life situations, and decision-making preferences (Danaci & Koç, 2020; Suhonen et al., 2000; Suhonen et al., 2005). Thus, individualized care empowers patients to make healthcare decisions based on their unique values and priorities rather than just the most important risk factor suggested by evidence-based research (Kent et al., 2019). Furthermore, individualized care enhances healthcare quality, upholds ethical obligations, informs health policy development, and respects patient choices (Suhonen et al., 2019).

SOT recipients, living donors, and their families need a continuum of care throughout the phases of transplantation. The screening process, the surgical procedure, the alternative treatments to transplant, the potential medical risks of transplantation, and the potential psychosocial risk of transplantation vary by donor and recipient (Cupples et al., 2017). Transplant nurses must incorporate transplant recipients' and their families' previous experiences, learning needs, and changes in health status when providing nursing care.

In the pre-transplantation phase, a transplant recipient completes many laboratory analyses, including panel reactive antibodies (PRA). PRAs determine the percentage of human leukocyte antigen (HLA) to assess donor-recipient immune compatibility; the crossmatch is specific to individual recipients (Cupples et al., 2017). Also, a comprehensive assessment of a transplant recipient should be completed to identify patient factors (i.e., older age, race/ethnicity, lower income or education level, English not the primary language, unemployed, no health insurance, limited cognitive function, or impaired vision/hearing), which may increase the risk of adverse health effects associated with transplantation (Chisholm-Burns et al., 2018).

The healthcare team must provide emotional support to the family of deceased donors (Kute et al., 2020). The transplant nurse is responsible for living donors' persistent physical symptoms, depression or anxiety, and financial burdens (e.g., lost wages or unreimbursed expenses post-organ donation; Cupples et al., 2017; Dew et al., 2017).

In the post-transplantation period, adjustments to the dosing of immunosuppressants are individualized to the recipient's response to the medications. Transplant nurses should assess signs and symptoms of infection, rejection, and medication toxicity (Wong & Pagalilauan, 2015). Transplant nurses should have knowledge of early diagnostic tests and postoperative infection care (Timsit et al., 2019). When establishing goals during the pre- and post-transplant period, it is essential to consider the health literacy of transplant recipients and their families (Chisholm-Burns et al., 2018).

A few studies demonstrate that transplant nurses practicing individualized care have improved patient outcomes (Dols et al., 2020; Dols et al., 2018; Waterman et al., 2021). Nurse-led interventions tailored to meet the liver transplant population's educational needs (e.g., language barrier and health literacy), aligned with patient goals, activities, and material at a second-grade level with preferred patient language, improved post-liver transplant teaching during discharge preparation and decreased readmission rates by 16.3% (Dols et al., 2020). In Dols et al.'s (2018) study, nurses designed an individualized intervention to increase understanding and adherence to medication regimens and restrictions; this intervention decreased unnecessary hospital readmissions. In Waterman et al.'s (2021) study, patients seeking kidney transplantation received individualized care (e.g., individually tailored education at various intervals) during the pre-transplantation process and showed increased pre-transplant readiness and knowledge compared to kidney transplantation recipients with a standard of care. Therefore, nurses' individualized care provision is crucial for the SOT population.

Assessing nurses' perceptions of individualized care is essential to reinforce nurses' awareness of individualized care components and identify issues regarding individualized care in clinical practice. The identified weak areas will help develop nurses' continuing education and training in individualized care. Also, nurses' competency self-assessment can allow nurses to identify their learning needs (Smith, 2012) and develop nursing education to support optimal

patient care (Istomina et al., 2011). Studies have shown significant positive relationships between general nurse competency and the quality of patient care (Istomina et al., 2011).

The ANA and ITNS (2016) have advocated transplant nurses' competencies with the book *Transplant Nursing: Scope and Standards of Practice*. It provides competencies for direct transplant nurses in the nursing practice, organizational development, and teaching-research dimensions required to provide transplant excellence. In fact, the competencies encourage individualized transplant care. The following examples of competency statements represent the emphasis on individualized care: the collection of comprehensive data in a systematic and ongoing process, identification of actual or potential risks to transplant patient's health and safety, a time estimate for the attainment of expected outcomes, provides for continuity in the plan of care, implements the plan in a timely manner and evaluates the results.

Therefore, the investigation of nurses' perceived transplant nursing competency and individualized care for SOT living donors, recipients, and their families is preliminary and significant to identifying the need for improvement in individualized transplant nursing care and the educational and training needs of transplant nurses to advance the nursing practice and optimal patient outcomes.

Theoretical Framework

Individuality is a fundamental concept of humanity. The value of individuality has evolved and remains an essential concept in society (Suhonen et al., 2019). Personal life goals, beliefs, and societal roles make an individual unique. Nurses must embrace a holistic approach to care to recognize and support individuality fully.

This study primarily follows the individualized care model developed by Suhonen et al. (2000). Individualized care is defined as nurses' actions that take into account the patient's individuality and facilitate the patient's decision-making of nursing care (Suhonen et al., 2000). So, individualized nursing care is the degree to which a nurse personalizes care to meet a

patient's feelings, preferences, and desired level of participation in healthcare (Suhonen et al., 2005).

The individualized care model consists of two dimensions. Dimension A measures nursing activities that support patient individuality, and Dimension B measures nurses' perceptions that the care they provide is individualized. Each dimension embraces three patient domains: Clinical Life Situation, Personal Life Situation, and Decisional Control Over Care. The Clinical Life Situation domain pertains to the individual's biological needs and symptoms. The Personal Life Situation domain constitutes an individual's personality and world views. The Decisional Control Over Care domain relates to preserving an individual's autonomy (Suhonen et al., 2010). Table 1 lists the domains and elements of the individualized care concept (Suhonen et al., 2019).

Table 1

Individualized Nursing Care: Domains and Elements

Domains	Clinical Life Situation	Personal Life Situation	Decisional Control Over Care
Elements	- Physical and psychological care needs, fears, and anxieties - Abilities, capacities, or resources - Health condition - Meaning of illness	- Life situation in general (employment) - Cultural background, traditions - Daily activities, habits, and preferences	- Knowledge about illness and treatment/care - Making choices, having alternatives - Decision-making - Expressing own views, opinions,

Domains	Clinical Life Situation	Personal Life Situation	Decisional Control Over Care
	• Reactions or responses to illness • Feelings, affective states	• Family involvement • Earlier experiences of hospitalization	and wishes, and making proposals.

Transplant nursing care is complex and requires good nurse competency to address various transplants. A nurse must address various transplant characteristics and tailor the needs of living donors, recipients, and their families (Black et al., 2018; Bos et al., 2020; Scheuher, 2016). Novice nurses or unskilled nurses may find it challenging to deliver individualized nursing care that supports patients' lifestyles and promotes their professional growth while providing quality care (Ozdemir, 2019). Individualized care by competent nurses improved recipients' adherence to medications and nursing regimens (Hugon et al., 2014; Papastavrou et al., 2015).

Nursing competency is the core abilities of professionalism, clinical knowledge, practice-based learning, and interpersonal and communication skills (HealthStream, 2022; Meretoja et al., 2002). Nursing competency definitions and measurements vary by specialty, clinical organization, and country. For example, the ANA and ITNS (2016) have set standards of practice and competencies for transplant nursing, entitled *Transplant Nursing: Scope and Standards of Practice*. Six standards of practice for transplant nursing outline transplant nurses' duties to perform competently: 1) Assessment, 2) Diagnosis, 3) Outcome Identification, 4) Planning, 5) Implementation, and 6) Evaluation competencies (see Table 2).

Table 2*Standards of Practice for Transplant Nursing*

Standards	Definition of the standard
Assessment	The transplant nurse collects comprehensive data pertinent to the patient's health status or situation.
Diagnosis	The transplant nurse analyzes assessment data to determine diagnoses, problems, needs, or issues
Outcomes Identification	The transplant nurse identifies expected outcomes for a plan individualized to the patient or the situation.
Planning	The transplant nurse develops a plan that prescribes strategies and alternatives to attain expected outcomes.
Implementation	The transplant nurse implements the identified plan, coordinates care delivery, and employs strategies to promote health and a safe environment.
Evaluation	The transplant nurse evaluates progress toward the attainment of outcomes.

A total of 88 transplant nursing competencies are divided into each of the six standards of practice. This researcher reviewed the list of transplant nursing competencies endorsed by the ANA and ITNS (2016) with a general nursing competency measurement tool, the Nurse Competence Scale (NCS), developed by Meretoja et al. (2004). The NCS characterizes nurse competence with 73 items in seven categories: 1) Helping Role, 2) Teaching-Coaching, 3) Diagnostic Situations, 4) Managing Situations, 5) Therapeutic Interventions, 6) Ensuring Quality, and 7) Work Role. The NCS has often been applied to evaluate nurses' clinical competency in different settings (Faraji et al., 2019; Hamstrom et al., 2012; Strandell-Laine et al., 2018). The

NCS provides an understanding and holistic management of situations recognized as meaningful characteristics of patient-centered care (HealthStream, 2022; Meretoja et al., 2002).

Notably, the transplant nursing competencies were mapped with the 73 items of the NCS and had more transplant nursing-specific competencies. It was determined that the transplant nursing competencies of the six standards of practice are well reflective of individualized care practices and will strengthen the assessment of the transplant nurses' competencies.

Assumptions

Figure 1 presents the theoretical framework of this study, showing the constructs of individualized care provision, transplant nursing competency, and nurse characteristics and their relationships. Based on the literature review, this study assumes that 1) there is a significant relationship between nurses' perceived levels of transplant nursing competency and individualized care provisions, and 2) nurses' perceived levels of transplant nursing competency and individualized care provisions can vary by nurse characteristics.

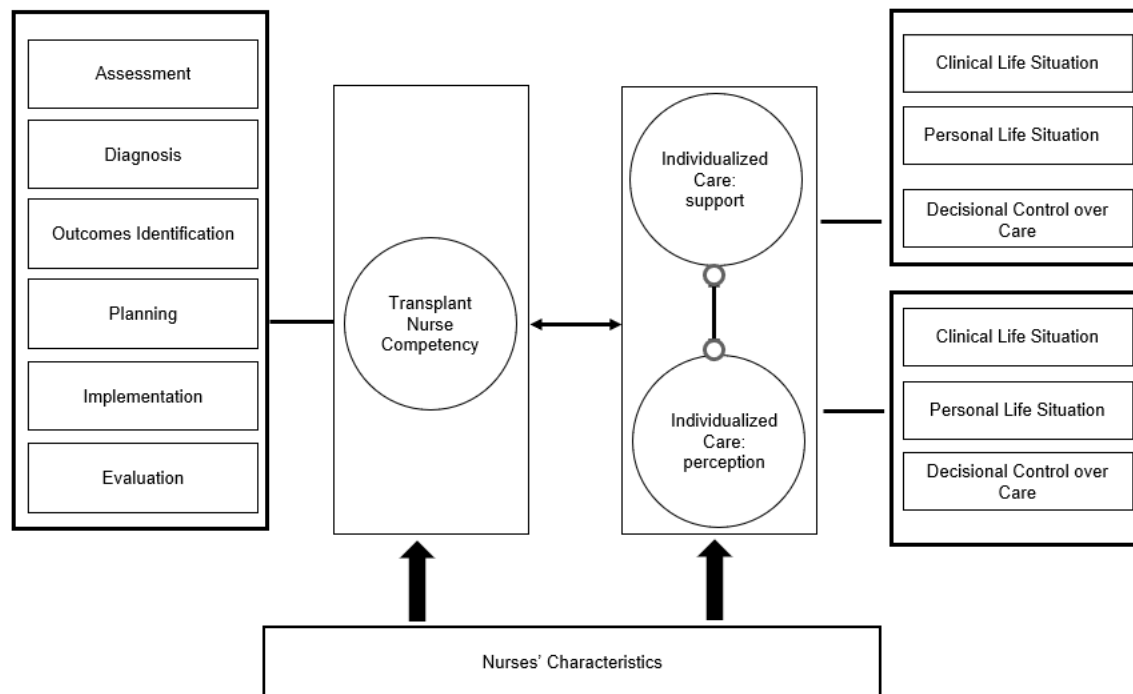
The literature reported that an increase in general nursing competence would be a positive indicator of individualized care. Jeong and Seo (2022) showed nurses' communication competency had a significant positive correlation with individualized care ($r = .74, p < .001$). Katja et al.'s (2022) descriptive correlative survey confirmed general nurse competency as a predictor of patient-centered care, commonly referred to as individualized care ($\beta = 0.01, S.E = 0.002, t = 4.785, p < .001$).

The ANA Standards of Transplant Nursing Practice state, "the depth and breadth in which an individual registered nurse engages in the total scope of nursing practice are dependent upon that individual's education, experience, role and the population being served" (ANA & ITNS, 2016, p. 1). The transplant nurse competencies are objective and measurable statements that transplant nurses are responsible and accountable (ANA & ITNS, 2016). These

statements, transplant nurse competencies, support and direct the nurses' ability to plan and individualize care for solid organ transplant recipients, living donors, and their families.

Figure 1

Theoretical Framework of the Study



Previous studies have reported that nursing competency level varies by nurses' characteristics, although there have been conflicting reports across studies. For example, nurses with longer work experience tended to have significantly higher competency levels (Iacrossi et al., 2020; Karami et al., 2017; Meretoja et al., 2015; Numminen et al., 2013). Nurse competency level was higher in nurses over the age of 40 or having a diploma in nursing ($p < .05$; Iacrossi et al., 2020). However, Faraji et al. (2019) found no statistically significant difference in clinical competence by demographic variables among Iranian nurses working in an intensive care unit (ICU).

The level of nursing education, years of experience, and professional development are significant in evaluating nurse competence and the quality of nursing care (Istomina et al., 2011). For example, the nurses averaged 17 years of work, and those with higher education or who completed additional educational courses to develop their professional development had a higher level of competence (Istomina et al., 2011). In Katja et al.'s (2022) study that used the NCS, nurses' education level was positively correlated with general nurse competence ($p < .007$). Furthermore, the categories of teaching-coaching, managing situations, and therapeutic interventions had a positive association with education ($p < .040$; $p < .046$; $p < .043$, respectively). Age had a positive association with managing situations ($p < .028$), therapeutic interventions ($p < .043$), ensuring quality ($p < .001$), and work role ($p < .000$). Men and older nurses assessed managing situations higher than women and younger nurses ($p < .030$). Work role was positively associated with longer work experience in health care settings ($p < .014$) and the current unit ($p < .014$).

Also, a few studies reported the relationship between individualized care and nurses' characteristics. Idvall et al. (2012), with orthopedic and trauma nurses from seven different countries, including the United States, found that nurses' education level, work title, length of work experience, and country of practice were statistically significant in their support for individualized care as measured by Individualized Care Scale-Nurse (ICS-Nurse) instrument. For example, nurses with a diploma or a bachelor's in nursing scored higher levels supporting individuality than those with vocational education. Nurses with longer working experience scored a higher level in support of individuality.

In Katja et al.'s (2022) study using the ICS-Nurse instrument, nurses' age was positively associated with their individualized care provisions ($p < .001$). Nurses' support for patients' clinical situations varied by their education level ($p < .019$). Nurses' perceptions of personal life situations were associated with their gender ($p < .043$) and education level ($p < .001$). Nurses with part-time employment assessed the patient's decisional control higher than those in full-

time employment ($p < .013$). Nurses with longer work experience assessed the patients' decisional control lower than those with shorter work experience ($p < .015$).

Suhonen, Papastavrou, et al. (2011) Suhonen et al. (2011) found older nurses with long working experience to have a high mean score of supporting individuality ($p = .008$). Yildiz et al. (2018) found that nurses with 21-30 years of experience had a significantly higher score of individualized care ($p < .05$). Also, the average score of individualized care was higher in female nurses ($M = 3.82$; $SD = 0.70$) than males ($M = 3.51$; $SD = 0.84$), and higher in married nurses ($M = 3.79$; $SD = 0.77$) than single nurses ($M = 3.68$; $SD = 0.68$). As for educational level, postgraduate ($M = 4.29$; $SD = 0.37$), associate degree ($M = 3.80$; $SD = 0.69$), and bachelor's degree nursing ($M = 3.72$; $SD = 0.82$) was higher than vocational educational ($M = 3.58$; $SD = 0.55$; Yildiz et al., 2018).

Given a lack of studies on transplant nursing competency and individualized care, this study aims to find out the extent of the relationship between individualized care provision, transplant nursing competency, and nurse characteristics among nurses who are working for SOT recipients, living donors, and their families.

Definition of Terms

Nursing Competency

- Conceptual Definition: Nursing competency is the formal exhibition of skills, abilities, and aptitude for professional nursing practice (ANA, 2015).
- Operational Definition: In this study, nursing competency refers to the list of competencies from the ANA and ITNS (2016) standards of practice for transplant nursing.
- The list contains 88 items evaluating transplant nursing competency based on the nursing process: assessment, diagnosis, outcomes identification, planning, implementation, and evaluation. (ANA & ITNS, 2016).

Individualized Care

- Conceptual Definition: Individualized care is a person's perception of their health status, experience, and involvement in the care provided (Suhonen et al., 2019).
- Operational Definition: In this study, individualized care refers to perceptions of individualized care and is measured by the ICS-Nurse. The ICS-Nurse instrument evaluates nursing care attuned to the patient's clinical condition, personal life situation, and decisional control over care (Suhonen et al., 2019).

Limitations

A limitation of this study is the use of self-assessment to measure transplant nursing competency and individualized care, which is subjective to participants' responses. Another limitation is that the study only examines the perception of individualized care from the nurses' perspective, not the patients' view. Further studies are needed to compare nurses' and patients' perspectives of individualized care with SOT.

Summary

SOT has evolved and promoted the survival of patients with end-stage organ failure. However, SOT recipients endure a long recovery process and necessitate frequent hospital readmissions due to infections or rejection. SOT recipients also experience neurological, cardiovascular, gastrointestinal, renal complications, and mental health problems, leading to a high risk of morbidity and mortality. These problems and experiences cause SOT recipients to have high healthcare costs, which is a significant challenge for SOT recipients. Living donors also endure unexpected experiences post-operatively and report mental health disorders, including anxiety, depression, and post-traumatic stress disorder. In addition, families of SOT recipients have difficulties during the transplantation process, such as doubts, ambiguity, stress, and dread in their position as caretakers.

An appropriate nursing workforce is needed to provide high-quality transplant nursing care, supporting optimal patient outcomes. Furthermore, pre- and post-transplantation

experiences and healthcare needs of SOT recipients, living donors, and their families vary by age, gender, race, ethnicity, and socioeconomic status, as presented in this chapter. Therefore, the interventions supporting transplantation require individualized care that encompasses organ donation, SOT recipients, living donors, and their families.

Individualized care provisions empower patients' decision-making management of different situations and respect patients' perspectives of good quality care. Individualized care has been endorsed by national organizations such as IOM, NQF, and the American Board for Transplant Certification (ABTC). Transplant nurses should be able to assess and address the needs of SOT recipients, living donors, and their families in a systematic and ongoing process, including but not limited to physical, functional, psychosocial, emotional, cognitive, sexual, cultural, age-related, environmental, and spiritual experiences. Also, to honor the uniqueness of the individual transplant patient and their families, transplant nurses must elicit their values, preferences, expressed needs, and knowledge of their healthcare situation. For strengthening transplant nurses' competencies of individualized care, it is preliminary to assess the extent to their perceived levels of transplant clinical competency and individualized care provision.

Yet, few studies have addressed transplant nursing competency and the delivery of individualized care for SOT recipients, living donors, and their families. This study primarily followed the individualized care model developed by Suhonen et al. (2000). Also, this study assumed that there would be a significant relationship between nurses' perceived levels of transplant nursing competency and individualized care provisions, and nurses' perceived levels of transplant nursing competency and individualized care provisions could vary by nurse characteristics. Assessing nurses' perceptions of individualized care through this study can reinforce nurses' awareness of individualized care components and identify issues regarding individualized care in clinical practice. Also, these findings can facilitate developing educational interventions or training for nurses to support SOT recipients, living donors, and their families in the planning, implementing, and evaluating individualized care provisions.

CHAPTER II

REVIEW OF LITERATURE

The chapter presents a literature review of SOT characteristics and the challenges SOT recipients, donors, and their families face. Also, the chapter reviews the current status of the transplant nursing workforce and transplant nursing care and discusses the need for SOT nursing education and training. In addition, the chapter reviews the concepts of nursing competency and individualized care, including how it is defined and assessed. This chapter highlights gaps in the literature on nurses' experience, perceptions, and competencies for SOT care and individualized care.

Solid Organ Transplantation

From January 1, 1988, to June 30, 2022, 898,856 transplants have been performed in the United States (OPTN, 2022c). In 2022, the number of SOTs was 23,304 as of July 22, representing the average daily number of SOTs as 126. However, the need for SOT surpasses the supply of organs. In 2019, there was a need for 113,000 organ transplants, and only 58% of the American population are registered organ donors (Lewis et al., 2021). Similarly, as of July 22, 2022, the number of available donors was 11,324, and 38,126 patients were on the waitlist (OPTN, 2022b).

Transplantation occurs in a highly charged atmosphere, constantly evolving (Sen et al., 2019). There are two significant classifications of organ donation: living and deceased donation. Kidney and liver donations are from either a living or deceased donor. However, the heart, lung, and pancreas transplantation are from deceased donors only, either donation after brain death or donation after circulatory death (Black et al., 2018). All types of organ donations undergo extensive medical and social evaluation. In addition, a living donor is evaluated for any psychosocial issue or mental health illness that may place the living donor at risk for a poor psychological outcome. Also, informed consent is obtained from the living donor. The records of the deceased donor are de-identified, and the living donor has a right to remain anonymous.

All the SOTs go through a similar seven-step process (United Network for Organ Sharing [UNOS], 2022). First, a patient with end-stage organ failure has an evaluation by a transplant team. The patient begins with a battery of laboratory tests. Then, the patient completes the psychosocial, financial, nutritional, surgical, pulmonary, and vascular evaluation. Also, the patient follows up with additional required consultations. After all the pre-transplant evaluation is complete, a medical review board decides if the patient meets the criteria, then the patient is listed for transplant. Second, the patient registers as a transplant candidate on the national organ transplant waiting list. Third, the transplant candidate begins to coordinate their support system in preparation for the transplant. Fourth, the transplant candidate develops a financial plan to support the transplantation journey. Fifth, the transplant candidate waits for an organ. In the sixth step, the transplant candidate undergoes surgery for organ transplantation. The seventh step is post-transplant care immediately after surgery and at home (UNOS, 2022).

The post-transplantation period is divided into three time periods due to the risk of infection post-transplantation: the early post-transplant period (0 to 30 days post-surgery), the intermediate period (month one to six post-surgery), and late post-transplant period (> 6 months post-surgery). During the early post-transplant period, prophylaxis therapy and antibiotic regimes are added to the immunosuppressant regimen to mitigate the high risk of infections from the donor or opportunistic infections. In the intermediate period, prophylaxis is stopped or weaned off; however, there is a higher risk of developing opportunistic infections. In the late post-transplant period, most recipients have reduced immunosuppression therapies, and the risk of infection shifts to community-acquired infections (Cupples et al., 2017).

To prevent rejection from the new organ, transplant recipients will receive immunosuppressive medications for life. Immunosuppressive medications are classified into calcineurin inhibitors, antiproliferatives, and corticosteroids. However, SOT recipients are still at risk for rejection due to suppressed immune system problems. These problems are infection,

malignancies, and renal insufficiency due to the excretion of calcineurin inhibitors (Black et al., 2018; Bos et al., 2020; Jasiak & Park, 2016; Scheuher, 2016).

Non-adherence to immunosuppressant drug regimens after transplantation remains a leading cause of preventable organ rejection (Shneider et al., 2018). Transplant recipients develop hypertension, dyslipidemia, coronary artery disease, diabetes, gastrointestinal complications, renal failure, and neurological difficulties (Sen et al., 2019). Hypertension occurs in about 90% of SOT recipients (Nassar et al., 2022), and dyslipidemia occurs in 60% of SOT recipients (Sen et al., 2019). Coronary artery disease accounts for 11.4% of deaths within 30 days post-transplantation (Sen et al., 2019). The incidence of new-onset diabetes is 70%, renal failure in 10%, and gastrointestinal complications in 40% of SOT recipients (Sen et al., 2019). Neurological complications, such as stroke, range from 10% to 20%; heart transplant recipients have the highest stroke incidence (Li et al., 2016; Sen et al., 2019; Simanovski & Ralph, 2020). The complications attributed to end-stage organ disease processes and exacerbated by immunosuppressive therapies predispose patients to risks of infection or rejection (Sen et al., 2019).

Hospital readmissions are common in SOT recipients. The readmission rate after kidney transplantation stands at 36%, with 12% being attributed to infection and 11% to endocrine disorders (Simanovski & Ralph, 2020). Among patients with liver transplants, 19.5% are readmitted for infection, 9.3% for renal failure, and 8.5% for gastrointestinal disorders (Li et al., 2016). The readmission rates for lung transplant recipients are as follows: 19-25% for infection, 34% for respiratory adverse events related to the structure of the lungs, 20-26% for pleural space adverse events, 3-15% for gastrointestinal disorders, < 10% for organ rejection, 11% for renal dysfunction, 6-18% for cardiac adverse effects, and 3% for thromboembolic events (Li et al., 2016; Simanovski & Ralph, 2020). Eighteen percent of heart transplant recipients are readmitted due to rejection, followed by post-procedure complications (14%), arrhythmias (7.3%), and kidney dysfunction (7%; Darmoch et al., 2019).

Readmission within 30 days after discharge is associated with higher patient mortality and morbidity (Dols et al., 2018; Li et al., 2016). The mortality rate for SOT recipients ranges from 13 to 30%; higher mortality rates are among SOT recipients with older age, diabetes mellitus, obesity, frailty, chronic heart problems, kidney dysfunction, and lung disease (Azzi et al., 2021).

Survival rates vary by organ. Survival rates after kidney-pancreas transplantation were highest, with 1-year, 3-year, and 5-year survival rates of 96%, 89%, and 81%, respectively. The corresponding survival rates after heart-lung transplantation were the lowest, at 80%, 58%, and 49% (Bentley & Ortner, 2020).

Experiences and Challenges of SOT Recipients, Living Donors, and Their Families

Needing IC

All types of organ donations undergo extensive medical and psychosocial evaluation. For living donors, the recovery process can have unexpected consequences (Cupples et al., 2017; Li et al., 2017). Liver and kidney-living donors have reported surgical complications (38.3%; Li et al., 2017). Living liver donors experience more surgical risks than living kidney donors (LaPointe Rudow & Warburton, 2016). The living liver donors had 35.9% postoperative complications, ranging from biliary (10.7%), abdominal (12.6%), cardiopulmonary (6.8%), and hepatic complications (10.7%). At 1 year postoperatively, 28.8% continued to have biliary, abdominal, cardiopulmonary, and hepatic complications (Benzing et al., 2018).

Living kidney and liver donors have also reported experiencing unexpected pain postoperatively (29.8%; Li et al., 2017). Also, 21% of the living kidney donors reported abdominal and back pain and fatigue lasting up to 2 years post-donation (Butt et al., 2018). Benzing et al. (2018) found that living liver donors' quality of life immediately postoperative and at 1-year post-transplantation scored good or better than the general population ($p < .001$). However, donors who developed postoperative complications scored statistically significantly lower ($p < .05$). The physical quality of life improved after 12 months of kidney donation. Still, it did not return to pre-

donation levels (Butt et al., 2018). Living donors' ongoing fatigue, pain, and decreased physical quality of life require additional time off work (Butt et al., 2018; Li et al., 2017).

In addition, a living donor is evaluated for any psychosocial issue or mental health illness that may place the living donor at risk for a poor psychological outcome. A systematic review found that the prevalence of mental health disorders in kidney and liver donors ranged from 12.5% to 26% (Thys et al., 2015). Living donors experience anxiety, depression, and posttraumatic stress disorder (LaPointe Rudow & Warburton, 2016). Living kidney donors encounter hurdles in justifying donation with family and friends (Raza et al., 2020).

The age of recipients receiving SOTs varies from less than 1 year to over 65 years; 40.4% of transplant recipients are aged 50-64 (OPTN, 2022a). Age is an independent risk factor for postoperative morbidity and mortality (Hemmersbach-Miller et al., 2019; Neri et al., 2017). Older age transplant recipients are subject to infectious complications and frailty, a significant disability.

McAdams-DeMarco et al. (2017) and McAdams-Demarco et al. (2018) found frailty in 18-20 % of kidney transplant recipients. In liver transplant recipients, frailty was prevalent in 17-35% of patients with cirrhosis post-transplant (Tandon et al., 2016; Lai et al., 2014) and among 68% of hospitalized liver recipients (Lai et al., 2014; Tandon et al., 2017). Frailty leads to a decline in physical, psychosocial, emotional, social, and cognitive function (Kobashigawa et al., 2019; National Academies of Sciences, 2021). Also, frailty can create a feeling of impending death, and assessing their spiritual experience is crucial (Exterkate et al., 2016; Kobashigawa et al., 2019). Liver transplant candidates who are frail tend to have high death rates during the pre-transplantation period (Lai et al., 2014; Tandon et al., 2016). Due to the frequency of frailty, treatments supporting post-discharge and palliative management must be adopted (Lai et al., 2014; Tandon et al., 2017; Tandon et al., 2016). According to Wilson et al. (2016), 102 lung transplant patients who were fragile had a decreased post-transplant survival rate of 45%. The prevalence of frailty in pre-transplant heart failure patients ranges from 25-78%, and 52% do not

survive post-heart transplantation (Joseph et al., 2017; Teigen et al., 2017). Jha et al. (2016) found that 33% of patients waiting for a heart transplant are frail; their survival rate at 1 year post-heart transplantation was 52%.

Female recipients of SOTs have a higher risk of acute rejection than males (Aufhauser et al., 2016; Walters et al., 2020; Yoneda et al., 2017). Ethnicity can also be a prognosticator of post-transplantation survival rates (Dave et al., 2018; LeClaire et al., 2021). African American and Hispanic/Latino patients have lower survival rates than Caucasian and Asian patients. Although studies suggest immunological mechanisms contribute to a higher risk of acute and chronic rejection, the expense of transplant care, socioeconomic status, and access to healthcare are the major contributing factors to worsening post-transplant outcomes in African Americans and Hispanic/Latino patients (Morris et al., 2016). Cultural beliefs may influence care post-transplantation, such as receiving a blood transfusion or willingness to donate organs (Chisholm-Burns et al., 2018). For example, American Indians/Alaska Natives have low rates of organ donation (0.3%) and transplantation (1%; Jernigan et al., 2013). Their cultural beliefs about burial conflicted with the organ donation process. Also, they reported mistrust of the healthcare system, which was a barrier to transplantation (Jernigan et al., 2013).

Health literacy levels in SOT affect patients' decision-making, comprehension of health information, and medication adherence (Chisholm-Burns et al., 2018). It has been found that 9% to 72% of transplant recipients had low health literacy (Chisholm-Burns et al., 2018; Doerry et al., 2022; Taylor et al., 2016). Low health literacy is associated with inappropriate healthcare utilization, such as low use of preventative healthcare and the inability to manage medication, consequently causing long-term health conditions, an increase in hospitalization, and emergency department visits (Chisholm-Burns et al., 2018; Dols et al., 2018; Taylor et al., 2016). Liver transplant recipients who had an increase in health literacy resulted in a 13% to 15% reduction in post-transplant hospital readmission; the strategies to increase health literacy

were simplified patient instructions, improved medication labels, increased counseling, and frequent monitoring with feedback from high-risk patients (Serper et al., 2015).

Tang et al. (2021) found challenges in medicine-taking among transplant recipients from a systematic review of 119 qualitative studies. The barriers to medicine taking were impaired self-image, unprepared side effects, isolated in the decision-making, and loss of financial independence. SOT recipients must acquire knowledge of medications, establish routines, counteract side effects, and prepare for unexpected consequences to preserve function while adapting to a new normal post-transplant (Tang et al., 2021).

Families/caregivers of SOT recipients experience uncertainties, ambiguity, stress, and fear in their role as caregivers and challenges during the transplantation process (Cupples et al., 2017; Glaze et al., 2021). The caregivers reported a lack of basic knowledge about lung transplantation, and they were concerned about an increasing role as caregivers post-transplantation, requiring support from family or support groups (Glaze et al., 2021). The caregivers' role post-transplantation necessitates a change in their personal priorities (such as physical health), lifestyle, socialization with friends, and financial status. These changes lead to anxiety, depression, and frustration (Glaze et al., 2021).

Ladin et al. (2018) revealed through a systematic review and meta-analysis of 32 studies that liver transplant recipients with social support showed a higher medication adherence ($OR = 1.34$, 95% CI [1.01, 1.77]). Dew et al. (2008) reported a significant positive correlation between perceived family caregiver support and medication adherence ($r = 0.92$). Also, lung and heart transplant recipients who reported having social support had a statistically significantly higher post-transplant outcome ($OR = 1.30$, 95% CI [1.02, 1.66]; Dew et al., 2008).

SOT recipients also face unmanageable healthcare costs (Robiner et al., 2022; Tucker et al., 2019). The average bills charged by transplants range from \$408,800 (total pancreas transplantation) to \$1,664,800 (total heart transplantation; Bentley & Ortner, 2020). This cost includes 30 days pre-transplantation, procurement, transplantation, medical care during

hospitalization, 180 days post-transplantation, outpatient immunosuppressants, and other required medications. However, costs may vary by various factors, such as type of transplants, insurance coverage, transplant centers, and underlying diagnosis or disease status (Bentley & Ortnier, 2020). For multiple organ transplants, the total amount doubles. To reduce their financial burdens, financial coordinators and transplant nurses should provide information on cost-effective resources, including medication regimes, durable medical equipment, nutritional supplements, and housing throughout the phases of transplantation (Cupples et al., 2017).

Transplant nurses should be able to assess and address the needs of SOT, recipients, living donors, and their families in a systematic and ongoing process, including but not limited to physical, functional, psychosocial, emotional, cognitive, sexual, cultural, age-related, environmental, and spiritual experiences (ANA & ITNS, 2016). Also, to honor the uniqueness of the individual transplant patient and their families, transplant nurses must elicit their values, preferences, expressed needs, and knowledge of their healthcare situation (ANA & ITNS, 2016).

Transplant Nursing Workforce

Transplant nurses should hold a baccalaureate degree, have a minimum of two years of nursing experience, and within 1-2 years of employment at a transplant center, and obtain their national certified clinical transplant nurse (CCTN) certification (Coleman et al., 2015; Lerret et al., 2021). The CCTN certification is valid for three years, and recertification requires the nurse to retake the exam or submit 60 continuing education credits (ABTC, 2022). Continuing education must focus on the methodology and technology changes that make the transplant nurse keep up with the new developments in transplantation (ABTC, 2022). The approved continuing education credits can be obtained through academic credit courses, teaching and consulting activities, professional publications, paper presentations, poster sessions, quality assurance, leadership activities, or professional development programs that address health care (ABTC, 2022). North American Transplant Coordinators Organization (NATCO), UNOS, and the

ITNS organizations are the most common providers of the CCTN educational credits. These organizations follow the competencies established by the ANA and ITNS (2016).

Approximately 1,100 transplant coordinators are certified in the United States; however, the exact number of transplant nurses is not easily available (Coleman et al., 2015).

There are 252 active transplant centers in the United States (OPTN, 2022c). A consensus model of the required staffing is one transplant nurse for every ten pre-transplant patients and one for every 90 post-transplant recipients (Coleman et al., 2015). Many nurses working in transplant care do not hold transplant certifications. Furthermore, advanced practice nurses cannot be certified by the certifying body of transplantation (Coleman et al., 2015).

There has been few studies specific to transplantation nursing education. A study (Hoy et al., 2011) examined the effect of a 5-week online transplantation elective on graduate nursing students' attitudes toward organ donation and plans to work with transplant patients. To measure these outcomes, the researchers used an 18-item transplant-registered nurse (TXP-RN) questionnaire that they developed. The course included the basic history of transplantation, organ donation, immunosuppression, clinical care of transplant patients, and future trends in transplantation. Compared to pre-education tests, the education was effective in improving nurses' attitudes toward encouraging others to become organ donors ($p = .04$), preparation to discuss transplantation with others ($p < .001$), advocacy to discuss transplantation among colleagues ($p = .003$), confidence in working with transplant patients ($p = .005$), confidence in speaking to communities about organ donation ($p = .001$) and plans to encourage others to get involved in transplantation ($p = .03$). These authors concluded the need for providing focused education on transplantation issues to registered nurses, particularly in the academic setting. Hussein and Zatoon (2019) evaluated nurses' knowledge and practices when caring for post-kidney transplant recipients using an assessment checklist. The educational interventions were implemented using four phases: assessment, planning, implementation, and evaluation. These educational interventions had a positive influence on the development of critical care nursing

performance. The study recommended that training programs for kidney transplantation should be developed and continued (Hussein & Zatoon, 2019).

Transplant Nursing Care

The ANA and ITNS (2016) define transplant nursing as the following:

the delivery of specialized nursing care focused on protecting, promoting, and optimizing the health and abilities of the transplant recipient and living donors across the life span.

Patient care includes prevention, detection, and treatment of illness and injury related to diseases treated by solid organ transplantation and to diseases that may result from living donation. (p 7)

These two organizations convened and published the 2nd edition of *Transplant Nursing: Scope and Standards of Practice* in 2016 to comprehensively delineate the competent level of practice and professional performance common to and expected from transplant RNs in all practice levels and settings (ANA, 2022). This book contains detailed characteristics of transplant nursing, educational requirements, globalization, palliative care, ethics, informed decisions, advanced practice transplant nursing, specialty certification, and future considerations for the transplant nurse (ANA & ITNS, 2016).

There are 16 standards to offer a framework for evaluating transplant nursing practice outcomes and goals (ANA & ITNS, 2016). Six standards of practice for transplant nursing outline transplant nurses' duties to perform competently: 1) Assessment, 2) Diagnosis, 3) Outcomes Identification, 4) Planning, 5) Implementing, and 6) Evaluation (ANA & ITNS, 2016). Additionally, there are 10 standards of professional performance for the transplant nurse: 7) Ethics, 8) Education, 9) Evidence-Based Practice and Research, 10) Quality of Practice, 11) Communication, 12) Leadership, 13) Collaboration, 14) Professional Practice Evaluation, 15) Resource Utilization, and 16) Environment Health (ANA & ITNS, 2016). A set of specific competencies accompanying each standard indicates minimal compliance with that standard (ANA & ITNS, 2016).

Good competencies among nurses caring for SOT recipients support a path of transplant excellence with improved patient outcomes (Cupples et al., 2017). With continued education and successful clinical practice, a transplant nurse's competency level increases, thereby adhering to the standards of a professionally performed transplant nurse (ANA & ITNS, 2016).

The transplant nurse should be able to assess various physical and psychosocial healthcare needs of transplant recipients and their families throughout pre- and post-transplantation. The transplant nurse is required to effectively manage SOT recipients' complex pre- and post-transplantation complications (Coleman et al., 2015; Lerret et al., 2021). The transplant nurse coordinates patient care by collaborating with the transplant team, including physicians, surgeons, financial specialists, social workers, dietitians, other healthcare providers, patient caregivers, and their support system (ANA & ITNS, 2016; Cupples et al., 2017).

SOT recipients, living donors, and their families should keep a specific awareness of the illness encountered daily. Divdar et al. (2019) identified the high psychosocial needs of the recipient and their families, such as assurance, comfort, information, proximity, and support. Maldonado's (2019) literature review concluded that a higher pre-transplant psychosocial risk led to a higher risk of infection, rejection, non-adherence to medications, hospital readmission, graft failure, and decreased transplant survival. When deciding on educational and research priorities, it is crucial to take into account their experiences and skills. A report by the Canadian Donation and Transplant Community found psychosocial issues (67.6%), post-transplant (53.7%), biological research (53.6%), and healthcare organization (51.5%), and pre-transplant (51.1%) as educational and research priorities for SOT recipients and their families (Ballesteros Gallego et al., 2018).

Individualized care for transplant recipients is essential because SOT trajectory can vary by the recipient's characteristics (e.g., age, gender, psychosocial issues), organs, biomarkers, treatments, and medication regimes (Nobakht et al., 2021; Yang et al., 2020). Studies are

reporting the effects of individualized care for SOT recipients. A randomized controlled trial by Waterman et al. (2021) found that among patients seeking kidney transplants, the group that received individualized care interventions during the pre-transplantation process increased pre-transplant readiness and knowledge; the intervention consisted of individualized telephone coaching, feedback reports, access to community resources, and a video with printed educational resources (Waterman et al., 2021). Dols et al. (2020) explored the effect of nurse-led education on the 30-day readmission of liver transplant patients. The nurse-led education maintained the standard education and added twice-day mutual patient-focused goals with individualized patient and caregiver education (e.g., medication list, home care prevention, and signs and symptoms of infection and rejection). After 1 year of implementing the nurse-led individualized education, the hospital readmission rates of liver recipients decreased by 16% (Dols et al., 2020).

Nevertheless, there are still minimal studies on nurses' perceptions of individualized care provision, knowledge, and skills in transplant care. Fernandez-Alonso et al. (2020) described the experiences of RNs and transplant coordinators through a qualitative phenomenological descriptive design. They identified that novice nurses looked for additional education and training to work as transplant coordinators, and transplant coordinators also needed further education and training.

Given limited studies about transplant-specific nursing competency and transplant nurses' individualized care, assessing the transplant nursing competency and individualized care perception and provision in transplant nurses is imperative and fundamental to improving the quality of transplant nursing care.

Nursing Competency Assessments

Competency is the ability to perform tasks with desirable outcomes (Benner, 1982) and the practical application of knowledge and skills (Meretoja et al., 2004). Fukada (2018) defines

competency as a two-fold concept: the potential ability to work under certain circumstances effectively and the motivation to demonstrate one's usefulness of those abilities.

Professional competence in nursing is defined as the nurse's capability to integrate knowledge, skills, attitudes, and values to effectively handle various nursing situations (Benner, 1994; Meretoja et al., 2004; Numminen et al., 2013). Nursing competency is a complex integration of attributes, such as knowledge, professional judgment, skills, values, attitudes, experience, critical thinking, proficient skills, and professionalism (Benner, 1982; Bindon, 2017; Fukada, 2018; Smith, 2012). Fukada (2018) emphasized nursing competency in three components, namely: 1) the ability to understand people and situations, 2) the ability to provide people-centered care, and 3) the ability to improve nursing quality.

Assessing nursing competency can serve as a facilitator to fulfilling nursing responsibilities. Levine and Johnson (2014) noted that nursing competency could reflect performance, behaviors, safety, integration, and application of knowledge with skills, measurable actions, desirable outcomes, and quality patient care. Competency assessments help verify if a nurse's knowledge is translated to appropriate action, thus validating their competency and truly reflecting nursing performance (Clifford, 2020). Nurses' competency self-assessment positively influences the educational development of nursing education to support optimal patient care (Istomina et al., 2011). For example, Hamstrom et al. (2012) assessed and found a lower level of nurses' competency in recognizing the family's and others' mental and educational needs. They used the competency assessment results to emphasize the value of training nurses to promote patient-centered care, ensuring patients' well-being and safety.

Nursing competency varies by the scope of nursing practice, clinical care setting, nursing specialty, and definition of nursing competency. There are various nursing competency assessment instruments. Among these available instruments, the Nurse Competence Scale (NCS) is a widely used instrument for assessing the level of nursing competencies across different settings. The NCS, originally developed by Meretoja et al. (2004), is a 73-item

instrument that contains seven competence categories: Help Role, Teaching-Coaching, Diagnostic Functions, Managing Situations, Therapeutic Interventions, Ensuring Quality, and Work Role. The NCS measures nurse competence using a visual analog scale (VAS) and determines nurse competence levels into four categories: VAS 0-25 points are considered a low level of nurse competence, VAS 25-50 points as a rather good level, VAS 50-75 points as good level, and VAS 75-100 points as very good level (Meretoja et al., 2004).

The NCS has been used to assess nursing competency in nurses working in an ambulatory surgery setting in Finland (Hamstrom et al., 2012), surgical wards in a hospital in Lithuania (Istomina et al., 2011), a major hospital in Finland (Meretoja & Leino-Kilpi, 2003), five university hospitals in Finland (Numminen et al., 2013), a tertiary hospital in the east of the USA (O'Leary, 2012), and among three generational nurse cohorts (Meretoja et al., 2015). Flinkman et al. (2017) found 30 articles using NCS published between 2004 to 2015. This systematic review discovered that length of work experience, age, higher education, permanent employment, and participation in educational programs correlated positively with competence; variables including empowerment, commitment, practice environment, quality of care, and critical thinking were also associated with higher competence.

Other studies have also shown that the level of nurse competence is positively associated with the frequency of clinical practice ($r = .27 - .73, p < .05$; Numminen et al., 2013; O'Leary, 2012). Also, nurse competence level is positively associated with the age of the nurse ($r = .27, p < .01$; O'Leary, 2012), length of work experience in healthcare ($r = .22, p = .000$), and length of work experience in current work unit ($r = .22, p = .000$; Meretoja et al., 2015). Istomina et al. (2011) found the level of nurse competence was associated with the quality of nursing care ($r = .863, p < .01$).

Regarding specific instruments regarding transplant nurse competency, there are few instruments. A literature review on transplant education for nurses found no instrument measuring effectiveness in transplantation nursing education (Hoy et al., 2011). A study

developed an 18-item TXP-RN questionnaire to measure registered nurses' attitudes, confidence, advocacy, and commitment to organ transplantation (Hoy et al., 2011). Later, Hoy et al. (2017) modified it as a 22-item TXP-RN instrument and examined its content, construct validity, and internal reliability. The questions were divided into four subscales: 1) desire to work in transplantation, 2) confidence in transplantation advocacy, 3) organ donation advocacy, and 4) procurement. The TXP-RN instrument had good validity and reliability with overall Cronbach alpha = .94 and subscales ranging from .649 to .925. Meyer et al. (2012) developed a 22-item tool to measure professional competence in organ donation. The questions were scored using a 5-Likert-type scale that ranged from 1 to 5, with a neutral/undecided point at 3; there is no report of reliability and validity.

These instruments noted above were designed to assess competency; however, the NCS and TXP-RN instruments do not assess transplant-specific competencies. Given the limited available transplant nurse competency assessment tools, it is considered that using standards of transplant nursing competencies is worthy of evaluating the nurse competency of transplant nurses because it is inclusive and measures the competence of practicing transplant nurses. Thus, the researcher reviewed the ANA and ITNS (2016) scope and standards of practice for transplant nursing and the NCS items by a mapping process. All NCS items were found in the standards of practice for transplant nursing. The assessment of transplant nurses' competency level will strengthen with the standards of transplant nursing competencies.

Individualized Care Assessments

The terms *individualized*, *personalized*, and *tailored nursing care* have been used synonymously in the literature. Since the 1960s, individualized care has been considered an essential aspect of nursing care (Suhonen et al., 2019). A fundamental principle of individualized care is to recognize the uniqueness of an individual and the importance of meeting the individual's needs (Suhonen et al., 2010). Idvall et al. (2012) believed an aspect of quality nursing care is the practice of individualized care, which involves considering a patient's

characteristics, clinical conditions, personal life situations, and decision-making preferences when delivering nursing care. Suhonen et al. (2019) recognized that the practice of individualized care is to help a person understand healthcare services, receive quality healthcare, address ethical obligations, and develop healthcare policies. However, nurses do not always recognize the individual preferences, personal life situation, and history of the patient, which might be due to the recognition of emergent physiological needs in patients (Suhonen et al., 2012). Assessing nurses' perceptions of individualized care is essential for enabling nurses to understand the individualized care concept and utilize knowledge and skills to provide individualized interventions and deliver high-quality nursing care.

The Individualized Care Scale (ICS)-Nurse A & B, developed by Suhonen et al. (2010), is the most commonly used instrument to measure nurses' perception of the delivery of individualized care. This instrument defines individualized care as the care that considers an individual's needs, desires, experiences, preferences, behaviors, feelings, perceptions, and understanding. The NCS-Nurse A & B assesses nurses' views on individualized care in two dimensions: Dimension A assesses how nurses support patient individuality through nursing activities; Dimension B explores how nurses perceive the care provided as individualized (Suhonen et al., 2007). The instrument uses a 34-item questionnaire with 17 questions for each dimension, measuring individualized care using three domains for both dimensions (ICS-Nurse A & B): clinical life situation, personal life situation, and decisional control over care. This instrument uses a 5-point Likert-type scale to measure individualized care: 1 = strongly disagree, 2 = disagree to some extent, 3 = neither agree nor disagree, 4 = agree to some extent, and 5 = strongly agree. All the items are positively worded, and a higher score represents higher perceptions of individualized care. The maximum total score is 170, and the minimum total score is 34 (Suhonen et al., 2010).

The ICS-Nurse A & B has been used across clinical settings and countries through the translation validation process. Charalambous et al. (2012) examined the concept of

individualized care among nurses in four primary care settings. Idvall et al. (2012) assessed the individualized care provisions from orthopedic and trauma nurses from Cyprus, Finland, Greece, Portugal, Sweden, Turkey, and the United States. They found that nurses' sociodemographic variables were associated with their views of patient individuality and the delivery of individualized care. For example, the ICS-Nurse A scores were significantly associated with the level of nurses' education ($F(df) = 3.23, p = .022$), work title ($F(df) = 5.61, p = .004$), length of work experience ($F(df) = 4.92, p = 0.27$), and country ($F(df) = 5.48; p < .001$). The ICS-Nurse B scores were significantly associated with work title ($F(df) = 4.75, p = .009$) and country ($F(df) = 8.00; p < .001$).

In Suhonen et al.'s (2012) study with nurses working long-term care units using the ICS-Nurse A & B, nurses showed a low score a subscale of the Personal Life Situation (ICS-Nurse A: $M = 3.95, SD = 0.78$; ICS B: $M = 3.7, SD = 0.85$), which means that nurses did not fully support the individuality of older persons relating to their personal situations. They also found nurses' sociodemographic were associated with the perceptions of individualized care in long-term care units. More positive views of supporting patient individuality in care (ICS-Nurse A) appeared in older nurses ($r = .153, p = .027$), who had longer work experience in health care ($r = .274, p = .001$) and worked longer in the current floor ($r = .226, p = .001$). The length of working experience correlated with perceptions of individuality in care ($r = .191, p = .006$; ICS-Nurse B). Gender, education, and job title had no association with nurses' perception of individualized care (Suhonen et al., 2012). Therefore, this study emphasized educators or managers need to provide training and education on delivering individualized care activities to increase nurses' perceptions of patient individuality in long-term care, considering nurses' age, length of working experience, and length of experience in the current ward (Suhonen et al., 2012).

Suhonen et al. (2010) found that nurses' perceptions of individualized care varied by healthcare organizations. In a study by Suhonen & Papastavrou et al. (2011), nurses'

perceptions of individualized care from orthopedic floors varied by five countries: Czech Republic ($M = 4.14$; $SD = 0.53$), Cyprus ($M = 4.09$; $SD = 0.52$), Finland ($M = 3.89$; $SD = 0.48$), Greece ($M = 3.68$; $SD = 0.91$), and Hungary ($M = .33$; $SD = 0.51$). These findings can facilitate an understanding of nursing interventions globally and support the development of nursing interventions to provide individualized care for patients effectively.

Suhonen, Stolt et al. (2011) explored nurses' perceptions of individualized caring for older people using the ICS-Nurse A & B instrument. Overall, nurses supported patient individuality in the nursing activities (ICS-A $M = 4.19$, $SD = 0.56$) and perception of individuality in the care provided (ICS- B $M = 4.46$; $SD = 0.54$). However, nurses showed lower levels in the ICS A & B subscale of perception of decisional controls (ICS-Nurse A $M = 3.88$, $SD = 0.73$; ICS-Nurse B $M = 3.99$, $SD = 0.71$) and personal life situations (ICS-Nurse A $M = 3.38$, $SD = 0.94$; ICS-Nurse B $M = 3.63$, $SD = 0.87$). This low score supports the development of nursing interventions to support the delivery of individualized care.

These studies have provided a basis for continuing research on individualized care, examination of care processes, the nurses' characteristics, and organizational factors affecting the nurses' perception of individualized nursing care. However, little research has been done on transplant nurses' individualized care for SOT recipients, living donors, and their families, and there have been few studies originating in the United States. Individualized care practices are especially needed for transplant patients and their families because transplantation is complex and has many complications (Cupples et al., 2017). Assessing nurses' perceptions of individualized nursing care is essential to promote robust, individualized nursing care.

Summary

Although SOT has increased the life expectancy of people with end-organ dysfunction, SOT recipients, living donors, and their families have various experiences post-transplantation. SOT recipients experience infectious complications, rejection, frailty, and disability, leading to readmissions and high healthcare costs. For living donors, the recovery process can have

unexpected consequences such as postoperative complications, pain, fatigue, psychological distress, and decreased quality of life. SOT recipients, living donors, and their families have expressed care burden and limited knowledge of care management. The post-transplantation experiences and healthcare needs of SOT recipients, living donors, and their families vary by age, gender, race, ethnicity, socioeconomic status, culture, health literacy level, etc. To comprehensively address the needs of SOT recipients, living donors, and their families, nurses should be able to conduct a systematic and ongoing process that covers a range of their needs, such as physical, functional, psychosocial, emotional, cognitive, sexual, cultural, age-related, environmental, and spiritual experiences. This approach honors the uniqueness of the individual transplant recipient, living donor, and their families and elicits the values, preferences, expressed needs, and knowledge surrounding their healthcare situation.

There are 252 active transplant centers in the United States. Many nurses working in transplant care do not hold transplant certifications. Furthermore, advanced practice nurses cannot be certified by the certifying body of transplantation. There are limited studies that explored transplant nursing education; the literature concluded the need for training programs specific to transplant nursing.

The ANA and ITNS's standards of practice for transplant nursing and standards of professional performance provide six standards of practice and ten standards of professional performance with core competencies for each standard. Therefore, transplant nurses who adhere to the standards of practices outlined by the ANA and ITNS will follow a path supporting transplant excellence and meet the individual needs of all SOT recipients, living donors, and their families.

However, there has been a lack of studies on transplant-specific nursing competency and transplant nurses' provisions on individualized care. Assessing nursing competency with specific transplant nurse competencies and individualized care is essential to providing nursing excellence and delivering optimal patient outcomes. Furthermore, the measure of nurse

competency using the standards of practice for transplant nursing competencies will strengthen the competency assessment of transplant nurses. Also, the measurement of individualized care can allow transplant nurses to understand a patient's clinical situation, personal life situation, and decision-making control. The research study of nurses' perceptions of competencies and individualized care for solid organ transplant care is beneficial to ensuring that this life-saving treatment improves a person's quality of life. These findings can support the development of education and training for nurses caring for SOT recipients, living donors, and their families.

CHAPTER III

PROCEDURES FOR COLLECTION AND TREATMENT OF DATA

This chapter presents the study's methodology, setting, population, and sample. Also, it addresses the protection of human subjects, instruments, and the treatment of data.

Study Design

The study used a cross-sectional, descriptive correlation design to describe nurses' perceptions of transplant nursing competency and individualized care for SOT recipients, living donors, and their families. It examined the relationship between nurses' perceived transplant nursing competency and individualized care levels. A cross-sectional design is a study design that collects data across a sample population at one point in time (Polit & Beck, 2021). A descriptive correlation study is a non-experimental type of quantitative research to investigate the relationship among variables, including the direction and the strength of a relationship between variables (Polit & Beck, 2021). A cross-sectional, descriptive correlational study design was suitable for this study to address the following specific research questions:

1. What are nurses' perceived transplant nursing competency levels for SOT recipients, living donors, and their families?
2. What are nurses' perceived individualized care levels for SOT recipients, living donors, and their families?
3. What is the relationship between nurses' perceived transplant nursing competency level and individualized care level for SOT recipients, living donors, and their families?
4. To what extent are nurse characteristics associated with their perceived transplant nursing competency level and individualized care level for SOT recipients, living donors, and their families?

Setting

The study was conducted using Qualtrics, an online survey. So, there was no specifically designated place for the study. Participants completed the online survey at any convenient time and place. The ITNS, the first professional nursing organization that focuses on transplant nurses' professional growth and development worldwide (ITNS, 2022), was the organization used to recruit participants for this study.

Population and Sample

A convenience sample of nurses was recruited through the ITNS organization, nurses working in transplant centers, ITNS Twitter, ITNS central, ITNS LinkedIn, and ITNS Facebook. The convenience sample was a non-probability sampling method that allowed the researcher to recruit study participants from the population who are conveniently available for the study (Polit & Beck, 2021). To be eligible for this study, participants must have met the following inclusion criteria: (1) being over 18 years old, (2) holding a license as a registered nurse (RN) or APRN with a minimum of 6 months experience, and (3) currently caring for SOT recipients, living donors, and their families in the United States. Exclusion criteria included (1) RNs and APRNs not caring for SOT recipients and living donors or (2) employed in a leadership role overseeing other nurses (e.g., nurse administrators).

A priori power analysis using G*Power 3.1.9.7 estimated the minimum sample size required to find statistical significance using multiple regression analysis. In nursing competency-related studies, the common effect size ranged from small (Cohen's $f^2 = 0.02$) to medium (Cohen's $f^2 = 0.15$; Bathish et al., 2018; Melnyk et al., 2020; Obeidat et al., 2018). Therefore, with $f^2 = 0.15$, $\alpha = .05$, power = 0.8, and medium effect size (0.15), the minimum sample size required for this study was 114. Considering a common rate (10%) of missing data that may affect data analysis and study results (Marino et al., 2021), the study targeted 125 participants to account for the possibility of missing data.

Protection of Human Subjects

This dissertation study was approved by the Texas Woman's University Institutional Review Board (IRB). The researcher's pilot study related to this dissertation study was also approved earlier. Thus, this study went through the IRB amendment process. All participants received a research information statement that fully disclosed details of the study and confirmed that the study participation was voluntary. In addition, the participants were asked to provide consent on the front page of the survey before proceeding with the questionnaire responses. Participants were able to complete the study at any convenient time or place. All data was completed anonymously through a Qualtrics based survey and stored securely on its server. The research data collected was aggregated and analyzed in groups.

Confidentiality

All identifiable information collected remained confidential and protected to the full extent allowed by law. There was a potential risk of loss of confidentiality in all email, downloading, electronic meetings, and internet transactions. The researcher ensured the security of all the data collected for this study by saving the data in the researcher's password-protected database until the study's findings are published. The study's results are being reported at a professional conference, with the assurance that no identifying information of the participants, including their names, will be disclosed.

Anonymity

There was minimal risk of a loss of anonymity related to using an electronic survey. The information provided for the study was not linked to the participant. Participants were eligible to receive compensation upon completing the survey and were required to provide their email address. The participant's email address was not attached to any of the survey data provided. All survey data was labeled and identified with a unique participant number.

Coercion

There was minimal risk of coercion as nurses in the ITNS and transplant care centers may have felt pressured to participate in the study. Therefore, the study flyer emphasized that the study participation is completely voluntary, and participants can withdraw from the study at any time. Also, the consent form clearly stated that there were no consequences or penalties for nurses who chose not to participate or to withdraw from the study.

Compensation

After completing the survey, participants who agreed to receive compensation for the study submitted their email addresses to receive financial compensation for their participation in the study. The personally identifiable information was used to complete a drawing and determine the 30 participants who received a \$50 Amazon e-gift card.

Instruments

An online self-report questionnaire was created using Qualtrics. The survey had a total of 136 items, comprising: 1) consent form (one item), 2) nurse demographics (12 items), 3) transplant nurse competency (88 items), and 4) individualized care (34 items) and 5) compensation entry form (2 items). It was estimated to take approximately 25-30 minutes to complete the entire survey. The researcher's pilot study, which had a total of 199 questions, included eleven participants and spent an average of 25 minutes, ranging from 25-35 minutes.

Nurse Characteristics Questionnaire

This questionnaire collected working country, age, gender, highest level of education in nursing completed, the scope of practice (RN or APRN), years of practice nursing as an RN, years practiced nursing as an APRN, years of practice in direct care for transplants recipients and living donors, type of nursing setting, primary language race, and ethnicity. See Table 3.

Table 3*Nurse Characteristics Questionnaire*

Variables	Operational definitions
Age	Age in year was self-reported by the participants.
Gender	Indicators of gender: Male, female, and other.
Highest education level	Indicators for highest education level: Associated degree or diploma, Bachelor, Masters, or Doctoral.
Scope of practice	Indicators for scope of practice: RN and APRN
Years as a RN	Years as an RN self-reported by the participants.
Years as an APRN	Years as an APRN self-reported by the participants.
Years of practice in direct care for transplant patients	Years of practice in direct care for transplant recipients and living donors
Type of nursing setting	Indicators for type of nursing setting: Transplant Center (Outpatient), Transplant Designated Floor (Inpatient), Critical Care Unit/Intensive Care Unit (Transplant Specific), Post Anesthesia Care Unit, Medical/Surgical Floor (NOT Transplant Specific), Critical Care Unit/Intensive Care Unit (NOT Transplant Specific), and Other (specified by the participants).
Primary language	Indicators of primary language: English, Spanish, Tagalog, Vietnamese, French, and Other (specified by the participants).
Race	Indicators of the race: Caucasian, Black or African American, American Indian, Alaska Native, Asian, Native Hawaiian, and Other Pacific Islander
Ethnicity	Indicators of ethnicity: Hispanic and non-Hispanic

TNC Scale

The standards of transplant nursing practice have been designed to guide transplant nurses, transplant nurse coordinators, and advanced practice nurses in acquiring the nursing skills necessary to care for transplant patients (ANA & ITNS, 2016). The researcher reviewed all the competences listed in the standards of transplant nursing practice and compared them with the items of NCS. A table was created listing the six standards of practice for transplant nursing and the corresponding competencies for the transplant nurse, transplant nurse coordinator, and APRN with the 73 NCS items. Notably, all of the items on the NCS were found to be included in the standards of transplant nursing practice. To strengthen the study's validity, the standards of transplant nursing practice competencies were utilized to assess nurses' perception of transplant nursing competency.

Therefore, the self-assessment of transplant nursing competency was conducted by using the transplant nurse competency (TNC) scale, which contains 88 items (see Table 4). The items are across six standards of practice: Assessment, Diagnosis, Outcomes Identification, Planning, Implementation, and Evaluation. The scale follows a 5-point Likert-type scale (1 = strongly disagree, 2 = disagree to some extent, 3 = neither nor disagree, 4 = agree to some extent, 5 = strongly agree). A higher score represented higher perceptions of transplant nursing competency. The maximum total score is 440, and the minimum total score is 88. A total score of 88 to 176 will indicate low transplant nursing competency, 177 to 264 points as quite good, 265 to 353 points as good, and 354 to 440 points as very good competency.

Table 4*Standards of Practice and Transplant Nurse Competency Scale*

Standards	Transplant nursing competencies
Assessment	1. Collects comprehensive data in a systematic and ongoing process, including but not limited to physical, functional, psychosocial, emotional, cognitive, sexual, cultural, age-related, environmental, spiritual/process while honoring the uniqueness of the individual transplant patient. 2. Elicits the patient's values, preferences, expressed needs, and knowledge of the healthcare situation. 3. Includes the patients (regardless of age), their family and support system, and interprofessional healthcare team members in holistic data collection across the continuum of transplant care from acute to community care to end of life. 4. Identifies barriers (e.g., psychosocial, literacy, financial, cultural) to effective communication and makes appropriate adaptations. 5. Recognizes the impact of personal attitudes, values, and beliefs. 6. Assesses family dynamics and impact on patient's health and wellness. 7. Priorities data collection based on the patient's immediate condition or anticipated needs. 8. Uses developmentally appropriate evidence-based assessment techniques and instruments, analytical models, and problem-solving tools in data collection. 9. Applies ethical, legal and privacy guidelines and policies to the collection, maintenance, use, and dissemination of data and information.

Standards	Transplant nursing competencies
	10. Recognizes the patient as the authority on their own health by honoring their care preferences. 11. Documents relevant data in a comprehensive and retrievable format. 12. Synthesizes data, information, and knowledge relevant to the situation to identify patterns and variances.
Diagnosis	13. Derives diagnoses, problems, or needs based on assessment data. 14. Validates diagnoses, problem, or needs with the patients, their family and support system, members of the interprofessional team, and other healthcare providers when possible and appropriate. 15. Identifies actual or potential risks to the transplant patient's health and safety or barriers to health, which may include but are not limited to interpersonal, systematic, or environmental circumstances. 16. Uses standardized classification systems and clinical decision support tools, when available, in identifying diagnoses. 17. Documents diagnoses or issues in a manner that facilitates the determination of the expected outcomes and plan. 18. Derives diagnoses encompassing identified or potential age-related physical, psychological, social, or developmental problems. 19. Derives diagnoses encompassing need for rehabilitation care post-transplant based on comorbidities, developmental level, and psychosocial status. 20. Derives diagnoses encompassing support and educational needs of caregivers.

Standards	Transplant nursing competencies
Outcomes Identification	21. Derives diagnoses encompassing any present, or potential, physical, or psychosocial environmental problem.
	22. Involves the patient, family, support system, healthcare providers, and others in formulating expected outcomes when possible and appropriate.
	23. Derives culturally and age-appropriate expected outcome from the diagnoses that are patient oriented, evidence based, attainable, and realistic in relation to the patients', caregivers', and their support systems' present and potential abilities.
	24. Considers associated risks, benefits, costs, current. scientific evidence, trajectory of the condition, and clinical expertise when formulating expected outcomes.
	25. Defines expected outcomes in terms of patient values, culture, and ethical considerations.
	26. Includes a time estimate for attainment of expected outcomes.
	27. Develops expected outcomes that provide direction for continuity of transplant care.
	28. Modified expected outcomes based on patient changes and evaluation of the situation.
	29. Documents expected outcomes as measurable goals.
	30. Develops a plan of care with the patients, their family and support system, and others considering the person's characteristics or situation, including but not limited to values, beliefs, spiritual and health practices,

Standards	Transplant nursing competencies
	preferences, choices, developmental level, coping style, culture and environment, and available technology.
	31. Participates in the design and development of interprofessional processes to address the situation or issue. 32. Supports the integration of clinical, human, and financial resources to enhance and complete the decision-making process. 33. Establishes plan priorities with the patients, their support system, and others as appropriate to meet the goals of the plan of care. 34. Demonstrates the ability to set achievable goals through realistic interventions that are measurable. 35. Supports the use of clinical guidelines linked to positive patient outcomes. 36. Includes strategies in the plan that addresses promotion and restoration of health. 37. Includes strategies in the plan that addresses prevention of illness, injury, and disease. 38. Includes strategies in the plan that addresses the alleviation of suffering. 39. Includes strategies in the plan that addresses supportive care for those who are dying. 40. Includes strategies for health and wholeness across the life span. 41. Provides for continuity in the plan of care. 42. Incorporates an implementation pathway or timeline in the plan

Standards	Transplant nursing competencies
	43. Considers the economic impact of the plan on the patients, their family, and support system. 44. Integrates current scientific evidence, trends, and research in the planning of care. 45. Utilizes the plan to provide direction to other members of the transplant team. 46. Explores practice setting and safe space and time for the nurses and the patient to explore suggested, potential, and alternative options. 47. Defines the plan to reflect current statutes, rules and regulations, and standards. 48. Modifies the plan according to the ongoing assessment of the patient's response and other outcome indicators. 49. Contributes to the development and continuous improvement of organizational systems that support the planning process. 50. Documents the plan in a manner that uses standardized language or recognized terminology.
Implementation	51. Partners with the patients, their support system, and caregivers as appropriate to implement the plan in a safe, realistic, and timely manner. 52. Demonstrates caring behaviors toward patients, significant others, and groups of people receiving care. 53. Utilizes technology to measure, record, and retrieve transplant patient data, implement the nursing process, and enhance nursing practice.

Standards	Transplant nursing competencies
	54. Utilizes evidence-based interventions and treatments specific to the diagnosis or problem. 55. Provides holistic care that addresses the needs of diverse populations across the life span. 56. Advocates for health care that is sensitive to the needs of patients, with particular emphasis on the needs of diverse populations. 57. Applies appropriate knowledge of major health problems and cultural diversity, particularly related to organ transplantation, in implementing the plan of care. 58. Applies available healthcare technologies to maximize access and optimize outcomes for patients. 59. Utilizes community resources to help implement the plan of care. 60. Collaborates with healthcare providers from diverse backgrounds to implement and integrate the plan. 61. Accommodates for different styles of communication used by patients, families, support systems, and healthcare providers. 62. Integrates evidence-based traditional and complementary healthcare practices as appropriate. 63. Implements the plan in a timely manner in accordance with patient safety goals. 64. Employs fundamentals of project or systems management. 65. Uses consensus-driven clinical guidelines. 66. Promotes the transplant patient's capacity for the optimal level of participation and problem solving.

Standards	Transplant nursing competencies
	67. Document implementation and any modifications, including changes or omission, of the identified plan. 68. Organizes the components of the plan. 69. Manages a patient's care to maximize independence and quality of life. 70. Assists the patient to identify options for alternative care. 71. Communicates with the patient, family, support system, and system during transitions in care. 72. Advocates for the delivery of dignified and humane care by the interprofessional team. 73. Documents the coordination of care and reports any unexpected outcomes in implementing care. 74. Documents plan-of-care communications, rationales for plan-of-care changes, and collaborative discussions to support and advance patient care and the well-being of the family and support system. 75. Assists in developing modifications in care delivery. 76. Provides direct care that implements the plan. 77. Provides health teaching that addresses such topics as healthy lifestyles, risk-reducing behaviors, patient self-monitoring, developmental needs, activities of daily living, and preventive self-care. 78. Uses health promotion and teaching methods appropriate to the situation and the patient's developmental level, learning needs, readiness, ability to learn, literacy level, language preference, spirituality, culture, and socioeconomic status.

Standards	Transplant nursing competencies
Evaluation	79. Seeks opportunities for feedback and evaluation of the effectiveness of the strategies used.
	80. Uses information technologies to communicate health promotion and disease prevention information to the patient in a variety of settings.
	81. Provides patients with information about intended effects and potential adverse effects of proposed therapies.
	82. Conducts a systematic, ongoing, and criterion-based evaluation of the outcomes in relation to the structures and processes prescribed by the plan of care and the indicated timeline.
	83. Collaborates with the patient and others involved in their care during the evaluation process.
	84. Evaluates, in partnership with the patient, the effectiveness of the planned strategies in relation to the patient's responses and the attainment of the expected outcomes.
	85. Uses ongoing assessment data to revise the nursing diagnoses, the plan, and the implementation as needed.
	86. Disseminates the results to the patient, family, and others involved, in accordance with federal and state regulations.
	87. Participates in assessing and assuring the responsible and appropriate use of interventions to minimize unwarranted or unwanted treatment and healthcare consumer suffering.
	88. Documents results of the evaluation.

ICS-Nurse A and B Scale

The ICS-Nurse A & B is a 2-part instrument developed in Finland to assess nurses' perceptions of individualized patient care (Suhonen et al., 2005; Suhonen et al., 2000). Permission was granted in writing from Professor Riitta Suhonen from the University of Turku, Department of Nursing Science in Turku, Finland, to use the ICS-Nurse A & B version instrument for non-commercial purposes. Nurses' perceptions of individualized care are self-assessed in two dimensions: ICS-Nurse A measures nurses' views on how they support their patient's individually through specific nursing activities, and ICS-Nurse B measures nurses' views on how they evaluate the maintenance of individuality in the care they provided. Within these two dimensions, individualized care includes the recognition of the patient's clinical situation, personal life situation, and the decisional control they have over their care (Suhonen et al., 2010).

The instrument has 34 items, including 17 items for ICS-Nurse A and 17 for ICS-Nurse B. Both parts of the ICS-Nurse A & B instrument have three subscales: Clinical Situation (Clin A & B, seven items), Personal Life Situation (Pers A & B, four items), and Decisional Control over Care (Dec A & B, six items). The ICS-Nurse A & B use a 5-point Likert-type scale (1 = strongly disagree, 2 = disagree to some extent, 3 = neither nor disagree, 4 = agree to some extent, 5 = strongly agree). All the items are worded positively, and a higher score represents higher perceptions of individualized care. The maximum total score is 170, and the minimum total score is 34 (Suhonen et al., 2010). A score of 34 to 79 indicated a low level, 80 to 125 indicated a medium level, and 126 to 170 indicated a high level, see Table 5.

Table 5*ICS-Nurse A & B*

Subscales	ICS-Nurse A Items
Clinical Situation (Clin A)	A1. I talk with patients about how they feel regarding their illness/health condition. A2. I talk with patients about their nursing care needs. A3. I give patients the chance to take responsibility for their care as much as they are able. A4. I identify when patients' feelings toward their care or illness/condition change. A5. I talk with patients about their fears and anxieties. A6. I make an effort to find out how their illness/health condition affects them. A7. I talk with patients about what their illness/health condition means to them.
Personal Life Situation (Pers A)	A8. I ask patients what activities they do in their everyday life outside the hospital (work, leisure activities). A9. I ask patients about their previous experience with hospitalization. A10. I ask patients about their daily habits (e.g. personal hygiene). A11. I ask patients whether they want their family to take part in their care.
Decisional Control Over Care (Dec A)	A12. I give instructions to patients using language that is easy for them to understand. A13. I ask patients what they want to know about their illness/health condition. A14. I listen to patients' personal needs regarding their care. A15. I help patients take part in decisions concerning their care.

Subscales	ICS-Nurse A Items
	A16. I encourage patients to express their opinions on their care.
	A17. I ask patients at what time they would prefer to have a bath.
Subscales	ICS-Nurse B Items
Clinical	B1. I took into account how they feel about their illness/health condition.
Situation	B2. I took into account their nursing care needs.
(Clin B)	B3. Patients assumed responsibility for their care as much as they were able.
	B4. I took into account when patients' feelings toward their care or illness/condition changed.
	B5. I took into account their fears and anxieties.
	B6. I took into account how their illness/health condition has affected them.
	B7. I took into account what their illness/health condition means to them.
Personal Life	B8. I took into account their daily activities (e.g. work, leisure activities)
Situation	outside the hospital.
(Pers B)	B9. I took into account their previous experience (s) with hospitalization.
	B10. I took into account their daily habits during their stay in hospital (e.g. personal hygiene).
	B11. Patients' family member took part in the care of my patients if they wanted them to do so.
Decisional	B12. I made sure they understood the instructions given.
Control Over	B13. I gave them appropriate information about their illness/health condition.
Care (Dec B)	B14. I took into account their wishes regarding their care.
	B15. Patients took part in decision-making concerning their care.
	B16. I took into account their opinions about their care.

Subscales	ICS-Nurse A Items
	B17. Patients had the opportunity to make their own decision when to take a bath.

The psychometrics of the ICS-Nurse A & B have been tested and proven to be valid, reliable, and sensitive to evaluating nurses' perceptions of individualized care in various work experiences, clinical areas, and countries (Charalambous et al., 2012; Idvall et al., 2012; Suhonen et al., 2010; Suhonen, Papastavrou, et al., 2011; Suhonen et al., 2012). The internal consistency reliability of the ICS-A Nurse scale was Cronbach's alpha of .88 (range = .72 - .83), and the one of the ICS-B Nurse scale was .90 (range = .73 - .84). The content validity, face validity, and construct validity of the ICS-Nurse A & B were proven based on instrument development methodology (Suhonen et al., 2010). In the researcher's pilot study with transplant nurses ($n = 11$), the reliability score of this instrument was Cronbach alpha .966. Thus, the ICS A and B instrument is suitable, valid, and reliable for measuring individualized care by transplant nurses.

Data Collection

Data was collected using an online survey. For recruiting, the researcher posted the online survey link on social media platforms, Twitter and LinkedIn. In addition, the president of each local chapter in ITNS was contacted to introduce the proposed research study and distribute the survey to their chapter members. A recruitment email and study flyer was provided with the purpose, a brief description of the research study, instructions to complete the survey, compensation information, and the researcher's contact information. An explicit appeal was requested to forward the recruitment email and study flyer to their chapter members. Also, weekly reminder emails were sent to each ITNS local chapter leader to achieve the required sample size. In addition, the survey was re-posted on ITNS Twitter, ITNS central, ITNS

LinkedIn, and ITNS Facebook and was conducted weekly until the minimum sample size was reached. The consent for the study was present on the first page of the online survey, including the purpose of the survey, eligibility, participant involvement, compensation for participation, potential risks (i.e., confidentiality, coercion), investigator contact, and IRB contact.

Treatment of Data

The data collected was analyzed using the IBM Statistical Package for Social Science (SPSS) version 28.0. All completed responses through the Qualtrics survey was exported to SPSS. The researcher labeled and identified the data in the exported dataset with a unique participant number. A separate file was generated with contact information (i.e., email address). The personally identifiable information containing the email addresses was separated and saved. This personally identifiable information was used to determine the 30 participants who received compensation.

Data Analysis

The unit of analysis was examined at the individual level. Descriptive statistics, such as means, standard deviation, minimum, and maximum for continuous variables, and frequencies with percentages for categorical variables, was used to summarize the nurse characteristics and dependent variables. Center tendency (e.g., mode, median, mean) was used to identify data patterns, and variability (e.g., range and standard deviation) was used to determine the extent to which data is dispersed (Polit & Beck, 2021). Normality and outliers were detected prior to correlation and multiple regression analysis. To test for normality, a histogram with a superimposed normal curve and a normal probability plot method was used. On the other hand, a Box plot test was used to detect outliers; this graphical method displays the locality, spread, and skewness of the numerical data through quartiles (Vehkalahti & Everitt, 2019).

The missing values were removed to avoid distortion of the study's results (Vehkalahti & Everitt, 2019). The means and standard deviations of the score for continuous variables such as age, years as an RN, years as an APRN, years of practice in direct care for transplant patients,

perceived transplant nurse competency, and individualized care level were calculated.

Frequencies and percentages were computed for categorical variables such as gender, highest education level, scope of practice, and race/ethnicity. Contingency tables were created to denote the differences in responses by nurse characteristics.

The multiple linear regression relied on the following statistical assumptions (Laerd Statistics, 2022). First, a linear relationship between the dependent variable and each independent variable was assessed using a scatterplot. Second, there was no multicollinearity of the independent variables. Multicollinearity can make it difficult to figure out which specific variable contributes to the dependent variable's variance. A Variance Inflation Factor (VIF) test was used to detect multicollinearity and correlation coefficients less than 10, indicating acceptable levels. Third, the error term was constant across different independent variable values (homoscedasticity). A scatterplot was used to detect this assumption. The violation of homoscedasticity is heteroscedasticity, which is when the size of the error term differs across values of the independent variable. Fourth, observations were independent of one another. The Durbin-Watson statistic was used to test and detect autocorrelation; the test had values from 0-4; a value of 0-2 had a positive autocorrelation, a value of 2-4 had a negative autocorrelation, and a value of 2 indicated that there is no autocorrelation.

For research questions 1 and 2, nurses' perceived transplant nursing competency and individualized care levels were identified with descriptive statistics. First, reliability testing using Cronbach's alpha was performed to examine the inter-item consistency. Next, the total scores for the overall scale and subscales were computed. Then, descriptive statistics (means and standard deviation) were used to determine the total and subtotal perceived transplant nursing competency and individualized care levels. This study considered data collected from the total scale and the responses for each subscale of the transplant nursing competency and individualized care scale. The transplant nursing competency levels were categorized based on the total scores as such: low (scores ranging from 88 to 176), quite good (scores ranging from

177 to 264), good (scores ranging from 265 to 353), and very good (scores ranging from 354 to 440). The individualized care levels were categorized based on the total scores: low (score ranging from 34 to 79), medium (score ranging from 80 to 125), and high (score ranging from 126 to 170).

Research question 3 used a correlational analysis to examine the relationships between perceived transplant nursing competency and individualized care levels. The Pearson correlation coefficient (r) was computed to indicate the direction and magnitude of the relationships; the strength of the association was considered 'very weak' for absolute values of $r \leq .19$, 'weak' for $r = .20 - .39$, 'moderate' for $r = .40 - .59$, 'strong' for $r = .60 - .79$, and 'very strong' for $r = .80 - 1.00$ (Polit & Beck, 2021). The level of statistical significance was set at $p < .05$ to identify significant associations among the variables.

For research question 4, a series of multiple linear regression analyzed the extent to which nurse characteristics were associated with the nurses' perceived transplant nursing competency and individualized care levels. Multiple linear regression analyzed the relationship between independent variables to predict the outcome of a dependent variable (Laerd Statistics, 2022). The independent variables included age, gender, highest education level, scope of practice, years as an RN, years as an APRN, and years of practice in direct care for transplant patients; however, the independent variables used in the multiple linear regression were determined through an earlier correlation analysis. The dependent variables are perceived transplant nursing competency and individualized care levels.

A multiple linear regression model provided an equation represented by y as the outcome (dependent variable), x_1 as the predictor (independent variable), with beta coefficient (β_0) as the y-intercept, beta coefficient 1 (β_1) is the slope of the line and ε is the random error. This analysis determined the model's total variation and each independent variable's relative influence on the total variance. The proportion of variance in the dependent variable was explained by the independent variable evaluated using R^2 statistics and adjusted R^2 . The

statistical significance of the regression models was determined by capturing the F statistic value and corresponding p -value. The significance of each predictor was interpreted using Beta and β coefficients, along with t statistics and p values (Vehkalahti & Everitt, 2019). The level of significance was set at $p < .05$.

Summary

This study used a cross-sectional, descriptive correlation design to describe nurses' perceptions of transplant nursing competency and individualized care in relation to solid organ transplantation and identify the relationship. This study was conducted using a survey tool called Qualtrics. A convenience sample was used to recruit nurse participants and approached through various platforms, including the ITNS organization, transplant centers, ITNS Twitter, ITNS central, ITNS LinkedIn, and ITNS Facebook. The minimum sample size for this study was 114, as determined by a priori power analysis. This study targeted 125 participants to account for the potential of missing data.

The study began after obtaining IRB approval, and all efforts were made to protect human subject rights, including confidentiality, anonymity, and non-coercion. To incentivize participation, participants who completed the online survey could enter a drawing to win one of 30 \$50 Amazon e-gift cards. The study used a combination of questionnaires, including nurse characteristics, transplant nursing competency, and ICS-Nurse A & B. Using SPSS v.28, the collected data was analyzed through descriptive statistics, correlation analysis, and multiple regression analyses was conducted to address the research questions.

CHAPTER IV

RESULTS

This chapter presents the results of the study concerning nurses' perceived TNC and IC levels in caring for SOT recipients, living donors, and their families. Furthermore, this chapter provides the relationships between nurses' perceived TNC levels, IC levels, and various nurse characteristics. A total of 445 nurses responded to the survey invitation; 13 respondents did not start the survey, and 38 did not complete it. Additionally, three instances of duplicate responses were identified and removed from the dataset. As a result, 391 cases were retained for data analysis.

Nurse Characteristics

Table 6 presents the descriptive information pertaining to the characteristics of the nurses who participated in this survey. The majority of the participants were female ($n = 281$, 71.9%). Over half of the nurses' participants held a Bachelor's degree ($n = 221$, 56.5%), with 20.5% having completed a master's degree ($n = 80$), 16.6% reporting an associated degree ($n = 65$), and 6.4% possessing a doctoral degree ($n = 25$).

Approximately 53% of the participants reported practicing as RNs, ($n = 206$), whereas 47.3% were APRNs, ($n = 185$). A total of 76.6% of nurses worked in a healthcare setting exclusively designated for transplant patients, while 23.4% of nurses worked in a non-transplant-specific healthcare setting. The detailed distribution of nurses across various nursing settings is presented in Table 6. Ninety-seven percent of participants reported English as their primary language ($n = 381$). The majority of the nurse participants were Caucasian ($n = 344$, 88%). Sixty-two percent were non-Hispanics ($n = 243$), 35.8% were Hispanics ($n = 140$), and 2% preferred not to answer ($n = 8$).

The age range of the participants spanned from 20 to 65 years, with a mean age of 32.21 ($SD = 6.59$). Participants reported 6 months to 44 years ($M = 6.35$, $SD = 6.29$) of experience as an RN. For APRNs, the range was 0 months to 30 years ($M = 3.05$, $SD = 4.30$).

Participants reported working 0 months to 33.5 years, with a mean of 4.05 ($SD = 4.79$) in the direct care of transplant recipients.

Table 6

Nurse Characteristics (n = 391)

Nurse Characteristics	<i>n</i>	%
Gender		
Male	110	28.1
Female	281	71.9
Highest Educational Level		
Associated Degree	65	16.6
Bachelor's Degree	221	56.5
Master's Degree	80	20.5
Doctoral Degree	25	6.4
Scope of Practice		
RN	206	52.7
APRN	185	47.3
Types of Nursing Settings		
Transplant Center	63	16.1
Transplant Designated Floor-Inpatient	141	36.1
Transplant Specific Critical Care Unit/Intensive Care Unit	93	23.8
Post-Anesthesia Care Unit	44	11.3
Non-Transplant Specific Medical Surgical Floor	28	7.2
Non-Transplant Specific Critical Care Unit/Intensive Care Unit	19	4.9
Other (Transplant research centers, Dialysis centers)	3	0.8

Nurse Characteristics	<i>n</i>	%
Primary Language		
English	381	97.4
Spanish	2	0.5
Tagalog	3	0.8
Vietnamese	1	0.3
French	1	0.3
Other (Malayalam, Thai)	3	0.8
Race		
Caucasian	344	88
Black or African American	9	2.3
American Indian & Alaska Native	13	3.3
Asian	8	2.0
Native Hawaiian & other Pacific Islander	17	4.3
Ethnicity		
Hispanics	140	35.8
Non-Hispanics	243	62.1
Missing (did not answer)	8	2

Nurse Characteristics	min	max	mean	<i>SD</i>
Age	20.0	65.00	32.21	6.59
Years as an RN	0.5	44.00	6.35	6.29
Years as an APRN	0.0	30.00	3.05	4.30
Years of practice in direct care of transplant patients	0.0	33.50	4.05	4.79

TNC Levels

Table 7 presents descriptive statistics to address research question 1: What are nurses' perceived transplant nursing competency levels for SOT recipients, living donors, and their families? The TNC has a range of scores from a minimum of 88 to a maximum of 440. These scores are categorized into four levels: A score of 88 to 176 indicates low, 177 to 264 is quite good, 265 to 353 is good, and 354 to 440 is very good. The total mean TNC score for all participants was 334.48 ($SD = 67.74$), indicating that, on average, nurses perceived they have a good level of TNC according to the defined four TNC levels.

The TNC scale has subscales according to the six standards of transplant nursing practice. Nurse participants provided the following scores for each subscale. Assessment, comprising 12 items, showed a mean score of 45.67 ($SD = 9.52$). Diagnosis, with nine items, had a mean score of 34.16 ($SD = 34.16$). Outcome Identification, consisting of eight items, with a mean score of 30.13 ($SD = 6.28$). Planning, which had 21 items, had an average score of 79.63 ($SD = 16.33$). Implementation, comprising 31 items, showed a mean score of 118.29 ($SD = 24.31$). Evaluation, with seven items, had a mean score of 26.60 ($SD = 5.57$). The scores of each subscale were also categorized into four levels. Assessment score of 12 to 21 is low, 22 to 34 is quite good, 35 to 47 is good, and 48 to 60 is very good. Diagnosis score of 9 to 15 is low, 16 to 25 is quite good, 26 to 35 good, and 36 to 45 very good. Outcomes Identification score of 8 to 18 is low, 19 to 27 is quite good, 28 to 36 is good, and 37 to 45 is very good. Planning score of 21 to 39 is low, 40 to 61 is quite good, 62 to 83 is good, and 84 to 105 is very good. Implementation score of 31 to 59 is low, 60 to 91 is quite good, 92 to 123 is good, and 124 to 155 is very good. Evaluation score of 7 to 11 is low, 12 to 19 is quite good, 20 to 27 is good, and 28 to 35 is very good. The mean scores across all TNC subscales indicated a good level.

The reliability analysis for the TNC subscale had a Cronbach's Alpha coefficient ranging from .909 to .978, while the overall TNC reliability was $\alpha = .920$ (see Table 7). A Cronbach's

Alpha greater than 0.90 is considered excellent (Polit & Beck, 2021), confirming the high reliability of the TNC instrument used in this study.

Table 7

TNC Levels

TNC	Items (<i>n</i>)	Mean	<i>SD</i>	Range	Cronbach's Alpha
Assessment	12	45.67	9.52	27-60	.943
Diagnosis	9	34.16	7.19	9-45	.932
Outcomes Identification	8	30.13	6.28	17-40	.909
Planning	21	79.63	16.33	46-105	.966
Implementation	31	118.29	24.31	69-155	.978
Evaluation	7	26.60	5.57	14-35	.912
Total TNC	88	334.48	67.74	211-440	.920

The average score of the total TNC level was further analyzed by nurse characteristics, using a two-sample *t*-test and one-way ANOVA. Table 8 presents the corresponding results. There was a statistically significant difference in the TNC levels between female nurses ($M = 351.64$, $SD = 65.53$) and male nurses ($M = 290.64$, $SD = 51.87$, $t(389) = -9.676$, $p < .001$). No significant difference was identified in TNC levels by nurses' education levels ($F(3, 387) = 2.055$, $p = .10$). Regarding the scope of practice, the TNC levels of RNs ($M = 340.11$, $SD = 68.06$) were higher than the one of APRNs ($M = 328.20$, $SD = 67.01$); however, the difference was not significantly different ($t(389) = 1.740$, $p = .083$).

Notably, there was a statistically significant difference in the TNC levels based on the type of transplant nursing settings ($F(6, 384) = 23.081$, $p < .001$). The highest TNC level was observed in those working in research transplant centers and dialysis centers ($M = 392.67$, SD

= 37.23), followed by nurses working in an inpatient floor designated for transplant patients ($M = 366.40$, $SD = 58.91$), outpatient transplant center ($M = 355.76$, $SD = 61.54$), and a transplant-specific critical care unit/intensive care unit ($M = 323.30$, $SD = 64.66$). In contrast, nurses working on a non-transplant-specific medical-surgical floor showed a lower TNC level ($M = 265.61$, $SD = 37.21$) than nurses working in a PACU ($M = 288.45$, $SD = 54.53$) and non-transplant-specific critical care unit/intensive care unit ($M = 287.53$, $SD = 48.28$).

There was a statistically significant difference in the TNC levels between nurses who indicated English as their primary language and those with a non-English primary language ($t(389) = -3.350$, $p < .001$). The TNC levels of the participants displayed statistically significant variations by race ($F(4,386) = 6.796$, $p < .001$). The highest TNC levels were observed in Asians ($M = 420.88$, $SD = 42.78$), while Native Hawaiian and Other Pacific Islander exhibited the lowest TNC levels ($M = 306.76$, $SD = 63.32$). There was a statistically significant difference in nurses' TNC level between non-Hispanics and Hispanics ($t(381) = -9.069$, $p < .001$). The TNC levels significantly varied by gender, types of transplant nursing settings, primary language, race, and ethnicity. These variables were subsequently used as covariates in the regression analysis.

Table 8

Total TNC Levels by Nurse Characteristics (n = 391)

Nurse characteristics	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F/t</i>	<i>p</i>
Gender				-9.676	<.001
Male	110	290.64	51.87		
Female	281	351.64	65.53		
Highest Education Level				2.055	.10
Associated Degree	65	339.46	77.82		
Bachelor's Degree	221	339.41	62.71		

Nurse characteristics	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F/t</i>	<i>p</i>
Master's Degree	80	323.44	68.66		
Doctoral Degree	25	313.20	75.39		
Scope of Practice				1.740	.083
RN	206	340.11	68.06		
APRN	185	328.20	67.01		
Types of Nursing Settings				23.081	<.001
Transplant Center	63	355.76	61.54		
Transplant Designated Floor-Inpatient	141	366.40	58.91		
Transplant Specific Critical Care Unit/Intensive Care Unit	93	323.30	64.66		
Post-Anesthesia Care Unit	44	285.45	54.53		
Non-Transplant Specific Medical-Surgical Floor	28	265.61	37.21		
Non-Transplant Specific Critical Care Unit/Intensive Care Unit	19	287.53	48.28		
Others	3	392.67	37.23		
Primary Language				-3.350	< .001
English	381	332.64	67.17		
Non-English	10	404.40	52.49		
Race				6.796	<.001
Caucasian	344	332.90	67.11		
Black or African American	9	400.00	52.48		
American Indian & Alaska Native	13	313.92	62.44		
Asian	8	420.88	42.78		

Nurse characteristics	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F/t</i>	<i>p</i>
Native Hawaiian & other Pacific Islander	17	306.76	53.42		
Ethnicity				-9.069	<.001
Hispanics	140	296.20	59.15		
Non-Hispanics	243	355.70	63.32		

Note. Regarding ethnicity, there were eight missing responses

IC Levels

Table 9 presents descriptive statistics to address research question 2: What are nurses' perceived individualized care (IC) levels for SOT recipients, living donors, and their families? The IC scores range from a minimum of 34 to a maximum of 170. A score of 34 to 79 indicates a low level, 80 to 125 indicates a medium level, and 126 to 170 indicates a high level. The total mean IC score for all nurse participants was 64.96 (*SD* = 13.0), indicating a low level of IC according to the defined three IC levels.

The IC scale has two dimensions (ICS-A & ICS-B); each has three subscales: clinical life situation, personal life situation, and decisional control over care. The nurse participants provided the following scores for each dimension and the subscales. For the overall ICS-A (support of patient individuality), comprising 17 items, the mean score was 64.76 (*SD* = 13.14). Within this dimension, nurses' perception of IC levels concerning clinical life situation, involving seven items yielded a mean score of 26.27 (*SD* = 5.57). Personal life situation, containing four items, had a mean score of 15.09 (*SD* = 3.29). Decisional control over care, encompassing six items, had a mean score of 22.91 (*SD* = 4.71). For the total ICS-B (individuality in the care provided), comprising 17 items, the mean score was 65.15 (*SD* = 13.30). Within this dimension, nurses' perception of IC levels concerning clinical life situation, comprising seven items, resulted in a mean score of 26.74 (*SD* = 5.64). Personal life situation, comprising four items, had a mean score of 15.18 (*SD* = 3.18). Decisional control over care, comprising six items, had a mean

score of 23.23 ($SD = 4.83$). Each of the dimension A and B scores and its subscales were categorized into three levels. The ICS-Nurse A & B score of 17 to 39 is low, 40 to 62 is medium, and 63 to 85 is high. Clinical life situation A & B score of 7 to 15 is low, 16 to 23 is medium, and 26 to 35 is high. Personal life situation A & B score of 4 to 8 is low, 9 to 14 is medium, and 15 to 20 is high. Decisional control over care A & B score 6 to 12 is low, 13 to 21 is medium, and 22 to 30 is high. The total IC score for each dimension and all the subscales indicated a low IC level, according to the predefined three IC levels.

The reliability analysis for each ICS A & B subscale demonstrated a range of Cronbach Alpha values from an $\alpha = 0.825$ to .905. Specifically, the ICS-A showed an α of .943, the ICS-B had $\alpha = .905$, and the combined total ICS-A & B yielded an α of .841 (see Table 9). A Cronbach's Alpha greater than 0.825 is considered good (Polit & Beck, 2021), thus confirming the good reliability of this study's ICS-A & B instrument.

Table 9

ICS-Nurse A & B (n = 391)

ICS	Items (n)	Mean	SD	Range	Cronbach's Alpha
ICS Nurse-A: Support of patient individuality					
Total ICS Nurse-A	17	64.76	13.14	40-85	.943
Clinical situation ICS-A	7	26.76	5.57	14-35	.905
Personal situation ICS-A	4	15.09	3.29	5-20	.841
Decisional control over care ICS-A	6	22.91	4.71	14-30	.882
ICS Nurse-B: Individuality in the care provided					
Total ICS Nurse-B	17	65.15	13.30	41-85	.905
Clinical situation ICS-B	7	26.74	5.64	14-35	.905

ICS	Items (<i>n</i>)	Mean	SD	Range	Cronbach's Alpha
Personal situation ICS-B	4	15.18	3.18	9-20	.825
Decisional control over care ICS-B	6	23.23	4.83	13-30	.888
Total ICS Nurse A & B	34	64.96	13.07	41-85	.841

The average score of the total IC level was further analyzed by nurse characteristics, using a two-sample *t*-test and one-way ANOVA. Table 10 provides the corresponding results. There was a statistically significant difference in the IC levels between female nurses ($M = 68.10$, $SD = 12.54$) and male nurses ($M = 56.92$, $SD = 10.80$, $t(389) = -8.783$, $p < .001$).

Remarkably, there was a statistically significant difference in the IC levels based on the type of transplant nursing setting ($F(6,384) = 24.519$, $p < .001$). Among the nurses, the highest IC level was noted in those working in research transplant centers and dialysis centers ($M = 75.33$, $SD = 13.73$); however, it still fell into the low IC level based on the predefined IC categorization. In contrast, nurses working on a non-transplant-specific medical-surgical floor showed the lowest IC level ($M = 52.00$, $SD = 7.74$).

There was a statistically significant difference in the IC levels between nurses who indicated English as their primary language ($M = 64.58$, $SD = 12.99$) and those with a non-English primary language ($M = 79.35$, $SD = 6.90$, $t(389) = -6.468$, $p < .001$). The IC level of the nurse participants displayed statistically significant variations based on race ($F(4,386) = 6.995$, $p < .001$). The highest IC levels were observed in Asians ($M = 82.13$, $SD = 6.37$) and Black or African Americans ($M = 78.33$, $SD = 8.89$). There was statistical significance in nurses' IC level between non-Hispanics ($M = 69.17$, $SD = 12.08$) and Hispanics ($M = 57.41$, $SD = 11.50$, $t(381) = -9.330$, $p < .001$). The IC levels varied significantly by gender, types of transplant nursing

settings, primary language, race, and ethnicity. These variables were subsequently used as covariates in the regression analysis.

Table 10

Total IC Levels by Nurse Characteristics (n = 391)

Nurse characteristics	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F/t</i>	<i>p</i>
Gender				8.783	<.001
Male	110	56.92	10.80		
Female	281	68.10	12.54		
Highest Education Level				2.181	.090
Associated Degree	65	65.77	15.28		
Bachelor's Degree	221	66.02	12.13		
Master's Degree	80	62.49	12.80		
Doctoral Degree	25	61.32	14.84		
Scope of Practice				1.829	.068
RN	206	66.10	13.10		
APRN	185	63.68	12.96		
Types of Nursing Settings				24.519	<.001
Transplant Center	63	68.27	11.44		
Transplant Designated Floor- Inpatient	141	71.66	11.22		
Transplant Specific Critical Care Unit/Intensive Care Unit	93	62.68	12.20		
Post-Anesthesia Care Unit	44	55.14	10.57		

Nurse characteristics	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F/t</i>	<i>p</i>
Non-Transplant Specific Medical-Surgical Floor	28	52.00	7.74		
Non-Transplant Specific Critical Care Unit/Intensive Care Unit	19	55.53	10.37		
Others	3	75.33	13.73		
Primary Language				-6.468	
					<.001
English	381	64.58	12.99		
Non-English	10	79.35	6.90		
Race				6.995	<.001
Caucasian	344	64.55	12.92		
Black or African American	9	78.33	8.89		
American Indian & Alaska Native	13	62.23	12.39		
Asian	8	82.13	6.37		
Native Hawaiian & other Pacific Islander	17	60.21	11.53		
Ethnicity				-9.330	<.001
Hispanics	140	57.41	11.50		
Non-Hispanics	243	69.17	12.08		

Note. Regarding ethnicity, there were eight missing responses

Relationship Between Nurses' Perceived TNC and IC Levels

Table 11 displays the correlation coefficients to address research question 3: What is the relationship between nurses' perceived transplant nursing competency level and individualized

care level for SOT recipients, living donors, and their families? The correlation analysis showed a strong positive correlation between perceived TNC and IC levels ($r = .969$, $p < 0.05$). Also, there were strong positive correlations between subscales of perceived TNC and IC levels, ranging from $r = .827$ to $r = .990$. The results suggest that better-perceived transplant nursing competence was associated with higher individualized care levels.

Table 11*Correlation of the TNC and ICS A & B (n = 391)*

1. Total TNC	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2. Assessment	.978**														
3. Diagnosis	.946**	.936**													
4. Outcomes ID	.966**	.938**	.928**												
5. Planning	.987**	.954**	.919**	.950**											
6. Implementation	.990**	.958**	.912**	.942**	.971**										
7. Evaluation	.962**	.935**	.888**	.915**	.941**	.955**									
8. Total ICS A & B	.969**	.946**	.901**	.928**	.960**	.962**	.947**								
9. Total ICS-A	.962**	.936**	.891**	.917**	.954**	.957**	.935**	.989**							
10. Clinical ICS-A	.953**	.930**	.887**	.914**	.941**	.949**	.922**	.969**	.975**						
11. Personal ICS-A	.894**	.868**	.827**	.845**	.891**	.888**	.875**	.931**	.943**	.874**					
12. Decisional ICS-A	.929**	.904**	.857**	.886**	.925**	.923**	.904**	.960**	.976**	.924**	.897**				
13. Total ICS-B	.955**	.935**	.891**	.917**	.944**	.946**	.937**	.989**	.955**	.940**	.898**	.923**			
14. Clinical ICS-B	.931**	.912**	.868**	.898**	.918**	.923**	.916**	.964**	.929**	.922**	.862**	.896**	.977**		
15. Personal ICS-B	.926**	.908**	.872**	.896**	.918**	.911**	.904**	.948**	.919**	.897**	.877**	.888**	.956**	.897**	
16. Decisional ICS-B	.930**	.910**	.862**	.883**	.919**	.925**	.913**	.969**	.937**	.920**	.884**	.906**	.979**	.929**	.924**

Relationships of Nurse Characteristics With TNC and IC

Tables 12 and 13 provide the results of multiple regression analysis to address research question 4: To what extent are nurses' characteristics associated with their perceived transplant nursing competency level and individualized care level for SOT recipients, living donors, and their families? The overall regression model of the nurses' characteristics on the total TNC level was significant (adjusted $R^2 = .426$, $F = 29.01$, $p < .001$), implying that the nurses' characteristics explained 42.6% of the variation in the total TNC level.

The independent variable, primary language, was excluded from the regression analysis because 97.4% of nurses reported English as their primary language, while the proportion of nurses reporting other languages as their primary language was less than 10%. Among the nurse characteristics analyzed, age, gender, years as an RN, the type of transplant nursing setting, and ethnicity showed statistically significant associations with the total TNC level. Age emerged as a significant predictor of the total TNC level ($p = .013$), indicating that for every one-year decrease in age, the total TNC level increased by 1.79 scores. Female nurses had a notably higher TNC level, suppressing male nurses by 38.55 scores. Years of experience as an RN significantly impacted the total TNC level ($p < .001$), with every additional year of experience as an RN resulting in a 3.65 higher score in the level of the total TNC. The type of transplant nursing setting also wielded substantial influence on the total TNC level ($p < .001$); nurses working in transplant settings showed a 44.48 higher score in the level of the total TNC. Non-Hispanic nurses exhibited a 28.21 higher score in the level of the total TNC. Among these statistically significant nurse characteristics influencing the total TNC level, years of experience as an RN was the strongest factor ($\beta = .340$, $p < .001$), followed by types of transplant nursing settings ($\beta = -.278$, $p < .001$), gender ($\beta = .256$, $p < .001$), ethnicity ($\beta = .198$, $p < .001$), and age ($\beta = -.175$, $p = .013$; see Table 12).

Table 12*Multiple Regression Coefficients of Nurse Characteristics on the Total TNC Level*

Predictors	Unstandardized	Standardized	<i>t</i>	Sig.
	<i>B</i>	Beta (β)		
Age	-1.790	-.175	-2.495	.013
Females	38.558	.256	6.070	<.001
Graduate	-9.887	-.063	-1.521	.129
APRN	-8.847	-.065	-1.464	.144
Years as a RN	3.655	.340	3.611	<.001
Years as an APRN	.446	.028	.575	.565
Years in direct care for transplant patients	.363	.026	.318	.751
Non-Transplant Settings	-44.484	-.278	-6.551	<.001
Non-Caucasian	14.483	.069	1.711	.088
Non-Hispanic	28.217	.198	4.497	<.001

Note. $F(10, 368) = 29.01$, $p < .001$, $R^2 = .441$, adjusted $R^2 = .426$

a. Dependent variable: Total TNC level

b. Independent variables' reference categories: Males = 0; Undergraduates = 0; RN = 0;

Transplant Settings (encompassing Transplant Center, Transplant Designated Floor-Inpatient, Transplant Specific Critical Care Unit/Intensive Care Unit, Transplant Research Center, Dialysis Center) = 0; Non-Transplant Settings (including Post-Anesthesia Care Unit, Non-Transplant Specific Medical-Surgical Floor, Non-Transplant Specific Critical Care Unit/Intensive Care Unit) = 1; Caucasian = 0; Hispanics = 0.

The overall regression model of the nurses' characteristics on the total IC level was significant (adjusted $R^2 = .420$, $F = 28.360$, $p < .001$), implying that the nurses' characteristics predicted a 42% variation in the total IC level (see Table 13). Among the nurse characteristics,

age, gender, years as an RN, the type of transplant nursing setting, race, and ethnicity showed statistically significant association with the total IC level. Age emerged as a significant predictor of the total IC level ($p = .011$), indicating that the total IC level increased by .356 scores for every one-year decrease in age. Female nurses had a notably higher IC level, suppressing male nurses by 6.747 scores ($p < .001$). Nurses working in a non-transplant setting showed about nine scores lower in the total IC level compared to nurses working in a transplant setting ($p < .001$). Non-Caucasian nurses showed a 3.92 score higher in the IC level. Non-Hispanic nurses exhibited a 5.92 score higher in the total IC level. Among nurse characteristics significantly influencing the total IC level, the type of nursing setting ($\beta = -.292$, $p < .001$) had the strongest influence, followed by the years as an RN ($\beta = .290$, $p = .002$), gender ($\beta = .232$, $p < .001$), ethnicity ($\beta = .215$, $p < .001$), age ($\beta = -.180$, $p = .011$), and race ($\beta = .096$, $p < .001$).

Table 13

Multiple Regression Coefficients of Nurse Characteristics on the Total IC Level

Predictors	Unstandardized <i>B</i>	Standardized Beta (β)	<i>t</i>	Sig.
Age	-.356	-.180	-2.562	.011
Females	6.747	.232	5.478	<.001
Graduate	-2.008	-.067	-1.593	.112
APRN	-1.657	-.063	-1.414	.158
Years as a RN	.600	.290	3.058	.002
Years as an APRN	.046	.015	.304	.761
Years in direct care for transplant patients	.175	.064	.791	.430
Non-Transplant Settings	-9.011	-.292	-6.845	<.001

Predictors	Unstandardized <i>B</i>	Standardized Beta (β)	<i>t</i>	Sig.
Non-Caucasian	3.928	.096	2.393	.017
Non-Hispanic	5.923	.215	4.868	<.001

Note. $F(10, 368) = 28.36$, $p < .001$, $R^2 = .435$, adjusted $R^2 = .420$

a. Dependent Variable: Total ICS A & B.

b. Independent variables' reference categories: Males = 0; Undergraduates = 0; RN = 0;

Transplant Settings (encompassing Transplant Center, Transplant Designated Floor-Inpatient, Transplant Specific Critical Care Unit/Intensive Care Unit, Transplant Research Center, Dialysis Center) = 0; Non-Transplant Settings (including Post-Anesthesia Care Unit, Non-Transplant Specific Medical-Surgical Floor, Non-Transplant Specific Critical Care Unit/Intensive Care Unit) = 1; Caucasian = 0; Hispanics = 0.

Summary

This cross-sectional, descriptive correlation study described nurses' perceptions of TNC and IC in relation to solid organ transplantation. The study conducted a correlation analysis to examine the relationship between the nurses' characteristics and the levels of TNC and IC. Also, this study conducted a regression analysis to explore the nurse characteristics' impact on the levels of TNC and IC.

Three hundred ninety-one nurses, including 286 RNs and 105 APRNs, participated in the survey. In this study, the developed TNC instrument demonstrated high reliability with a Cronbach Alpha of .920, confirming it is reliable for measuring transplant nursing competency. Also, the ICS-Nurse A & B instrument showed a Cronbach Alpha of .841. It supported reliability in assessing individualized care provisions among nurses caring for SOT recipients, living donors, and their families.

Based on the predefined categorization, the nurses perceived the total mean score and subscale mean scores of TNC levels fell within a good TNC level. However, the subscales and total IC mean scores were categorized as low. The correlational analysis found a statistically significant, strong positive relationship between nurses' perceived TNC and IC levels. The regression analysis revealed that the nurses' perceived TNC and IC levels significantly varied by age, gender, years as a registered nurse, types of nursing settings, race, and ethnicity. The younger the age of the nurse, the higher the TNC and IC levels. Females had a higher level of TNC and IC than males. Nurses with more years as RNs had higher TNC and IC levels than those with fewer years of experience. Also, nurses working in a transplant setting had higher TNC and IC levels. The TNC and IC levels for race and ethnicity differ; however, further analysis is needed to identify the difference by culture and nationality.

CHAPTER V

DISCUSSION

This chapter presents discussions on the study findings along with relevant literature. Additionally, this chapter discusses the implications and recommendations for transplant nursing practice, education, and research concerning TNC and IC for SOT recipients, living donors, and their families. Lastly, the chapter concludes with the limitations of this study.

TNC Assessment and Nurses' TNC Levels

Nursing competency assessments have been recognized as essential tools for evaluating nurses' performance, behaviors, safety, and integration (Levine & Johnson, 2014) and for quantifying their application of knowledge and skills, measurable actions, and desirable patient outcomes (Fukada, 2018). It also positively influences nursing education development to ensure optimal patient care (Clifford, 2020; Hamstrom et al., 2012; Istomina et al., 2011).

However, instruments for measuring transplant nursing competency have been limited. The TXP-RN questionnaire, developed by Hoy et al. (2017), measures RNs' attitudes, commitment, and advocacy for organ donation and transplantation. Similarly, the professional competence in organ donation questionnaire created by Meyer et al. (2012) explored intensive care nurses' perceptions of the theory, practical, socially mediated, and ethical knowledge in caring for organ donors and their relatives. While both questionnaires measured nurses' knowledge and attitudes about organ donation and transplantation, they did not measure nurses' perceptions of transplant nursing competency.

This study established the reliability of the TNC instrument in measuring nurses' perceived transplant nursing competencies, attaining a Cronbach Alpha of .920. Given that this TNC instrument was grounded in the guidelines presented in *Transplant Nursing: Scope and Standard of Practice* (ANA & ITNS, 2016). It is reasonable to infer that its use reliably measures nurses' perceptions of their adherence to the standards of transplant nursing practice, focusing on protecting, promoting, and optimizing the health and abilities of SOT recipients, living donors,

and their families across a life span. This instrument comprehensively addresses the pathophysiological, physiological, and psychosocial needs of SOT recipients, living donors, and their families. The standards emphasize individualized care to transplant recipients, living donors, and their families. Some examples of such standards are collects comprehensive data in a systematic and ongoing process, while honoring the uniqueness of the individual transplant patient, identifies expected outcomes for a plan individualized to the patient or the situation, and develops a plan of care with patients, their family and support system, considering the person's characteristics or situation. Thus, using the TNC instrument can provide insights into nurses' practice of individualized care for SOT recipients, living donors, and their families.

Using this newly developed TNC instrument, this study found that nurses caring for SOT recipients, living donors, and their families perceived an average TNC level of 334.48, which fell within the good competency category (265 - 353). The mean scores across all of the TNC subscales, representing six standards of transplant nursing practice (i.e., Assessment, Diagnosis, Outcome Identification, Planning, Implementation, and Evaluation) also fell within the good competency category. The total TNC score is 440; a score between 354 to 440 points is considered a very good competency. Continued education is imperative to maintain or enhance TNC levels and support a pursuit of excellence in transplant nursing. Periodic assessments of TNC through this TNC instrument can enhance nurses' awareness and fulfillment of nursing roles and responsibilities with transplantation. The findings of TNC assessments will be used to develop education material and training programs for nursing students, newly graduated registered nurses, and all nurses working for transplant patients, living donors, and their families.

IC Assessment and Nurses' IC Levels

This study found that the mean score for perceived individualized care was 64.96, which fell within the low level of the IC (34 - 79). The mean score for the ICS-A (support of patient individuality) personal life situation was (15.09), clinical life situation was 26.76, and decisional

control over care was 22.91. Also, the mean score for the ICS-B (individuality in the care provided) personal life situation was (15.18), clinical life situation was 26.74, and decisional control over care was 23.23. The score of the personal life situation for ICS-A & B exhibited a lower score, which can be attributed to having four items compared to clinical life situation (seven items) and decisional control over care (six items). This study's evaluation of transplant nurses' perceptions of individualized care adds weight to nurses' unclear view of how individualized care is supported and provided.

These findings of this study are consistent with previous studies, which demonstrated that nurses across various clinical settings generally face challenges in providing individualized care, mainly concerning personal life situations. Suhonen et al. (2012) observed vocational and registered nurses working in long-term care units to have a low score on the personal life situation domain. Suhonen, Stolt et al. (2011) also found licensed practical and registered nurses caring for older adults in four long-term caring settings to score low in personal life situation and decisional control over care domains.

The personal life situation domain requires nurses to consider an individual's personality and worldview. Therefore, nurses should consider asking patients about their situations, such as employment, cultural background, daily activities, preferences, family involvement, and earlier hospital experiences. The clinical life situation domain pertains to an individual's biological systems and needs. This domain focuses on the physical and psychological needs of a patient. So, nurses should consider the patients' abilities, capacities, resources, responses, and feelings or affective states to an illness. The decision control over care domain requires nurses to preserve an individual's autonomy. Therefore, nurses must consider the patients' knowledge about their illness, treatments, decision-making abilities, care alternatives, views or opinions, and proposed care actions.

The individualized care strategies concerning personal life situation consider a holistic assessment that involves the patient's physical health, emotional health, social well-being,

lifestyle, and family dynamics that are unique to their situation. For example, the development of goals of care is accomplished by having a patient complete a directive to physicians and family or surrogates living will fulfill this life situation. For the clinical life situation, the individualized care strategy is to customize care plans that provide health education regarding medication regimen, signs and symptoms of infection or rejection, and maintaining a healthy lifestyle. For example, using home digital medical devices to monitor vital signs and biometrics capturing heart function and lung sounds virtual are approaches to manage this situation. The individualized care strategies for decisional control over care use shared decision tools that support patients in the self-management of their healthcare needs and life situations. Therefore, transplant nurses should guide transplant recipients, living donors, and their families to complete a living will, the use of biometrics or home monitoring devices, and the recognition of shared-making opportunities.

Relationship Between TNC and IC Levels

This study found a strong positive correlation between nurses' perceived transplant nursing competency and individualized care levels ($r = .988$). This finding underlines the significance of the ANA and ITNS's (2016) standards of practice in guiding nurses to develop a personalized care plan that aligns with the nursing process. For example, the Outcomes Identification standard emphasizes that nurses must identify expected outcomes of care that are individualized to the patient's unique circumstances. The ICS A & B instrument (2009) supports nurses in considering various factors, including a patient's decision-making ability, clinical aspects, and personal view of the health situation. For example, it assesses how nurses engage with patients about their emotions regarding their illness and prompts nurses to consider patients' feelings about their condition. Therefore, the TNC and ICS A & B instruments are pivotal in evaluating nurses' perceptions of transplant nursing competency and their capacity to provide individualized care.

Previous studies have consistently observed the relationship between nursing competency and individualized care. Jeong and Seo (2022) and Katja et al. (2022) found that nurses working on a general inpatient floor with a good level of nursing competence were inclined to provide a higher level of individualized care. Similarly, Istomina et al. (2011) discovered that nurses working on a surgical inpatient floor with a good level of nursing competence correlated with the quality of nursing care such as task-oriented activities, human-oriented activities, and progress of the nursing process.

It is worth noting that Waterman et al. (2020) investigated the pathway to transplant for kidney patients and found statistically significant differences between those who received a tailored intervention and those who received standard care education. The kidney transplant patients who received the individualized (tailored pathway) showed an increase in readiness (47%) compared to those who received standard care education (33%, $p = .003$), along with improved transplant knowledge (effect size = .41, $p < .001$). This study's findings underscore the effectiveness of individualized care in improving patient outcomes in the context of transplantation.

Therefore, given the consistent findings of previous studies and the present research, it is recommended to increase transplant nursing education at all levels of nursing education and incorporate effective individualized care strategies.

Relationship of Nurse Characteristics With TNC and IC Levels

In this study, nurses' perceived TNC level significantly varied by the nursing characteristics, such as age, gender, years as a registered nurse, transplant nursing setting, and ethnicity. Additionally, nurses' perceived IC level was significantly different by race and addition, age, gender, years as a registered nurse, transplant nursing setting, and ethnicity. The study's findings are similar to Flinkman et al.'s (2017) systematic review of nurses' general competence across healthcare settings. In which age, length of work experience, practice environment, and participation in educational programs correlated positively with the perception

of higher nurse competence. Furthermore, Istomina et al. (2011), Meretoja et al. (2015), and O'Leary (2012) found that nurses' general competence levels were positively associated with the age of the nurse, the length of work experience in healthcare and the work experience in the current unit.

The mean age of the nurse participants in this study was 32.21($SD = 6.59$). Interestingly, the younger nurses perceived higher levels of TNC and IC. This finding appears to contradict previous studies. O'Leary (2012), Suhonen et al. (2010), and Suhonen et al. (2012) found that as nurses' age increased, so did their competency levels and individualized care. This discrepancy can be attributed to the changes in exposure to transplant nursing care needs and the availability of relevant training opportunities over the past decades. An essential factor to consider is the significant rise in SOT transplants, which has surged from more than 30,000 since 2015 to more than 42,000 in 2022 (OPTN, 2022). This increased number of transplantations demands more nursing workforce and transplant nursing care education. So, younger nurses, compared to their older counterparts, may have more access to transplant care education and training opportunities. Further research is necessary to evaluate TNC and IC levels across different nurse generations and develop customized training modules catering to their needs and experiences.

This study found female nurses perceived a higher level of TNC and IC when compared to male nurses. Nonetheless, when reviewing the results of the regression analysis, the TNC standardized beta coefficients for years as an RN (.340) and transplant care setting (.278) surpassed the coefficient for gender (.256). Similarly, the IC standardized beta coefficients for transplant care setting (.292) and years as an RN (.290) were higher than the coefficient for gender (.232). Consequently, further analysis is needed to delineate the distinct impacts of years as an RN and working in transplant-specific care settings on TNC and IC, considering each gender.

This study found that the scope of practice did not significantly predict the levels of TNC and IC, as the average scores of TNC for RN (340.11) and APRN (328.20) differed slightly. Likewise, the IC average scores for RN (66.10) and APRN (63.68) were reasonably alike. However, the ANA and ITNS (2016) have established distinct standards of practice for the RN and APRN, with the APRN having four additional standards of practice encompassing 27 competencies. Idvall et al. (2012) found that the nurses' scope of practice (practical nurse, RN, specialized nurse) had a significant association with nurses' view of patient individuality and the delivery of individualized care. Therefore, further research is necessary to assess the competencies in line with the scope of practice defined by ANA & ITNS (2016).

In this study, the transplant nurses who had more years as an RN were likely to perceive higher levels of TNC and IC. This finding aligns with Benner's (1982) and Ozdemir's (2019) conclusions that nursing competency and individualized nursing care tend to increase as nurses progress from a novice to an expert. Flinkman et al. (2017) and Suhonen et al. (2012) also found that the length of nurses' work experience was positively correlated with increased nursing competency and practice of individualized care. Interestingly, this study found no significance in predicting TNC and IC levels by the years as an APRN. No previous studies have explored the relationships between years as an APRN, TNC, and IC levels. Thus, further research is needed to evaluate the years as an APRN with their perceived TNC and IC levels.

The years of practice in direct care for transplant patients in the participants of this study were, on average, four years and were not significant in predicting TNC and IC levels. This finding is contradictory to previous studies. For example, Flinkman et al. (2017) and O'Leary (2012) found that the length of work experience in the current work unit is positively associated with the level of nursing competency. Suhonen et al. (2012) also concluded that nurses with an average of 16 years of nursing experience and seven years working in the current long-term care unit had an increased positive view of supporting patient individuality. However, this study found the type of transplant setting predicted higher TNC and IC levels. Nurse participants who

worked in a non-transplant setting showed lower levels of TNC and IC. A cause for the lower levels of TNC and IC in these nurse participants can be attributed to the complex medical management that transplant recipients require. Turner et al. (2018) conducted a qualitative study to evaluate renal transplant recipients' hospital experience with nurses on a general floor. The recipients felt that the floor nurses did not understand the importance of their immunosuppressive medications and ignored their (recipients) opinions about the care received.

This study discovered a significant difference in the IC levels between Hispanic and non-Hispanic nurses and significant variations in TNC and IC levels among nurses of different racial backgrounds. Understanding and respecting the cultural, religious, and ethical beliefs influencing decision-making and preferences is paramount in providing individualized care. Further studies are needed to gain a more profound understanding of the various facets of individualized care with nurses from different races and ethnic groups.

Implications of the Study

Implications for Transplant Nursing Practice

It is essential to perform continuous assessments of TNC and IC. The TNC instrument will assist with identifying learning opportunities and practice gaps necessary to improve the quality of transplant nursing care. The missing IC elements can guide the development of content for educational modules and strategies that promote and facilitate transplant nurses in delivering individualized care to SOT recipients, living donors, and their families. Furthermore, transplant nurses must include patients when developing a care plan, as this will enhance the delivery of individualized care.

Implications for Transplant Nursing Education

This study's findings on nurses' perceptions of transplant nursing competency and individualized care levels support the development of core curriculum and educational tools for student nurses, newly graduated nurses, and practicing registered nurses. Using the nursing process and implementation of individualized care strategies will support transplant nurses in

adhering to the standards of the TNC and the IC elements. Most importantly, transplant nurses must address the patient's situation and engage in decision-making when caring for transplant recipients, living donors, and their families. Additionally, educational modules and training programs will enhance the nurses' characteristics, such as the highest level of education, the scope of practice, and the type of nursing setting, predicting a correlational relationship with the TNC and IC levels. In turn, this enables the development of continuous education programs or curricula tailored to the identified areas of weakness in TNC and IC levels.

Implications for Transplant Nursing Research

Transplantation is diverse and specific to each facility, city, state, or country. This study focused on the TNC and IC levels perceived by nurses engaged in care for SOT recipients, living donors, and their families. Notably, the newly developed TNC instrument, in addition to the ICS-Nurse A & B instrument, showed high reliability. These two instruments can be applicable for measuring transplant nursing competency and individualized care levels among nurses caring for other types of transplant recipients, living donors, and their families.

A future study can combine qualitative methods with this quantitative research study. The qualitative research method will assist in developing concepts to explore the subject's experiences, opinions, and attitudes through observations or interviews. This mixed-method research aims to attain greater knowledge and understanding of the correlation relationship between transplant nursing competency, individualized care levels, and nurses' characteristics. Additional research studies would examine transplant nursing competency, individualized care levels, and nurse characteristics among various countries. The findings of this international study can explain the correlation relationship predicted by the nurses' culture and ethnicity. In addition, another research study would examine nurses' perceptions of TNC and IC levels by type of organ transplant, such as heart, lung, kidney, liver, and pancreas. This research can foster the development of strategies that guide transplant nurses in improving the quality of nursing care for each transplant recipient. Lastly, another quantitative research study examines

transplant recipients, living donors, their families, and transplant nurses' perceptions of individualized care. This research study can be used to understand individualized care practices from the patients' and nurses' perspectives.

Limitations of the Study

A limitation of this study is the use of convenience sampling, which recruited nurses through the ITNS organization, nurses working in transplant centers, ITNS Twitter, ITNS central, ITNS LinkedIn, and ITNS Facebook. As a result, the sample may not fully represent all U.S. transplant nurses. Also, the reliance on self-reporting data does not allow for validation through alternate sources. Additionally, the surveys did not include the participants' subjective experiences regarding transplant nursing competency and the provision of individualized care. In qualitative research, subjective experiences can be critically examined. They may offer an additional layer of understanding regarding the transplant nurses' experiences delivering individualized care to SOT recipients, living donors, and their families.

Summary

This study adds new knowledge to the gap in the literature on nurses' perceptions of transplant nursing competency and individualized care. The TNC instrument was reliable in measuring nurses' perceptions of transplant competency level. Most importantly, the TNC instrument addressed the pathophysiology, physiological, and psychosocial needs of transplant recipients, living donors, and their families and supports the patient's individualized needs. The IC instrument is also reliable in measuring nurses' perceptions of individualized care. In addition, the IC instrument aligns with the TNC to ensure nurses consider the patient's knowledge about their illness, care alternatives, and decision-making abilities. Furthermore, the study found a strong positive correlation between nurses' perceived transplant competency and individualized care levels. The nurses' characteristics, such as age, gender, years as a registered nurse, transplant nursing setting, and ethnicity, significantly predicted the perceived

TNC and IC levels. Also, the nurse's characteristics, such as race, significantly predicted the IC level.

This study's implications for transplant nursing practice are to perform continuous assessments of TNC and IC levels to identify learning opportunities for transplant nurses. The implications for transplant nursing education are to develop continuous educational tools that strengthen the weak areas in the TNC and IC levels. In conclusion, the correlational relationship between TNC and IC levels of nurses' characteristics in this study requires different perspectives, leading to implications for further transplant nursing research.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD-MODIFICATION APPROVAL LETTER

From: do-not-reply@twu.edu
To: Ramirez, Alicia: Lee, Mikiyoung
Subject: IRB-FY2022-130 - Modification Approval
Date: Tuesday, April 11, 2023 10:37:17 AM



Texas Woman's University
Institutional Review Board (IRB)

irb@twu.edu

<https://www.twu.edu/institutional-review-board-irb/>

April 11, 2023

Alicia Ramirez
Nursing - Dallas, Nursing - Houston

Re: Modification - IRB-FY2022-130 Nurses' Perceptions of clinical competency and individualized care in relation to solid organ transplantation

Dear Alicia Ramirez,

The modifications listed below have been reviewed and approved on April 10, 2023 by the TWU IRB - Dallas.

Modifications:

1. The title of the study has changed from: *"Nurses' perceptions of clinical competency and individualized care in caring for solid organ transplant recipients"* to *"Nurses' Perceptions of clinical competency and individualized care in relation to solid organ transplantation."*
2. The estimated study date end date has been updated from May 31, 2023, to December 15, 2023.*
3. The wording of the research questions is improved by adding the words 'transplant,' 'living donors,' and 'their families.' Also, the word 'actual clinical practice' is removed because it will not be measured.
4. Inclusion criteria is slightly updated as the following: Registered nurses and advanced practice registered nurses with a minimum of 6 months experience and currently caring for solid organ transplant recipients or living donors and their families in the United States because this study focuses on the perceptions of the nurses who care for solid organ transplant recipients.
5. Social media sites used for recruitment have been updated. The study invitation email and the flyer are updated with the revised inclusion and exclusion criteria and compensation amount.
6. Only if the participant wants to enter a drawing, they will be asked to provide their

email addresses. The updated survey now only asks for the participants' email addresses only and no longer asks for their names.

7. The description of the benefits for the participants is updated consistently.
8. Participants who opt-in to receive compensation will provide email addresses only.
9. The study procedures are slightly updated as the following:
 - The social media URL addresses are changed to post a study flyer.
 - The online survey platform changed from REDCaps to Qualtrics.
 - The demographic questionnaire has three additional questions: 1) working country, 2) years practiced in direct care for transplant recipients and living donors, and 3) type of nursing setting.
 - The Nurse Competence Scale (NCS) is replaced with the Transplant Nursing Competency (TNC) scale.
 - The estimated time for survey completion is reduced from 25-35 minutes to 25-30 minutes because the number of items has been reduced from 199 to 136.
 - The compensation mechanism for participants is modified as follows: The participants will be asked to provide an email address to enter a drawing to win one of the thirty \$50 Amazon e-gift cards. An Amazon e-gift code will be sent to the email address provided by the participant.
 - A series of multiple regression analyses will be additionally conducted.

**Note: Although the PI has updated the estimated study end date, the expiration date still remains 5/31/23. The PI will need to submit a renewal to update the expiration date.*

If you have any questions or need additional information, please email your IRB analyst at irb@twu.edu or refer to the [IRB website](#).

Sincerely,

TWU IRB - Dallas

APPENDIX B
QUALTRICS SURVEY



Participation Consent Form

Participant Consent Form

The survey of nurses' perceptions of clinical competency and individualized care

The Purpose of the Study

The purpose of the study is to describe nurses' perceptions of transplant nursing competency and individualized care when caring for solid organ transplant recipients, living donors, and their families and examine the relationship between nurses' perceived transplant nursing competency and individualized care levels and nurse characteristics.

Eligibility to participate in the study

You must be a registered nurse or advanced practiced registered nurse working in the United States and provide direct patient care to solid organ transplant recipients, living donors, and their families with a minimum of 6 months experience, and you need to be age 18 years or older.

Participant Involvement

Your participation in this research study is completely voluntary, and you may withdraw from the study at any time without penalty. The survey contains questions about your perceptions of clinical competency and individualized care for solid organ transplant recipients, living donors, and their families. Some questions will require your answers before moving on; you can continue or stop the survey at any time. This survey is expected to take about 25-30 minutes to complete.

Compensation for participation

To thank you for completing the survey, you will have an opportunity to voluntarily enter a drawing to win one of the thirty \$50 [Amazon e-gift cards](#).

Anonymity

There is a minimal risk of a loss of anonymity. Your email address will be requested to be entered

https://twu.qualtrics.com/Q/EditSection/Blocks/Ajax/GetSurveyPrintPreview?ContextSurveyID=SV_ewFH5x3CwvgEz7E&ContextLibraryID=UR_a4M... 1/31

into the drawing to win an Amazon e-gift card at the completion of the study. Your email address will not be attached to any of the survey data provided by the participant. All survey data will be labeled and identified with a unique participant number only. No one will be able to identify you with the research data.

Confidentially

There is a potential risk of loss of confidentiality in all email, downloading, meetings, and internet transactions. Confidentiality will be protected to the extent that is allowed by law. All identifiable information will remain confidential and will be stored separately from the research study data. The researchers will ensure the security of all the research data collected from this study by saving the data in the researcher's password-protected database until the study findings are published. When the results of the research are published or discussed at conferences, no identifiable information will be used. After the study results are published, the study data will be erased/destroyed.

Coercion

A possible risk is a coercion. Your decision to participate or to decline participation in this study does not jeopardize your standing with the organization or place you at risk of losing your membership or your position with the organization. If you decide to stop participating, there will be no penalties, intimidation, or inducement.

Investigator Contact

Alicia Ramirez, a Ph.D. student in the College of Nursing at Texas Woman's University. This study is part of her research as a student. If you have any questions regarding the research study purpose or procedures, you may contact Alicia Ramirez at aliciaramirez@twu.edu and her advisor Dr. Mikyoung Lee at MLee27@twu.edu at any time before, during, and after the completion of the study.

IRB contact

If you have questions about your rights as a participant in this research or the way this study has been conducted, you may contact the TWU Office of Research and Sponsored Programs at 940-898-3378 or via e-mail at IRB@twu.edu

The researchers will try to prevent any problems that could happen because of this research. You should let the researchers know at once if there is a problem, and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

Statement of Consent

By selecting "I agree" below, you are consenting to participate in this research study and are declaring that you are an eligible participant and at least 18 years old, read and understand the information provided above.

Statement of Consent

- ☐ I agree to participate in this survey.
- ☐ I do not agree to participate in this survey.

Working Country

Are you currently working in the United States?

- ☐ Yes
- ☐ No

Nurse Characteristics

What is your age (years)?

Gender

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ I do not want to answer

Educational level

What is your highest level of education level in nursing completed?

- ☐ Associated Degree or Diploma
- ☐ Bachelors
- ☐ Masters
- ☐ Doctoral

Scope of Practice

What is your scope of practice?

- ☐ RN (registered nurse)
- ☐ APRN (advanced practice registered nurse)

Years as an RN

How many years have you practiced nursing as a **registered nurse**? (If you work less than 1 year, please use decimal. e.g., 6 months = 0.5 years)

Years as an APRN

How many years have you practiced nursing as **advanced practice registered nurse**? (If you work less than 1 year, please use decimal. e.g., 6 months = 0.5 years, and 0 months = 0 years.)

Direct care of SOT

How many years have you **practiced in direct care for transplant patients**? (If you work less than 1 year, please use decimal. e.g., 6 months = 0.5 years, and 0 months = 0 years.)

Type of nursing setting

What healthcare setting are you currently working?

- ☐ Transplant Center-Outpatient
- ☐ Transplant Designated Floor-Inpatient
- ☐ Critical Care Unit/Intensive Care Unit- **Transplant Specific**
- ☐ Post Anesthesia Care Unit
- ☐ Medical/Surgical Floor-**NOT Transplant Specific**
- ☐ Critical Care Unit/Intensive Care Unit-**NOT Transplant Specific**
- ☐ Other, please specify

Language

What is your primary language?

- ☐ English
- ☐ Spanish
- ☐ Tagalog
- ☐ Vietnamese
- ☐ French
- ☐ Other, please specify

Race

What is your race?

- ☐ Caucasian
- ☐ Black or African American
- ☐ American Indian and Alaska Native
- ☐ Asian
- ☐ Native Hawaiian and Other Pacific Islander
- ☐ I do not want to answer

Ethnicity

What is your ethnicity?

- ☐ Hispanic
- ☐ Non-Hispanic
- ☐ I do not want to answer

Assessment

In 2016 the American Association of Nurses (ANA) and International Transplant Nurses Society (ITNS) published authoritative statements describing the duties of nurses practicing within the roles, population, and specialty of solid organ transplantation.

Please mark the best answer that represents the extent to which you AGREE or DISAGREE with each statement listed below.

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Collects comprehensive data in a systematic and ongoing process, including but not limited to physical, functional, psychosocial, emotional, cognitive, sexual, cultural, age-related, environmental, spiritual/process while honoring the uniqueness of the individual transplant patient.	☐	☐	☐	☐	☐
Elicits the patient's values, preferences, expressed needs, and knowledge of the healthcare situation.	☐	☐	☐	☐	☐
Includes the patients (regardless of age), their family and support system, and interprofessional healthcare team members in holistic data collection across the continuum of transplant care from acute to community care to end of life.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Identifies barriers (e.g., psychosocial, literacy, financial, cultural) to effective communication and makes appropriate adaptations.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Recognizes the impact of personal attitudes, values, and beliefs.	☐	☐	☐	☐	☐
Assesses family dynamics and impact on patient's health and wellness.	☐	☐	☐	☐	☐
Priorities data collection based on the patient's immediate condition or anticipated needs.	☐	☐	☐	☐	☐
Uses developmentally appropriate evidence-based assessment techniques and instruments, analytical models, and problem-solving tools in data collection.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Applies ethical, legal and privacy guidelines and policies to the collection, maintenance, use, and dissemination of data and information.	☐	☐	☐	☐	☐
Recognizes the patient as the authority on their own health by honoring their care preferences.	☐	☐	☐	☐	☐
Documents relevant data in a comprehensive and retrievable format.	☐	☐	☐	☐	☐
Synthesizes data, information, and knowledge relevant to the situation to identify patterns and variances.	☐	☐	☐	☐	☐

Diagnosis

Please mark the best answer that represents the extent to which you AGREE or DISAGREE with each statement listed below.

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Derives diagnoses, problems, or needs based on assessment data.	☐	☐	☐	☐	☐
Validates diagnoses, problems, or needs with the patients, their family and support system, members of the interprofessional team, and other healthcare providers when possible and appropriate.	☐	☐	☐	☐	☐
Identifies actual or potential risks to the transplant patient's health and safety or barriers to health, which may include but are not limited to interpersonal, systematic, or environmental circumstances.	☐	☐	☐	☐	☐
Uses standardized classification systems and clinical decision support tools, when available, in identifying diagnoses.	☐	☐	☐	☐	☐
Documents diagnose or issues in a manner that facilitates the determination of the expected outcomes and plan.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Derives diagnoses encompassing identified or potential age-related physical, psychological, social, or developmental problems.	☐	☐	☐	☐	☐
Derives diagnoses encompassing the need for rehabilitation care posttransplant based on comorbidities, developmental level, and psychosocial status.	☐	☐	☐	☐	☐
Derives diagnoses encompassing support and educational needs of caregivers.	☐	☐	☐	☐	☐
Derives diagnoses encompassing any present, or potential, physical, or psychosocial environmental problem.	☐	☐	☐	☐	☐

Outcome Identification

Please mark the best answer that represents the extent to which you AGREE or DISAGREE with each statement listed below.

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Involves the patient, family, support system, healthcare providers, and others in formulating expected outcomes when possible and appropriate.	☐	☐	☐	☐	☐
Derives culturally and age-appropriate expected outcomes from the diagnoses that are patient-oriented, evidence-based, attainable, and realistic in relation to the patients', caregivers', and their support systems' present and potential abilities.	☐	☐	☐	☐	☐
Considers associated risks, benefits, costs, current scientific evidence, the trajectory of the condition, and clinical expertise when formulating expected outcomes.	☐	☐	☐	☐	☐
Defines expected outcomes in terms of patient values, culture, and ethical considerations.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Includes a time estimate for the attainment of expected outcomes.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Develops expected outcomes that provide direction for continuity of trasplant care.	☐	☐	☐	☐	☐
Modified expected outcomes based on patient changes and evaluation of the situation.	☐	☐	☐	☐	☐
Documents expected outcomes as measurable goals.	☐	☐	☐	☐	☐

Planning

Please mark the best answer that represents the extent to which you AGREE or DISAGREE with each statement listed below.

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Develops a plan of care with the patients, their family and support system, and others considering the person's characteristics or situation, including but not limited to values, beliefs, spiritual and health practices, preferences, choices, developmental level, coping style, culture and environment, and available technology.	☐	☐	☐	☐	☐
Participates in the design and development of interprofessional processes to address the situation or issue.	☐	☐	☐	☐	☐
Supports the integration of clinical, human, and financial resources to enhance and complete the decision-making process.	☐	☐	☐	☐	☐
Establishes plan priorities with the patients, their support system, and others as appropriate to meet the goals of the plan of care.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Demonstrates the ability to set achievable goals through realistic interventions that are measurable.	☐	☐	☐	☐	☐
Supports the use of clinical guidelines linked to positive patient outcomes.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Includes strategies in the plan that addresses the promotion and restoration of health.	☐	☐	☐	☐	☐
Includes strategies in the plan that addresses the prevention of illness, injury, and disease.	☐	☐	☐	☐	☐
Includes strategies in the plan that addresses the alleviation of suffering.	☐	☐	☐	☐	☐
Includes strategies in the plan that addresses supportive care for those who are dying.	☐	☐	☐	☐	☐
Includes strategies for health and wholeness across the lifespan.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Provides for continuity in the plan of care.	☐	☐	☐	☐	☐
Incorporates an implementation pathway or timeline in the plan.	☐	☐	☐	☐	☐
Considers the economic impact of the plan on the patients, their families, and their support system.	☐	☐	☐	☐	☐
Integrates current scientific evidence, trends, and research in the planning of care.	☐	☐	☐	☐	☐
Utilizes the plan to provide direction to other members of the transplant team.	☐	☐	☐	☐	☐
Explores practice setting and safe space and time for the nurses and the patient to explore suggested, potential, and alternative options.	☐	☐	☐	☐	☐
Defines the plan to reflect current statutes, rules and regulations, and standards.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Modifies the plan according to the ongoing assessment of the patient's response and other outcome indicators.	☐	☐	☐	☐	☐
Contributes to the development and continuous improvement of organizational systems that support the planning process.	☐	☐	☐	☐	☐
Documents the plan in a manner that uses standardized language or recognized terminology.	☐	☐	☐	☐	☐

Implementation

Please mark the best answer that represents the extent to which you AGREE or DISAGREE with each statement listed below.

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Partners with the patients, their support system, and caregivers as appropriate to implement the plan in a safe, realistic, and timely manner.	☐	☐	☐	☐	☐
Demonstrates caring behaviors toward patients, significant others, and groups of people receiving care.	☐	☐	☐	☐	☐
Utilizes technology to measure, record, and retrieve transplant patient data, implement the nursing process, and enhance nursing practice.	☐	☐	☐	☐	☐
Utilizes evidence-based interventions and treatments specific to the diagnosis or problem.	☐	☐	☐	☐	☐
Provides holistic care that addresses the needs of diverse populations across the life span.	☐	☐	☐	☐	☐
Advocates for health care that is sensitive to the needs of patients, with particular emphasis on the needs of diverse populations.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Applies appropriate knowledge of major health problems and cultural diversity, particularly related to organ transplantation, in implementing the plan of care.	☐	☐	☐	☐	☐
Applies available healthcare technologies to maximize access and optimize outcomes for patients.	☐	☐	☐	☐	☐
Utilizes community resources to help implement the plan of care.	☐	☐	☐	☐	☐
Collaborates with healthcare providers from diverse backgrounds to implement and integrate the plan.	☐	☐	☐	☐	☐
Accommodates for different styles of communication used by patients, families, support systems, and healthcare providers.	☐	☐	☐	☐	☐
Integrates evidence-based traditional and complementary healthcare practices as appropriate.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Implements the plan in a timely manner in accordance with patient safety goals.	☐	☐	☐	☐	☐
Employs fundamentals of project or systems management.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Uses consensus-driven clinical guidelines.	☐	☐	☐	☐	☐
Promotes the transplant patient's capacity for the optimal level of participation and problem-solving.	☐	☐	☐	☐	☐
Document implementation and any modifications, including changes or omissions, of the identified plan.	☐	☐	☐	☐	☐
Organizes the components of the plan.	☐	☐	☐	☐	☐
Manages a patient's care to maximize independence and quality of life.	☐	☐	☐	☐	☐
Assists the patient to identify options for alternative care.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Communicates with the patient, family, support system, and system during transitions in care.	☐	☐	☐	☐	☐
Advocates for the delivery of dignified and humane care by the interprofessional team.	☐	☐	☐	☐	☐
Documents the coordination of care and reports any unexpected outcomes in implementing care.	☐	☐	☐	☐	☐
Documents plan-of-care communications, rationales for plan-of-care changes, and collaborative discussions to support and advance patient care and the well-being of the family and support system.	☐	☐	☐	☐	☐
Assists in developing modifications in care delivery.	☐	☐	☐	☐	☐
Provides direct care that implements the plan.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Provides health teaching that addresses such topics as healthy lifestyles, risk-reducing behaviors, patient self-monitoring, developmental needs, activities of daily living, and preventive self-care.	☐	☐	☐	☐	☐
Uses health promotion and teaching methods appropriate to the situation and the patient's developmental level, learning needs, readiness, ability to learn, literacy level, language preference, spirituality, culture, and socioeconomic status.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Seeks opportunities for feedback and evaluation of the effectiveness of the strategies used.	☐	☐	☐	☐	☐
Uses information technologies to communicate health promotion and disease prevention information to the patient in a variety of settings.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Provides patients with information about the intended effects and potential adverse effects of proposed therapies.	☐	☐	☐	☐	☐

Evaluation

Please mark the best answer that represents the extent to which you AGREE or DISAGREE with each statement listed below.

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Conducts a systematic, ongoing, and criterion-based evaluation of the outcomes in relation to the structures and processes prescribed by the plan of care and the indicated timeline.	☐	☐	☐	☐	☐
Collaborates with the patient and others involved in their care during the evaluation process.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Evaluates, in partnership with the patient, the effectiveness of the planned strategies in relation to the patient's responses and the attainment of the expected outcomes.	☐	☐	☐	☐	☐
Uses ongoing assessment data to revise the nursing diagnoses, the plan, and the implementation as needed.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Disseminates the results to the patient, family, and others involved in accordance with federal and state regulations.	☐	☐	☐	☐	☐
Participates in assessing and assuring the responsible and appropriate use of interventions to minimize unwarranted or unwanted treatment and healthcare consumer suffering.	☐	☐	☐	☐	☐
Documents results of the evaluation.	☐	☐	☐	☐	☐

Individualized Care Scale-Support

Version A: the support of patient individuality. The statements below are concerned with the ways nurses assist their patients. Give your opinion how well each statement corresponds to your usual ways of providing nursing care. Please mark the best answer that represents the extent to which you AGREE or DISAGREE with each statement listed below.

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
I talk with patients about how they feel regarding their illness/health condition.	☐	☐	☐	☐	☐
I talk with patients about their nursing care needs.	☐	☐	☐	☐	☐
I give patients the chance to take responsibility for their care as much as they are able.	☐	☐	☐	☐	☐
I identify when patients' feelings toward their care or illness/condition change.	☐	☐	☐	☐	☐
I talk with patients about their fears and anxieties.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
I make an effort to find out how their illness/health condition affects them.	☐	☐	☐	☐	☐
I talk with patients about what their illness/health condition means to them.	☐	☐	☐	☐	☐
I ask patients what activities they do in their everyday life outside the hospital (work, leisure activities).	☐	☐	☐	☐	☐
I ask patients about their previous experience with hospitalization.	☐	☐	☐	☐	☐
I ask patients about their daily habits (e.g. personal hygiene).	☐	☐	☐	☐	☐
I ask patients whether they want their family to take part in their care	☐	☐	☐	☐	☐
I give instructions to patients using language that is easy for them to understand.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
I ask patients what they want to know about their illness/health condition.	☐	☐	☐	☐	☐
I listen to patients' personal needs regarding their care.	☐	☐	☐	☐	☐
I help patients take part in decisions concerning their care.	☐	☐	☐	☐	☐
I encourage patients to express their opinions on their care.	☐	☐	☐	☐	☐
I ask patients at what time they would prefer to have a bath.	☐	☐	☐	☐	☐

Individualized Care Scale-Perceptions

Version B: perceptions of individuality in care. The statements below are concerned with the nursing care you have provided to your patients in the last shift. Please mark the best answer that represents the extent to which you AGREE or DISAGREE with each statement listed below.

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
I took into account how they feel about their illness/health condition.	☐	☐	☐	☐	☐
I took into account their nursing care needs.	☐	☐	☐	☐	☐
Patients assumed responsibility for their care as much as they were able.	☐	☐	☐	☐	☐
I took into account when patients' feelings toward their care or illness/condition changed.	☐	☐	☐	☐	☐
I took into account their fears and anxieties.	☐	☐	☐	☐	☐
I took into account how their illness/health condition has affected them.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
I took into account what their illness/health condition means to them.	☐	☐	☐	☐	☐
I took into account their daily activities (e.g. work, leisure activities) outside the hospital.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
I took into account their previous experience(s) with hospitalization.	☐	☐	☐	☐	☐
I took into account their daily habits during their stay in the hospital (e.g., personal hygiene).	☐	☐	☐	☐	☐
Patients' family member took part in the care of my patients if they wanted them to do so.	☐	☐	☐	☐	☐
I made sure they understood the instructions given.	☐	☐	☐	☐	☐
	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
I gave them appropriate information about their illness/health condition.	☐	☐	☐	☐	☐
I took into account their wishes regarding their care.	☐	☐	☐	☐	☐
Patients took part in decision-making concerning their care.	☐	☐	☐	☐	☐
I took into account their opinions about their care.	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree to Some Extent	Neither nor Disagree	Agree to Some Extent	Strongly Agree
Patients had the opportunity to make their own decision when to take a bath.	☐	☐	☐	☐	☐

Participation Incentive Form

Thank you for taking the survey! If you are interested to win one of the thirty \$50 Amazon e-gift cards? Please indicate 'yes' or 'no.' Your email address will not be linked to your survey responses (you will be taken to a different survey).

- ☐ Yes
- ☐ No

End of Study

We thank you for your time spent taking this survey.

Your response has been recorded.

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