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Patients' perceptions of stressors in the intensive care unit : a meta-analysis

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In The Intensive Care Unit:
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ABSTRACT

This study reveals what intensive care unit (ICU) patients from different countries consider most stressful about the ICU experience. A review of 16 independent studies on patients' perceptions of ICU stressors yielded 10 data sets from seven countries that met criteria for inclusion in a meta-analysis. Stressors were categorized according to three types – bodily, psychological, and physical environmental – and were selected for comparison based on their frequent appearance among the top 20 stressors in each study selected. Findings showed considerable agreement between studies. *Being in pain, Having tubes in the nose and mouth,* and *Being thirsty* were found to be the top ICU stressors of the top 25 identified. Bodily stressors had the highest combined mean value, but mean differences were determined not to be statistically significant. Given the diversity of studies sampled, these findings indicate that certain aspects of the ICU may be universally stressful to patients.

Keywords: intensive care unit, stressor, stress, patient, culture

PATIENTS' PERCEPTIONS OF STRESSORS IN THE INTENSIVE CARE UNIT: A META-ANALYSIS

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CHAPTER I

Introduction

Nearly six million people are admitted annually to intensive care units (ICUs) in the United States alone (Society for Critical Care Medicine, 2016e). Patients admitted to intensive care units frequently experience stress precipitated by multiple bodily, psychological and physical environmental factors. Common stressors include *Being in pain*, *Fear of death*, and *Being thirsty* (Novaes, Knobel, Bork, Pavo, Nogueira-Martins & Ferraz, 1999; Pang & Suen, 2008; Yava, Tosun, Ünver & Çiçek, 2011; Soehren, 1995). In addition to interfering with physical healing and patient comfort, ICU stress increases the likelihood of patients developing short- and long-term psychiatric disturbance following an ICU stay (McGiffin, Galatzer-Levy & Bonanno, 2016; Davydow, Katon & Zatzick, 2009; Davydow, Gifford, Desai, Needham, & Bienvenu, 2008; Griffiths, Fortune & Barber, 2007). These risks combined with gaps in the current research justify further investigation into what contributes to ICU patient stress. Given the complex nature of ICU stress, this area of research benefits from the perspectives of researchers from a variety of different fields, including social work.

To date, research on ICU stressors has only been conducted by researchers in the medical professions and been published exclusively in nursing and critical care journals. This may partly explain the lack of attention to broader contextual factors that influence patients' perceptions of the ICU environment. Despite the diversity of countries represented in the ICU stressor literature, few researchers have considered culture's possible influence on ICU patient stress, a contextual factor that may reveal broader truths about what causes and mitigates such stress.

Thusly, this author offers a culturally-informed social work perspective on ICU patient stress by way of a meta-analysis of findings from nine studies on patients' perceptions of ICU stressors. This study ties together a diverse body of research, the analysis of which may offer insights into which aspects of the ICU are universally stressful to patients, pointing to culture's relative influence on ICU patient stress. Application of Lazarus and Folkman's (1984) Transactional Model of Stress and Coping helps explain the etiology and nature of ICU stress, including specific factors that shape patients' perceptions of the ICU environment.

The results of this meta-analysis have implications for ICU patient care and more specifically, for social work practice in critical care settings. Broadly speaking, the findings of this study are intended to reach individuals in a position to influence ICU best practices and improve patient care in the ICU. In particular, social workers may find that a more complex and culturally-informed understanding of ICU patient stress enables them to provide more helpful support to ICU patients. This research offers social workers a starting place for their assessment of patients' needs, particularly the needs of patients with impaired communication ability. For example, this research could serve the basis for a universal assessment tool that allows clinicians in diverse cultural contexts to more accurately and efficiently determine patients' needs in relation to specific ICU stressors. Such targeted assessment and care may accelerate ICU patients' healing, improve patient satisfaction, and ensure better mental health outcomes among patients following discharge (McGiffin et al., 2016; Davydow et al., 2009; Davydow et al., 2008; Griffiths et al., 2007).

Finally, this study highlights a need for more in-depth investigations into the psychological and cultural bases of top ranking ICU stressors and into what coping mechanisms endow patients with a greater sense of control and peace of mind in the face of these stressors.

Additional meta-analytic reviews of ICU stressor data and modifications to the methodologies of individual stressor studies is also recommended.

CHAPTER II

Literature Review

The following literature review is divided into four sections. Section one includes an explanation of key terms. Section two contains a discussion of the theoretical framework for this investigation. Section three contains an overview of studies on patients' perceptions of stressors in the ICU. Section four includes a discussion of the relationship between ICU stress and culture.

Definition of Key Terms

Intensive Care Unit (ICU)

Intensive care units, also referred to as *critical care units,* function to provide specialized care to patients with complex medical conditions with the goal of "sustain[ing] physiologic life" (Hweidi, 2007; Wenham & Pittard, 2009; Baker, 1984, p. 67). The ICU as a method of medical care was developed in the 1950s in response to the polio epidemic (Reisner-Senelar, 2011; Wenham & Pittard, 2009; Azam, 2011). In 1952, Dr. Bjorn Ibsen - considered the "father" of intensive care medicine - led the effort to create a "multidisciplinary recovery room" designed to treat polio victims with particular attention to respiratory failure (Reisner-Senelar, 2011). Ibsen's organizational aptitude combined with his innovations in manual ventilation (using tracheostomy) gave him unique insight into what was required to treat critically ill patients (Reisner-Senelar, 2011). He concluded that units should be organized around the stabilization of patient's respiratory functioning, which needed to be addressed before other medical problems

could be successfully treated (Reisner-Senelar, 2011). Since Ibsen's work, intensive care has become ubiquitous in hospital settings around the world.

The Society of Critical Care Medicine (SCCM) (2016) describes intensive care as "medical care for patients whose illness requires close, constant watch by a team of specially trained caregivers." It specifies, "any illness that threatens life requires critical care" and includes in that category all illnesses that affect the functioning of major organs including the heart, brain, gastrointestinal tract, lungs and kidneys (SCCM, 2016b). The SCCM (2016b) also includes those patients who have experienced a stroke, have a systemic infection, have been involved in a major car crash, or have suffered a major fall, serious burns, a stabbing, or a gunshot wound.

The SCCM (2016b) distinguishes between the ICU and the emergency room by describing the ICU as a setting that provides long-term care to patients with life-threatening illnesses unlike the short-term care provided to similarly afflicted patients in emergency rooms. Baker (1984, p. 66) explains that ICU patients receive "specialized services at the bedside," which rely on the "constant monitoring" of sophisticated medical equipment by doctors and nurses. The nature of these specialized services and medical equipment may differ according to the type of ICU, for example, cardiac, neurological, surgical or medical ICU (McGiffin et al., 2016). Services may include basic and complex (i.e. wound care) nursing, consultations by doctors from a variety of medical disciplines, medical testing, and physical, speech, respiratory, and occupational therapy (SCCM, 2016c). Depending on the hospital, patients may be treated by "intensivists" or medical professionals who specialize in intensive care (SCCM, 2016c). Patients may also receive support from social workers or clergy (SCCM, 2016c).

ICU care involves a broad range of interventions that help sustain or prolong life, and cure or manage illness. Many patients in the ICU receive sedation and pain medication,

depending on their pain level and necessary follow-up procedures (McGiffin et al., 2016; SCCM, 2016d). Treatment in the ICU frequently involves temporary or prolonged mechanical ventilation to assist patients with breathing (Fredriksen & Ringsberg, 2007; McKinley et al., 2002; Lusk & Lash, 2005; Van de leur et al., 2004). Patients on a ventilator may or may not need a tracheostomy for insertion of an endotracheal (breathing) tube (SCCM, 2016c). Other interventions may include the insertion of a nasal cannula, catheter, central line, nasogastric or orogastric tube (i.e. feeding tube), continuous suction on wounds, and IV therapies that deliver nutrition, hydration, antibiotics, and other substances (SCCM, 2016c, 2016d). Physical restraint may be required depending on the patients' psychological or cognitive state, for example, if they present with delirium or ICU psychosis (Baker, 1984; McGiffin et al., 2016; SCCM, 2016d). Delirium commonly results from mechanical ventilation, certain medications (namely anesthesia and pain medications), infection, dehydration, pain, sensory under- or overstimulation, and sleep disturbance; it is typically treated with antipsychotic medication (Baker, 1984; SCCM, 2016d).

Overview of Stress

The term *stress* derives from the work of physicist-biologist Robert Hooke and was adopted by the social sciences in the 20th century (Lazarus, 1993). At that time, social scientists and laypeople understood stress to be "an external load or demand on a biological, social or psychological system" (Lazarus 1993, p. 2). The understanding of stress as a psychological phenomenon evolved considerably following WWI and WWII as doctors observed the devastating psychological effects of combat on soldiers (Lazarus, 1993, p. 2). Since then, popular definitions of stress have included, "any environmental, social, or internal demand which requires the individual to readjust his/her usual behavior patterns" and "the subjective experience of stressor exposure" (Holmes & Rahe, 1967; Terrill et al., 2015, p. 290). Sociologists have

described stress as a "disturbing agent," a "strain," or a product of "social disequilibrium" (Lazarus, 1993; Smelser cited in Lazarus, 1993, p. 4).

Terrill et al. (2015) and Monat & Lazarus (1977) agree that the term "stress" has complex meanings, which partly explains the variability in the ways that stress is studied and discussed. For example, stress is often referred to as both a *cause* and an *effect*; put simply, stress may induce something to happen or be the product of something that has happened. Also, stress takes many forms; for example, many authors have distinguished between physiological and psychological, and environmental (Lusk & Lash, 2005; Fredriksen & Ringsberg, 2007; Paldon et al., 2014).

Lazarus (1966) categorized stress according to three types: threat (anticipated harm), harm (sustained harm), and challenge (a demand treated like a positive challenge). He argued against treating stress as a one-dimensional, static phenomenon, hence his subsequent investigations into its presentation and multiple functions as a cause, effect, and mediator (cited in Thoits, 1993). He stated, "Because psychological stress defines an unfavorable person-environment relationship, its essence is process and change rather than structure or stasis" (Lazarus, 1993, p. 7). However, he also described four constant elements of the stress process: a) a "causal external or internal agent," b) an evaluation, c) coping processes, and d) a "complex pattern of affects on mind and body" (Lazarus, 1993, p. 4). These elements dictated the intensity and consequences of a person's stress response.

Stress has also been explained as a product of perception. Terrill et al. (2015, p. 291) distinguished *perceived stress* (as referenced in many studies on ICU stressors) as a person's evaluation of how stressful an event or circumstance is and, more specifically, the extent to which it is "threatening, unpleasant or uncontrollable." A person experiences varying degrees of

stress as a result of his/her impression of its causes (Terrill et al., 2015). *Stress* will herein be used interchangeably with *stressor* as defined by Lazarus (1993).

ICU Stressors

ICU stressors take numerous forms and affect ICU patients in different ways. Researchers in some ICU stressor studies organize ICU stressors according to type. For example, Yava et al. (2010, p. 38) and Pang and Suen (2008) distinguished between four types of ICU stressors: physical discomfort, psychological distress, treatment procedures, and ICU environment. Paldon et al. (2014) organized the 35 stressors in their scale according to three types: physical, psychological and environmental. Lusk and Lash (2005) also organized ICU stressors according to three categories – psychological, treatment, and environmental stressors. Fredriksen and Ringsberg (2007) studied ICU patients' experience of stress in relation to their body, the ICU room, and their relationships. Based on these studies, this researcher developed three ICU stressor categories for use in this research.

Bodily stressors. ICU patients' bodily stress derives largely from the physical discomfort and pain associated with their medical condition, mechanical ventilation, follow-up surgeries, and ongoing procedures such as dressing changes, blood draws, and catheter replacements (McKinley et al., 2002; Johnson & Sexton, 1990; Wenham & Pittard 2009; Lusk & Lash, 2005). Patients also feel stress from the confusion or "haziness" brought on by certain medications, particularly pain medication (Lusk & Lash, 2005, p. 29).

Many ICU patients experience physical discomfort and subsequent distress as a result of mechanical ventilation and the process of intubation and extubation (Fredriksen & Ringsberg, 2007; McKinley et al., 2002; Lusk & Lash, 2005; Van de leur et al., 2004). McKinley et al. (2002) described one patient who felt like he was drowning and several patients who felt as

though they were swimming under water. Tubes in the nose and mouth are also a significant source of stress for ICU patients given the continuous physical discomfort they produce as well as their restriction on patient mobility (Novaes et al., 1999; Pang & Suen, 2008; Yava et al., 2011; Wong & Arthur, 2000; Lusk & Lash, 2005; Hweidi, 2007). Patients have described feeling imprisoned as a result of multiple restrictions on their mobility in the ICU (Darbyshire et al., 2016). Darbyshire et al. (2016) quoted one patient who described feeling like "a lump of meat on a butcher's table with the real me inside but not able to get out" (Darbyshire et al., 2016).

Disruption of ICU patients' normal sleep cycle also creates considerable stress for patients and commonly results from continuous exposure to bright lights, 24/7 vital sign checks, frequent administration of medications, and "unfamiliar and intense" sounds (Fredriksen & Ringsberg, 2007, p. 130; McKinley et al., 2002; Donchin, 2002; Wenham & Pittard, 2009). Wenham and Pittard (2009) report that ICU patients are awake during 30-40% of what is normally their sleep time. Disruptions to normal sleep patterns (and particularly to REM sleep) lead many patients to develop ICU-induced dementia or delirium, particularly those who have longer stays in the ICU (Donchin, 2002; Wenham & Pittard, 2009). Sleep deprivation can also cause hormonal imbalances and weaken the immune system, increasing patients' vulnerability to infection and slowing the healing of wounds (Pulak & Jensen, 2016).

Physical environmental stressors. The physical environment in the ICU is another source of stress for patients. Hay and Oken (1972) capture well the physical environment of the ICU:

> "A stranger entering an ICU is ... bombarded with a massive array of sensory stimuli. ... The greatest impact comes from intricate machinery, with its flashing lights and buzzing…monitors… One sees many people rushing around

> performing life- saving tasks. The atmosphere is not unlike that of the tension-charged …war bunker."

Each element of this overwhelming combination of stimuli has a distinct impact on an ICU patient. Many authors cite the especially stressful intrusion of bright overhead lighting and constant, loud noise in the ICU (Donchin, 2002; Fredriksen & Ringsberg, 2007; Wenham & Pittard, 2009; Lusk & Lash, 2005; Baker, 1984; Kahn et al., 1998; Van de leur et al., 2004). Fredriksen and Ringsberg (2007) and Hupcey (2000) clarify that such intrusions are stressful in part because they diminish ICU patients' sense of control over their environment, adding to existing feelings of helplessness about their medical condition. Wenham and Pittard (2009, p. 179) point out that the decibel level in ICUs often exceeds recommended levels for hospitals and can cause patients to experience "noise-induced stress." The World Health Organization recommends that hospitals maintain a noise level lower than 30 decibels; some studies have shown that ICUs commonly operate with a decibel level of 60 or higher, a noise level similar to that produced by the average vacuum cleaner (Wenham & Pittard, 2009; Kahn et al., 1998; Abuatiq, 2013). The Environmental Protection Agency (EPA) recommends that ICUs operate under a decibel level of 45 during the day and 30 at night (Kahn et al., 1998), but sounds coming from ICU patients (coughing, rattling side rails, and crying out) can reach as high as 80 decibels.

In addition to their volume, the *types* of sounds that patients hear can determine their stress response (Lusk & Lash, 2005; Baker, 1984). These include alarms bells from machinery, groaning or moaning of other patients, and the continuous drone of ventilation and other machines (Lusk & Lash, 2005; Baker, 1984). Baker (1984) explains that the frequency of ICU sounds also influences patients' responses to them. Annoyance and irritability are the common

result of hearing unwanted noise and can lead to stress that increases in proportion to the length of exposure (Baker, 1984).

Baker (1984) also identifies "crowding" as a source of environmental stress. Similar to the effect of noise and lights, being surrounded by lots of people and machines can elevate an existing feeling of not being in control, as well as impinge upon a patient's need for privacy and calm (Baker, 1984). Not having a sense of whether it is night or day can also create stress for patients and exacerbate feelings of loss of control and disorientation (Johnson & Sexton, 1990; Wenham & Pittard, 2009; Baker, 1984). Disorientation can also occur as a result of sensory overload or "bombardment" in the ICU (Baker, 1984, p. 67). As an aggregate, ICU environmental stressors can interfere with a person's normal integration of external stimuli, causing panic, anxiety, and psychosis in ICU patients (Baker, 1984).

Psychological stressors. A loss of control over themselves and their environment is a major source of psychological stress among ICU patients (Lusk & Lash, 2005; Hupcey, 2000). The extreme dependency associated with being critically ill can lead many patients to feel helpless and stressed (McKinley et al., 2002; Fredriksen & Ringsberg, 2007; Lusk & Lash, 2005). ICU patients who do not feel sufficiently informed about their condition are more prone to stress and distress, which sometimes results in their refusal of necessary treatments and arguing with hospital staff (Hupcey, 2000; McKinley et al., 2002; Johnson & Sexton, 1990). Hupcey (2000), Lusk and Lash (2005), McKinley et al. (2002), and Russell (1999) found that the presence of attentive and kind nurses helped patients feel safer, more in control, and consequently less stressed. This was particularly the case when nurses kept patients informed about the progress of their recovery (McKinley et al., 2002).

Fredriksen and Ringsberg (2007) highlight the stress resulting from prolonged separation from loved ones and from having fewer (or no) opportunities to engage in sharing with others. Intubated patients have even fewer opportunities to connect with others given their inability to communicate verbally (Fredriksen & Ringsberg, 2007; Wenham & Pittard, 2009). Any connection that patients feel to other patients may be cut short by the death of those patients, an event that is often not explicitly acknowledged by staff on the unit (McKinley et al., 2002). Some ICU patients are also preoccupied with their own mortality (Lusk & Lash, 2005). Darbyshire et al. (2016) found that seeing other patients who appeared to be dying led some patients to believe that they themselves were dying.

Mechanical ventilation has a uniquely stressful effect on ICU patients' experience of themselves and others in the ICU. Fredriksen and Ringsberg (2007) describe the emotional toll on patients of respiratory aids such as mechanical ventilation, which causes some patients to feel afraid of their degree of dependence on machinery and more broadly, to feel stuck in their current condition and situation. When ventilated, many patients fear never being able to speak again and experience extreme stress from not being understood (Wenham & Pittard, 2009).

Finally, Fredriksen and Ringsberg (2007, p. 129) cite patient's "horizontal" body position in bed as an additional source of stress as it undermines a patient's sense of power and agency in relation to others and in relation to their own circumstances.

Theoretical Framework

Lazarus and Folkman's Transactional Model of Stress and Coping

The Transactional Model of Stress and Coping provides a logical framework for explaining patients' perceptions of stressors in the ICU (Lazarus & Folkman, 1984). Still frequently cited in stress literature, Lazarus and Folkman's Transactional Model of Stress And

Coping (also known as The Cognitive Relational Theory Of Stress And Coping) explains psychological stress as the product of an "unfavorable person-environment relationship" wherein the demands of the environment overwhelm a person's ability to cope with those demands (Lazarus, 1993, p. 8; Lazarus & Folkman, 1984). According to Lazarus (1966), this imbalance is dictated more by the nature of a person's appraisal of the stressor ("demand") than by the characteristics of the stressor itself. Based on his study of people watching stress-inducing video content, Lazarus (1993) determined that the intensity with which individuals experienced the same stressor depended upon their *appraisal* of that stressor. He wrote,

> "the concept of appraisal, (which) is the process that mediates - I would prefer to say actively negotiates - between, on the one hand, the demands, constraints, and resources of the environment and, on the other, the goal hierarchy and personal beliefs of the individual" (Lazarus, 1993, p. 6).

Lazarus (1993, p. 6) distinguished between two types of appraisal, *primary appraisal* and *secondary appraisal,* which he describes as the "cognitive mediator[s]" of stress. *Primary* appraisal is an individual's evaluation of whether a given situation is stressful (Folkman, 1984, p. 840). The constellation of an individual's personality, beliefs, values, goals (or "commitments"), background, and certain characteristics of the situation (e.g. familiarity with it) informs an individual's primary appraisal of a stressor (Folkman, 1984, p. 841-842). *Secondary* appraisal constitutes an individual's evaluation of what he/she can do about a particular situation given his/her "physical, social, psychological, and material" resources (or "assets") (Folkman, 1984, p. 842). Folkman and Lazarus (1984) contend that a person's sense of control over a stressful situation is a particularly powerful determinant of the person's ability to cope with that situation. Combined, these two forms of appraisal dictate the "coping and adaptational outcome" of

stressful situations as experienced between a person and their environment, in this case, between a patient and the ICU (Folkman, 1984, p. 848).

Studies on ICU Patients' Perceptions of ICU Stressors

A review of peer reviewed journals revealed a considerable number of studies on patients' perceptions of ICU stressors.[1] These studies, conducted in a wide range of countries, reveal a pattern of stressors most salient to patients in the ICU, namely *being in pain, inability to sleep, tubes in the nose/mouth,* and *being thirsty* (Novaes et al., 1999; Pang & Suen, 2008; Yava et al., 2011; Wong & Arthur, 2000).

Sources

Studies on ICU patient stressors can be found in peer-reviewed medical journals pertaining to critical care, nursing, and other medical fields. These include: *Journal of Critical Care, International Journal of Nursing Studies, Dimensions of Critical Care Nursing, Journal of Advanced Nursing, Nursing Research, CHEST, Intensive and Critical Care Nursing, Journal of Clinical Nursing,* and *Intensive Care Medicine.* No studies on ICU patient stressors were found in journals of social work.

Instruments

Researchers in a great majority of ICU stressor studies have used a version of the Intensive Care Unit Environmental Stressor Scale (ICUESS) or the Intensive Care Unit Environmental Stressor Questionnaire (ICU-ESQ) to measure patients' perceptions of ICU stressors. Researchers developed these instruments in the 1980s largely based on the work of Volicer and Bohannon (1973; 1975) who created a stress rating scale to determine common

[1] The majority of studies examined the relationship between patients' and nurses' perceptions of ICU patient stressors and found that nurses consistently perceived ICU patients as experiencing more stress than the patients themselves reported having experienced (Novaes et al., 1999; Pang & Suen, 2008; Yava et al., 2011; Cochran & Ganong, 1989; Cornock, 1998; So & Chan, 2004).

causes of hospital patient stress (Ballard, 1981; Nastasy, 1985; Cochran & Ganong, 1989; Cornock, 1998). Subsequent researchers formulated stressors based on interviews with patients, doctors, nurses and lay people about their hospitalization experiences. Other instruments used to measure ICU patient stress have tended to be shorter surveys and include similar language to that of the ICUESS and ICU-ESQ (Paldon et al., 2014; Granja et al., 2005; Pennock, 1994).

ICUESS and ICU-ESQ. Ballard (1981) developed the original ICUESS, which contained 40 items that captured a range of ICU stressors such as "being in pain," "having no control on oneself" and "feeling that nurses are in too much of a hurry." Nastasy (1985) added "intubation" and "ICU psychosis" to the original version and asked critical care nursing experts to assess the validity of the new version (Yava et al., 2010, p. 38; Cochran & Ganong, 1989). This version relied on the following Likert scale: *not stressful, mildly stressful, moderately stressful and very stressful* (Cochran & Ganong, 1989). All subsequent versions of the ICUESS have relied on the same or similar scale. Based on input from nurse participants, Cochran and Ganong (1989) recommended the addition of eight items to Nastasy's (1985) ICUESS. Cornock (1998) incorporated these eight items into the ICUESS and renamed it the 'ICU-ESQ'. The eight items expanded the scope of the scale to include a greater number of social and emotional indicators. Cornock (1998, p. 520) also changed the fourth interval in the ICUESS Likert scale from "very stressful" to "extremely stressful."

Cultural considerations. Researchers disagree about the appropriateness of using a western scale such as the ICUESS or ICU-ESQ in non-western cultural contexts. Yava et al. (2010) point out, "most of these studies noted that the ICUESS, which was developed for use in the West, may not be appropriate or sensitive to their cultural structure (Hweidi, 2007; So and Chan, 2004)." However, based on a professional translation (and back translation) of the ICU-

ESQ into Brazilian Portuguese and subsequent validity and reliability testing, Rosa et al. (2010, p. 623) concluded, "the ESQ adapted for Brazilian culture is a reliable instrument for evaluation of stressors in the ICU."

Culture and ICU Stress

Some researchers have noted the possible influence of culture on patients' perceptions of ICU stressors and on patient reporting of stress. Pang and Suen (2008) make reference to potential cultural bias in their study, noting that participants may have underreported their stress so as to be perceived as "the good patient" – a desire reflective of Chinese cultural norms. They add that Chinese patients do not want to be perceived as challenging their doctors or complaining, which may also contribute to underreporting on stress. So and Chan (2004, p. 83) report a similar finding, stating, "the emphasis of (the) Chinese culture in maintaining social harmony probably accounts for the patients' exceptionally low total ICUESS mean score when compared with previous studies."

Soh et al. (2008) observe that one particular ethnic group in Malaysia had greater overall stress in the ICU than others surveyed, suggesting the influence of culture on ICU patient stress levels. Wenham and Pittard (2009) point out that a patient's cultural background may influence how they interpret noise in the ICU environment and that interpretation may dictate whether they feel stress about it. However, Yava et al. (2011) note agreement between ICU stressor studies from different countries:

> "There is little research on the role of culture on ICU stress. However, several studies found that patients and nurses perceived similar ICU stressors in Western and non-Western countries (Hweidi, 2007; Pang & Suen, 2008, 2009). Some

studies conducted in non-Western countries had high internal consistencies and were similar to the results of those performed in Western cultures."

These observations suggest that while there is some agreement between studies, culture may still influence patients' stress responses in the ICU.

Summary

The intensity and complexity of the ICU experience justifies a synthesis of existing data on ICU stressors and the provision of such data to individuals in a position to reform and enhance ICU best practices. ICU stressors take a myriad of forms and test patients' bodies, minds, and emotional lives. There has been a proliferation of studies on ICU stressors and aspects of the ICU environment in the past few decades, but no researcher has recently analyzed the current body of ICU stressor data using quantitative methods. The diversity of countries represented in these studies calls for a concomitant examination of the intersection of culture and patients' perceptions of the ICU.

CHAPTER III

Methodology

A comprehensive study search strategy and rigorous inclusion criteria were developed to determine a study sample appropriate for meta-analysis. ICU stressors were coded according to category and analyzed using frequency and weighted mean values.

Study Selection

Database Search. The EBSCOhost online research database was used to find studies on ICU patients' perceptions of ICU stressors. An EBSCOhost search captured articles from other databases including Medline, PsycINFO, ScienceDirect, Directory of Open Access Journals, SciELO, Informit Health Collection, and PsycARTICLES. The search was limited to peer-reviewed journals published in English with no restrictions on publication date. The article search was conducted using multiple, different groupings of the following key terms: ICU, intensive care, intensive care unit, critical care, critical care unit, SICU, surgical care unit, patient, patients, stress, stressor, stressors, perception, perceptions, and perceived. Journals that contained studies on ICU patient stressors included: *Journal of Critical Care, International Journal of Nursing Studies, Dimensions of Critical Care Nursing, Journal of Advanced Nursing, Critical Care, Journal of Clinical Nursing,* and *Intensive Care Medicine*.

Inclusion criteria. To be included in the meta-analysis, studies needed to be empirical and quantitative. Studies needed to provide data on patients' perceptions of ICU stressors that was gathered using an original, modified, or adapted version of the ICU Environment Stressor Scale (ICUESS) or ICU Environmental Stressor Questionnaire (ICU-ESQ), or another measure

with similar items. Application of this criteria rendered 16 studies, which included 17 data sets (see Table 1).

Table 1

Original study sample (N=16)

Author	Date	Country	Article Title	Journal Title
Abuatiq	2015	Jordan	Patients' and health care providers' perception of stressors in the intensive care units.	*Dimensions of Critical Care Nursing*
Ballard	1981	USA	Identification of environmental stressors for patients in a surgical intensive care unit.	*Issues in Mental Health Nursing*
Biancofiore et al.*	2005	Italy	Stress-Inducing factors in ICUs: What liver transplant recipients experience and what caregivers perceive.	*Liver Transplantation*
Cochran and Ganong	1989	USA	A comparison of nurse's and patients' perceptions of intensive care unit stressors	*Journal of Advanced Nursing*
Cornock	1998	USA	Stress and the intensive care unit: perceptions of patients and nurses.	*Journal of Advanced Nursing*
Granja et al.	2005	Portugal	Patients' recollections of experiences in the intensive care unit may affect their quality of life.	*Critical Care*
Hweidi et al.	2000	Jordan	Jordanian patients' perception of stressors in critical care units: A questionnaire survey.	*International Journal of Nursing Studies*
Novaes et al.	1999	Brazil	Stressors in ICU: Perception of the patient, relatives and health care team.	*Intensive Care Medicine*
Paldon et al.	2014	India	A study to assess the stressors of the intensive care unit patients' and to compare these with the nurses' perception in selected hospitals of Karnataka state.	*International Journal of Nursing Education*
Pang and Suen	2008	Hong Kong	Stressors in the ICU: A comparison of patients' and nurses' perceptions.	*Journal of Clinical Nursing*
Pennock et al.	1994	USA	Distressful events in the ICU as perceived by patients recovering from coronary artery bypass surgery.	*Heart and Lung*
Rosa et al.	2010	Brazil	Stressors at the intensive care unit: the Brazilian version of the Environmental Stressor Questionnaire.	*Revista da Escola de Enfermagem da USP*
So and Chan	2004	Hong Kong	Perception of stressors by patients and nurses of critical care units in Hong Kong.	*International Journal of Nursing Studies*
Soehren	1995	USA	Stressors perceived by cardiac surgical patients in the intensive care unit.	*American Journal of Critical Care*

Soh and Soh	2008	Malaysia	Perception of intensive care unit stressors by patients in Malaysian Federal Territory hospitals.	*Contemporary Nurse*
Yava et al.	2011	Turkey	Patient and nurse perceptions of stressors in the intensive care unit.	*Stress and Health*

**Two data sets*

Exclusion criteria. To maximize comparability, the above criteria was expanded to exclude studies that reported on fewer than 25 stressors or used a scale without a majority of items that matched up with items in the ICUESS or ICU-ESQ (Pennock et al., 1994; Paldon et al., 2014; Granja et al., 2005). Studies were also excluded if they did not measure patient's perceptions of stress using a four-point Likert-type scale, 4 being most stressful and 1 being not stressful (Soh & Soh, 2008). Additional studies were eliminated for providing stressor rankings only and not providing mean values for each stressor (Cornock, 1998; Ballard, 1981; Abuatiq, 2015). The absence of standard deviation values, as in the case of Cochran and Ganong (1989), was not a criterion for exclusion.

Sample Description

Application of the above inclusion and exclusion criteria rendered a final sample of nine studies, which included 10 data sets (see Table 2). One study included two data sets representing two different groups of ICU patients- liver transplant patients and major abdominal surgery patients (Biancofiore, et al., 2005). Study publication dates ranged from 1989 to 2010. In addition to patients' perceptions, eight of these studies provided data on nurses' (or "healthcare team") and/or families' (or "relatives" or "caregivers") perceptions of ICU patient stressors. All researchers used convenience sampling of patients from one or two hospitals in their respective countries, which included the United States (2), Brazil (2), Hong Kong (2), Jordan (1), Turkey (1), and Italy (1). Sample sizes ranged from twenty to 165 patients. The average sample size was

85.6 ICU patients and the median was 81.5. All studies excluded patients under 18 years of age and patients who had spent less than 24 hours in the ICU.

Table 2

Final study sample (N=9)

Author	Date	Country	Article Title	Journal Title
Biancofiore et al.*	2005	Italy	Stress-inducing factors in ICUs: What liver transplant recipients experience and what caregivers perceive.	*Liver Transplantation*
Cochran and Ganong	1989	USA	A comparison of nurse's and patients' perceptions of intensive care unit stressors	*Journal of Advanced Nursing*
Hweidi et al.	2000	Jordan	Jordanian patients' perception of stressors in critical care units: A questionnaire survey.	*International Journal of Nursing Studies*
Novaes et al.	1999	Brazil	Stressors in ICU: Perception of the patient, relatives and health care team.	*Intensive Care Medicine*
Pang and Suen	2008	Hong Kong	Stressors in the ICU: A comparison of patients' and nurses' perceptions.	*Journal of Clinical Nursing*
Rosa et al.	2010	Brazil	Stressors at the intensive care unit: the Brazilian version of the Environmental Stressor Questionnaire.	*Revista da Escola de Enfermagem da USP*
So and Chan	2004	Hong Kong	Perception of stressors by patients and nurses of critical care units in Hong Kong.	*International Journal of Nursing Studies*
Soehren	1995	USA	Stressors perceived by cardiac surgical patients in the intensive care unit.	*American Journal of Critical Care*
Yava et al.	2011	Turkey	Patient and nurse perceptions of stressors in the intensive care unit.	*Stress and Health*

**Two data sets*

Reasons for patients' ICU admission included, but were not limited to, emergencies, organ transplants, and other planned surgeries (namely cardiac and gastrointestinal). Fewer than half of the studies indicated the reason for participants' admission to the ICU. Yava et al.'s (2010) sample was comprised of patients who were in the ICU for post-operative reasons. 92% of So and Chan's (2004) respondents had been admitted to the ICU as a result of an emergency. Pang and Suen (2008) also interviewed a majority emergency ICU patients. Biancofiore et al. (2005) surveyed and compared the experiences of two separate groups of ICU patients- those

who had undergone a liver transplant and those who had undergone other major abdominal surgery. Soehren (1995) surveyed only cardiac patients, 86% of whom had undergone bypass surgery. Rosa et al.'s (2010) sample also included a majority of 68% cardiac patients, as well as 20% patients with gastrointestinal pathologies.

Instruments. Researchers in seven studies applied a version of the Intensive Care Unit Environmental Stressor Scale (ICUESS) and researchers in two studies used a version of the Intensive Care Unit Environmental Stressor Questionnaire (ICU-ESQ). The number of scale items ranged from 40 to 50 depending on the type and version of the instrument used. Wording of items also varied between types and versions.

Likert-type scales differed slightly. Three authors employed the following scale: 4 = Extremely stressful, 3 = Very stressful, 2 = Mildly stressful, 1 = Not stressful (Biancofiore et al., 2005; Pang & Suen, 2008; Rosa et al., 2010). The remaining six studies relied on a similar scale: 4 = Very stressful, 3 = Moderately stressful, 2 = Mildly stressful, 1 = Not stressful (So & Chan, 2004; Soehren, 1995; Cochran & Ganong, 1989; Yava et al., 2010; Hweidi, 2007; Novaes et al., 1999). Several authors added a fifth level of '0 = Not applicable'. This researcher concluded that the difference between the two Likert-type scales was not significant and thus analyzing the 10 studies as an aggregate was appropriate.

Reliability. Most researchers determined the internal consistency reliability of their instrument using Cronbach's alpha coefficient. The scales used in six of the nine studies scored 0.9 or higher, which indicated high internal consistency reliability (Hweidi, 2007; Pang & Suen, 2008; So & Chang, 2004; Soehren, 1995; Yava et al., 2010; Rosa et al., 2010). Rosa et al. (2010) also reported an Intra-class Correlation Coefficient (ICC) of >0.9. In a few cases, scales were tested for reliability *after* having been translated (Hweidi, 2007). Cochran and Ganong (1989),

Biancofiore et al. (2005) and Novaes et al. (1999) did not report on internal consistency reliability.

Translation. For some of these studies, researchers translated the ICUESS or ICU-ESQ depending on the country in which the study took place. Languages included Arabic, Portuguese, Italian, Chinese, and Turkish. Most researchers assembled committees and launched pilot studies to test the reliability of their translations. To improve the reliability of the translated instrument, Yava et al. (2010) assembled a committee of bilingual nurses and academicians to assess the accuracy of their translation. Their evaluation included a pilot study that involved distributing a draft ICUESS survey to 10 patients and 10 nurses who gave feedback to the committee (Yava et al., 2010). So and Chan (2004) also assembled a bilingual committee of nurses to review the translation of the ICUESS to Chinese and launched a pilot study to test the validity of the translation. Pang and Suen (2008) set up a bilingual committee of doctors and nurses and surveyed two patients in a pilot study. Novaes et al. (1999, p. 1422) "culturally adapted" the original version of the ICUESS for their study and translated it into Portuguese. Hweidi (2007, p. 229) commissioned a panel of four "doctorally-prepared" nurses and four lay people to translate the ICUESS. Lastly, Biancofiore et al. (2005, p. 968) had the ICUESS "professionally translated" into Italian for their study.

***Timing of survey distribution*.** Not all researchers discussed the timing of their survey distribution, an important consideration in ICU stressor studies given the high probability of recall bias characterized by a poor recollection of the ICU experience (Russell, 1999). In five of the studies, researchers surveyed patient participants within three days after their transfer to a lower level of care (Cochran & Ganong, 1989; Yava et al., 2010; So & Chan, 2004; Hweidi, 2007; Soehren, 1995). Novaes et al. (1999) surveyed patients within a week of their admission to

the ICU. Others did not report on timing. Rosa et al. (2010) was the only researcher to retest a portion of respondents (28 out of original 106) with results consistent with original findings.

Coding

Demographic data. The nine studies in question were coded for demographic data, which included the gender, age, religion, marital status, employment status, class, education, and race of sample participants. Few studies provided data on race/ethnicity and religion (see Table 3).

Gender. All nine studies relied on samples comprised of more male than female ICU patients. On average, men comprised 68% of combined patient samples and women comprised 32%. The median proportion of men was 70.5% and women 29.5%. Soehren (1995) and Biancofiore (2005) had the most unbalanced samples, both compromising of 21% women and 79% men.

Age. The average combined age of participants in the 10 data sets was 56 years old. The median age was 56.5 years. This reflects an age slightly below the average age of patients admitted to ICUs according to data collected in the U.S., UK, Taiwan, and Denmark (Creagh-Brown & Green, 2014; Dragsted & Qvist, 1989; Yu et al., 2000; Cheng et al., 2014).

***Marital status*.** Among the five studies that included patients' marital status, on average, 77% of total respondents were married and 23% were unmarried (n=480) (Hweidi, 2007; Pang & Suen, 2008; Novaes et al., 1999; Yava et al., 2010; So & Chan, 2004). The median proportion of married respondents in these five studies was 74%.

Education, employment status and socioeconomic status (SES). Six studies included data on the education level or employment status of sample respondents. In two studies, the majority of respondents had received higher education and in two studies, the majority had not

(Hweidi, 2007; Novaes et al., 1999; Yava et al., 2010; Pang & Suen, 2008). 50% of respondents in So and Chan's (2004) study had received higher education. Only Rosa et al. (2010) reported on employment status, with 62% of respondents being unemployed. A few studies reported on the income level of respondents; this was reported in terms that were not comparable between studies (So & Chan, 2004; Rosa et al., 2010; Hweidi, 2007).

Descriptive data. Descriptive data was also collected. The author, publication date, and location of studies were coded, as well as the type of scale used, its Cornbach's alpha coefficient (if supplied), and the language in which it was administered. The number of hospitals, sample sizes, survey distribution timing, and reason(s) for admission was also recorded (see Table 3).

Table 3

Study sample characteristics (N=10 data sets)

Variable		Actual Range	*M*	% Total N (#)
Scale				
	ICUESS	8		
	ICU-ESQ	2		
	Other	0		
Sample size		20-165	85.6	
# Hospitals		1-2		
Age (years)		51-62	56.3	
Gender				
	Female	9-68		32% (284)
	Male	10-107		68% (603)
Marital status (n=5)				
	Single			23% (110)
	Married			77% (370)
Cornbach's Alpha Coefficient (n=6)		.94-.98		
Timing of survey distribution (n=7)		1-7 days		

***Scale items*.** Studies were coded for the name, rank, mean, standard deviation, and category of scale items (i.e. bodily, psychological, physical environment). The wording of certain scale items differed slightly between studies. For example, "being tied down by tubes" versus "being restricted by tubes and lines" (Yava et al., 2010; Cochran & Ganong, 1989). Best judgment was used to determine whether these differences disqualified certain stressors from being grouped together. For example, "being tied down by tubes" was determined to be similar enough to "being restricted by tubes and lines" such that they were grouped together and coded as the same stressor. Wording differences were noted on the coding sheet. Cochran and Ganong (1989) did not provide standard deviations. As explained in the literature review, stressors were categorized and subsequently coded based on three types: bodily, physical environment, and social/psychological stressors. Some stressors fell into multiple categories, which was indicated on the coding sheet.

Meta-Analysis Procedures

The decision of which ICU stressors to compare was determined by the frequency with which stressors ranked (by mean value) among the top 20 stressors in each study. After the top 20 stressors in each study were identified (47 stressors in total) and categorized (i.e. bodily, psychological or physical environment), the frequency with which these stressors ranked among the top 20 stressors across all studies was computed and recorded. The 25 stressors that appeared most frequently were flagged and gaps in the data were filled in. N was adjusted for those high frequency stressors (*S*) that did not appear in all data sets (*d*). Total or adjusted N was used to calculate the weighted mean and weighted standard deviation for each of the top 25 stressors:

$$\frac{\Sigma\ S_A(n_{d8}\ x\ mean_{d8}) + S_A(n_{d9}\ x\ mean_{d9}) + S_A(n_{d10}\ x\ mean_{d10})}{S_A(n_{d8} + n_{d9} + n_{d10})} = \bar{x}$$

CHAPTER IV

Findings

This meta-analysis was designed to identify the common sources of stress experienced by patients in the ICU and determine if cultural background influences those perceptions. The final study sample consisted of nine studies, which included 10 data sets from seven countries. The top 25 stressors represent the stressors that appeared most frequently among the top 20 stressors in each of the 10 data sets. Total combined N was 887 ICU patients.

Top 25 Stressors by Frequency

Table 4 represents the top 25 stressors in order of frequency. *Being in pain, Being thirsty,* and *Having tubes in your nose and mouth* had the highest frequencies, appearing among the top 20 stressors in all 10 data sets and appearing among the top 10 stressors in nearly all of the studies. *Not being able to sleep, Being tied down by tubes,* and *Not being in control of yourself* also ranked among the top stressors by frequency. However, *Not being able to sleep* was absent from one study (Rosa et al., 2010), decreasing N to 781 for that stressor. Variation of rankings increased considerably beyond the sixth highest-ranking stressor, with fewer than half of the stressors appearing among the top 10 stressors in the studies sampled.

Top 25 Stressors by Mean

Table 5 displays the top 25 stressors in order of weighted mean. *Fear of dying, Being in pain, Having tubes in your nose and mouth, Not being able to sleep,* and *Being thirsty* had the highest weighted means among the top 25 stressors. However, *Fear of dying* was omitted from six of the studies, decreasing N from 887 to 321 for that stressor. When including only those

stressors that appeared in all 10 data sets, *Being in pain, Having tubes in your nose and mouth,* and *Being thirsty* ranked as the top three stressors by mean. Of note, three low ranking stressors – *Being stuck with needles (19th), Room too hot/cold (22nd),* and *Missing your husband or wife* (25th) – ranked in 8th, 11th and 12th place, respectively, when analyzed according to frequency.

Table 4

Top 25 stressors, by frequency

	Stressor	Frequency in top 20	Frequency in top 10
1	Being in pain	10	10
2	Being thirsty	10	9
3	Having tubes in your nose and mouth	10	8
4	*Not being able to sleep (n=781)*	9	8
5	Being tied down by tubes	9	8
6	Not being in control of yourself	9	7
7	Being unable to move the hands or arms because of IV tubes or medication	8	4
8	Being stuck with needles	8	4
9	Hearing other patients cry out	8	1
10	Hearing the buzzers and alarms from machinery	7	2
11	Room too hot/cold	7	1
12	Missing your husband or wife	6	5
13	Only seeing family and friends for a few minutes each day	6	3
14	Having lights on constantly	6	3
15	Not knowing when things will be done to you	6	2
16	Not having privacy	6	1
17	Uncomfortable bed or pillow	5	3
18	Hearing your/the heart alarm monitor go off	5	1
19	Having to wear oxygen	5	0
20	Not having treatments explained to you	4	2
21	Not knowing what day it is	4	1
22	Not knowing where you are	4	0
23	*Fear of dying (n=321)*	3	2
24	*Not knowing length of stay in the ICU (n=321)*	3	2
25	*Being unable to fulfill family rules/roles (n=321)*	3	1

**Cochran and Ganong (1989) did not provide SD values*

Table 5

Top 25 stressors, by mean (N=887)

Stressor		Weighted Mean**	Weighted SD*
1	*Fear of dying (n=321)*	2.92	1.18
2	Being in pain	2.74	0.94
3	Having tubes in your nose and mouth	2.62	1.06
4	*Not being able to sleep (n=781)*	2.61	0.88
5	Being thirsty	2.52	0.97
6	*Being unable to fulfill family rules/roles (n=321)*	2.42	1.06
7	*Not knowing length of stay in the ICU (n=321)*	2.41	1.27
8	Being tied down by tubes	2.39	0.97
9	Not being in control of yourself	2.30	1.04
10	Hearing the buzzers and alarms from machinery	2.19	0.85
11	Being unable to move the hands or arms because of IV tubes or medication	2.16	1.00
12	Hearing your/the heart alarm monitor go off	2.07	1.05
13	Hearing other patients cry out	2.06	1.08
14	Only seeing family and friends for a few minutes each day	2.04	1.09
15	Uncomfortable bed or pillow	2.04	1.02
16	Not having privacy	2.02	1.00
17	Having lights on constantly	2.02	0.94
18	Being awakened by nurses	1.93	0.86
19	Being stuck with needles	1.93	1.03
20	Not knowing when things will be done to you	1.91	1.03
21	Having to wear oxygen	1.85	1.02
22	Room too hot/cold	1.83	1.06
23	Doctors/nurses talking (too loudly)	1.79	0.87
24	Not having treatments explained to you	1.78	1.06
25	Missing your husband or wife	1.78	1.12

**Cochran and Ganong (1989) did not provide SD values*

***All scales range 1-4*

Top 25 Stressors by Category

Table 6 provides a summary of stressor rankings according to category. While psychological stressors comprised nearly half of the top 25 stressors, bodily stressors appeared more frequently among the top 20 stressors in the nine studies and had a higher weighted mean

value. Physical environmental stressors were the least stress-inducing among the three categories. However, paired t-tests revealed that the differences between means associated with each of the three categories were not statistically significant ($p > .05$) (see Tables 7, 8 and 9).

Table 6

Top 25 stressors, by category

Stressor	Count	Average Combined Frequency In Top 20	Average Combined Mean	Average Combined SD*
Bodily	8	8.13	2.28	1.00
Psychological	12	5.25	2.11	1.07
Physical environmental	5	6.60	2.03	0.99

**Cochran and Ganong (1989) did not provide SD values*

Table 7

Bodily versus psychological stressors

Stressor	N	M (SD)	T	df	P	SED
Bodily	8	2.28 (1)	.357	18	.725	.476
Psychological	12	2.11 (1.07)				

Table 8

Bodily versus physical environmental stressors

Stressor	N	M (SD)	T	df	P	SED
Bodily	8	2.28 (1)	.440	11	.668	.568
Physical environmental	5	2.03 (.99)				

Table 9

Physical environmental versus psychological stressors

Stressor	N	M (SD)	T	df	P	SED
Physical environmental	5	2.03 (.99)	.143	15	.888	.559
Psychological	12	2.11 (1.07)				

Tables 10, 11 and 12 display the top five stressors in each stressor category – bodily, psychological, and physical environmental – by mean and frequency. There was considerable overlap between mean and frequency rankings for bodily and physical environmental stressors; psychological stressors differed somewhat between ranking methods. Only two psychological stressors – *Not being able to sleep* and *Not being in control of yourself* – had both high weighted mean and high frequency values. Additionally, four of the psychological stressors shown did not appear in all studies, decreasing N from 887 to 321 for those stressors.

Table 10

Top five bodily stressors, by mean and frequency

Weighted Mean	Frequency in Top 20
Being in pain	Being in pain
Having tubes in your nose and mouth	Being thirsty
Being thirsty	Having tubes in your nose and mouth
Being tied down by tubes	Being tied down by tubes
Being unable to move the hands or arms because of IV tubes or medication	Being unable to move the hands or arms because of IV tubes or medication

Table 11

Top five psychological stressors, by mean and frequency

Weighted Mean	Frequency in Top 20
Fear of dying (n=321)	*Not being able to sleep (n=321)*
Not being able to sleep (n=321)	Not being in control of yourself
Being unable to fulfill family rules/roles (n=321)	Missing your husband or wife
	Only seeing family and friends for a few minutes each
Not knowing length of stay in the ICU (n=321)	day
Not being in control of yourself	Not knowing when things will be done to you

Table 12

Top five physical environmental stressors, by mean and frequency

Weighted Mean	Frequency in Top 20
Hearing the buzzers and alarms from machinery	Hearing other patients cry out
Hearing your/the heart alarm monitor go off	Hearing the buzzers and alarms from machinery
Hearing other patients cry out	Room too hot/cold
Having lights on constantly	Having lights on constantly
Room too hot/cold	Hearing your/the heart alarm monitor go off

Summary

There was considerable agreement between studies about which aspects of the ICU patients found most stressful. *Being in pain, Being thirsty,* and *Having tubes in your nose and mouth* ranked consistently as the most stressful aspects of the ICU for patients in the study sample. Though not included in all 10 data sets, the stressors *Fear of death* and *Not being able to sleep* ranked as highly stressful to those patients who reported on them. Based on the agreement between studies, cultural influences were not evident.

CHAPTER V

Discussion

The purpose of this meta-analysis was to determine the aspects of the ICU that patients find most stress-inducing and to explore whether cultural differences patients' perceptions of ICU stressors. While a substantial body of research on ICU stress exists, there has been no recent quantitative, meta-analytic review of data on ICU patient stress, specifically. Past reviews of ICU stressor studies have comprised mainly of summaries of individual study findings or of discussions of the ICU patient experience generally (Fredriksen & Ringsberg, 2007; Hupcey, 2000; Donchin, 2002; McKinley et al., 2002; Russell, 1999; Wenham & Pittard, 2009). Some authors have examined specific aspects of the ICU such as constant light, unfamiliar and loud noise, and sleep disturbance (Baker, 1984; Donchin, 2002; Wenham & Pittard, 2009). Any meta-analyses of studies on the ICU experience have focused mainly on post-ICU Post-Traumatic Stress Disorder and the stress experienced by ICU nurses (Jones et al., 2015; Griffiths & Barber, 2007; Crickmore, 1987; Hay et al., 1972). Researchers have also meta-analyzed data on the relationship between stress and quality of ICU care, as well as data on psychiatric disturbance experienced by patients while in the ICU (Berenholtz et al., 2002; Davydow et al., 2009). Thusly, this study fills an important gap in current ICU research and sets the stage for a more in-depth investigation into the causes and mitigating factors of ICU patient stress.

Main Findings

The meta-analytic findings of this study reveal that patients from diverse cultural backgrounds share similar perceptions of ICU stressors, up to a point. When stressors that did

not appear in all 10 data sets were excluded, analyses based on frequencies and weighted mean values produced the same top five stressors: *Being in pain, Being thirsty, Having tubes in your nose and mouth, Being tied down by tubes,* and *Not being in control of yourself. Not being able to sleep* also ranked among the top stressors despite being omitted from one study, and *Fear of death* had the highest overall mean, but only appeared in three studies. Disagreement between the studies increased beyond the sixth highest ranked stressor, with frequency values shifting more noticeably than mean values, which remained within a 1.5 range. No combined mean value exceeded a rating of '3', which represented "very" or "moderately" stressful depending on the study.

Of the top six stressors, four were categorized as bodily stressors and two as psychological stressors. Despite this fact and the higher combined weighted mean of bodily stressors in the top 25, the differences between means was not statically significant ($p > .05$). The highest ranking bodily stressor was *Being in pain*, the top psychological stressors were *Fear of dying* and *Not being able to sleep*, and the highest ranking physical environmental stressors were *Hearing other patients cry out* and *Hearing the buzzers and alarms from machinery.* To note, psychological stressor rankings differed significantly depending on the ranking method used. Also, the predominance of psychological stressors among the top 25 stressors – 12 out of 25 – may be explained by the inclusion of more psychological stressors in the ICUESS and ICU-ESQ than stressors in the other two categories.

The Transactional Model as a Mechanism for Understanding ICU Stress

According to Lazarus and Folkman's (1984) Transactional Model of Stress and Coping, stress results from an imbalance in the person-environment relationship. In the context of this study, the demands or stressors of the ICU may overwhelm a patient's coping resources such that

a person experiences stress. A patient's *primary appraisal* or perception of a given ICU stressor (e.g. as threatening or non-threatening) combined with his/her *secondary appraisal* of what he/she can do about it dictates the intensity of his/her stress response. According to the model, a patient's personality, beliefs, goals, familiarity with a situation, and sense of control over their circumstances (among many other factors) influences their appraisal of stressors. The findings of this study indicate that despite cultural (and demographic) differences, ICU patients generally agree about what is most stressful about the ICU. Accordingly, factors unrelated to personal background/identity such as familiarity with the ICU and a patient's sense of control over their circumstances may be more powerful determinants of ICU stress. More research is needed to confirm these findings. Threats to bodily integrity such as pain, thirst, and being tied down, i.e. bodily stressors, may rank as particularly stress-inducing because of the extent to which they deprive a patient of control or sense of control. Additionally, the intense pain and discomfort associated with conditions that bring people to the ICU may be unfamiliar to most patients, adding to the likelihood that they will appraise certain aspects of the ICU environment as threatening, dangerous, and disempowering. This lack of familiarity combined with limitations to basic functioning (speech, mobility, etc.) and self-determination may render irrelevant (or at least less so) the individual characteristics that normally distinguish people from one another.

Fear of death as an underlying stressor. Like lack of familiarity and loss of control, fear of death and dying may greatly influence a patient's perceptions of the ICU environment and may uniquely inform a patient's appraisal of other ICU stressors. Many of the stressors in this study may evoke a sense of death and dying among patients. Pain, thirst, immobility, and crying out are commonly associated with, and in many cases, are actual characteristics of death and dying. Death and dying assumes a lack of control and loss of self-determination. Aspects of

the ICU perceived by patients as less stress-inducing – e.g. *Being unable to fulfill family roles, Not knowing length of stay in the ICU, Missing husband/wife,* and *Not having treatments explained to you* – may be less likely to evoke a sense of death and dying (and associated loss of control), which may partly explain their lower stressor ranking.

Cultural considerations. In the context of the Transactional Model, culture can be considered a resource that influences patients' appraisals of ICU stressors. However, as stated, the findings of this study suggest that aspects of the ICU experience such as unfamiliarity/disorientation, loss of control, and the threat of death may overwhelm resources such as those derived from one's cultural background. The field of ICU studies might benefit from a closer look at what specific cultural and personal characteristics are associated with more positive appraisals of the ICU environment and better coping abilities. For example, certain cultural attitudes towards death and dying may influence a patient's appraisal of their situation such that they feel a greater (or lesser) sense of control over their circumstances and thus more (or less) able to reconcile with a possible fatal outcome or long-term disability.

Methodological Limitations and Strengths

Despite the comprehensiveness of this study and value of the meta-analytic approach, a number of methodological limitations must be noted. The primary limitation of this study was the researcher's potential bias as it influenced study selection (i.e. inclusion/exclusion criteria) and the categorization of stressors (i.e. psychological, bodily, environmental). Broader inclusion criteria might have increased the study sample size, or eliminated studies that omitted items so as to avoid varying N values (as in the case of *Fear of death* and *Not being able to sleep*). In addition, a different system of categorization or different assignment of categories might significantly alter the results of this study as they pertain to category of stressor. Several stressors

in the study could have been considered as having the characteristics of multiple or different categories and analyzed as such. Replications of this study are necessary to determine additional and meaningful ways of categorizing stressors. This study's reliance on a western database of peer-reviewed journal articles poses another potential limitation. The use of such a database automatically excludes more informal investigations of ICU stressors as these investigations may not have withstood the evaluation of western academic journals. Future meta-analyses could benefit from including such studies, which may provide additional, valuable information about the relative influence of culture and other aspects of personal background on patients' perceptions of the ICU.

This meta-analysis was further limited by limitations to the individual studies sampled. Patient recall bias, reliance on convenience sampling, small sample sizes, and low diversity were limitations characteristic of most of the studies selected. Yava et al. (2011) and Pang & Suen (2008) have cited patient recall bias as a potential limitation to ICU stress studies because of time passed between the ICU stay and survey distribution and because of patients' varying degrees of alertness in the ICU due to sedation and disorientation. However, Wong & Arthur (2000), Green (1996), Nelson et al. (2010) and Alasad et al. (2015) contend that most patients remember many details of their ICU stay, including nurses' instructions, the presence of relatives, nightmares, hallucinations, and disorientation. Alasad et al. (2015) found that 83 percent of ICU patients they surveyed remembered clearly the events surrounding their ICU admission and the presence of relatives throughout their stay.

Convenience sampling can be considered another limitation in individual studies as well as relatively small patient sample sizes surveyed in a small number of hospitals (Novaes et al., 1999; Pang & Suen, 2008; Yava et al., 2011; Wong & Arthur, 2000; Cochran & Ganong, 1989;

Cornock, 1998; Alasad et al., 2015). Regarding diversity, all studies utilized one of two scales - the ICU Environment Stressor Scale (ICUESS) or the ICU Environmental Stressor Questionnaire (ICU-ESQ) - both of which are considered 'western' scales, i.e. developed by researchers residing in westernized countries. While, in some cases, researchers translated these scales, the scale instruments remained heavily influenced by western perceptions of stress and medical environments.

This study had several methodological strengths including the use of rigorous inclusion criteria for study sampling, the use of multiple ranking methods, and the system of categorization. Studies were included only if they involved use of one of two scales (ICUESS or ICU-ESQ), which shared similar scale items. Studies in the sample were also required to include mean data, which allowed for use of multiple ranking methods (by frequency and by mean). Lastly, the system of categorization of stressors – bodily, psychological, and physical environmental – enabled a second level of analysis of ICU stressor data that went beyond the characteristics of individual stressors.

Implications for Social Work Practice

This study provides social workers and social work therapists with a mechanism for understanding ICU stress, a starting place for assessing ICU patients' stress, and a guideline for helping ICU patients cope with the ICU environment. Given their training in biopsychosocial assessment and psychotherapy, social workers are uniquely equipped to appreciate and help patients cope with the overwhelming psychological, bodily, and environmental demands of the ICU environment. The Transactional Model of Stress and Coping suggests that patients may benefit from talking about what they find unfamiliar or disempowering about the ICU experience and from help to better understand and exert more control (however minor) over their

environment and circumstances. This may include providing patients with informational material about the ICU. Efforts should be made to inform patients of the reason and details of all procedures being done to them as this may enhance their sense of control and familiarity with ICU activity. Given the consistently high rating of stressors such as pain, thirst, and being tied down, special attention should be paid to explaining to patients why they are experiencing certain bodily sensations and what the function is of various tubes, lines, and machinery. Social work therapists can talk openly with patients about these aspects of the ICU and collaborate with them to minimize their stress-inducing effects.

With regards to empowerment, helpful interventions may also include highlighting patients' accomplishments and daily demonstrations of personal agency such as sleeping a certain number of hours or asking for something they need. ICU patients may also benefit from help with framing their ICU experience and the traumatic medical event that preceded it in a way that gives them a sense of purpose, meaning, and control. This may involve a more explicit discussion with the patient about his/her beliefs and feelings about death and dying, and what it means to them to not have perfect control of their body and by extension their mortality. Lastly, social workers should consider carefully whether their efforts to advocate on behalf of their ICU patients enhance or undermine their patients' sense of control and self-determination. Patients who retain a sense of agency during their ICU stay may progress more quickly in their recovery and cope better with potential long-term disabilities and limitations.

In addition, this study provides social workers with a guideline for assessing ICU patients, particularly those who have impaired communication abilities and/or are unconscious, delirious, or psychotic. Social workers should not presume to know what creates stress for ICU patients who are often unable to communicate their needs and anxieties. Given the methodology

and the diversity of patients sampled for this meta-analysis, social workers can rely on the high-ranking stressors identified in this study to guide their initial interviews and interventions with ICU patients. Addressing common sources of patient stress from the outset may ensure better short- and long-term health outcomes as ICU stressors can impede physical healing and undermine psychological wellbeing (McGiffin et al., 2016; Davydow et al., 2009; Davydow et al., 2008; Griffiths et al., 2007). A universal assessment and intervention tool could be structured according to category and then in order of stressor ranking.

Lastly, although these study findings put into question the influence of culture on patients' ICU stress perceptions, patients may still benefit from overall sensitivity to their cultural identity and preferences. Attention to cultural practices and attitudes may reveal sources of resilience that mitigate the stress of the ICU.

Considerations for Future Research

The results of this meta-analysis have several implications for future research. This study provides a starting point for future investigation into resources that may help patients from different countries cope with the identified top ICU stressors. Researchers may want to consider further examining patients' perspectives on death and dying and determine to what extent such perspectives influence their ability to cope with ICU care. Coping should also be better defined in this context and quantified such that its relationship to patients' personal beliefs and perspectives on death and dying, which are likely influenced by culture, can be accurately measured.

Regarding individual ICU stressor studies, this meta-analysis reveals gaps in existing research including a lack of attention to the relationship between admission type and stress level and also the exclusion of *Fear of dying* and *Not being able to sleep* from certain scales. Future

studies should include more robust demographic data in order to determine which people are more vulnerable to experiencing stress in the ICU. Likert scales should be expanded from a four-point to a seven-point range so that differences between ICU stressor ratings can be more precisely captured. With regards to future meta-analyses, researchers should aim to increase study sample sizes, refine inclusion criteria and stressor categorization, and analyze raw data from individual stressor studies. Such modifications will render more meaningful results from which to draw conclusions about what contributes to ICU patient stress.

Conclusion

These study findings indicate that patients from different countries largely agree on which aspects of the ICU are most stressful regardless of their cultural background. The top 25 stressors identified in this study provide a basis for a universal assessment tool that measures patient stress levels in relation to a list of verifiably common stressors. Such a tool will enable ICU staff, including social workers, nurses, and doctors, to provide more targeted assistance to patients as they confront stressful aspects of the ICU such as being in pain, being thirsty, and being tied down by tubes. The Transactional Model for Stress and Coping provides a useful lens for understanding the etiology of ICU patient stress and offers insights into what may enhance patients' coping abilities. Biancofiore et al. (2005, p. 972) articulate well the importance of ongoing research on this subject:

> "What patients consider to be stress generating in an ICU setting should be investigated by every institution, which should […] make ICUs more 'human' and ensure that psychophysical comfort is more frequently considered a resource to preserve rather than something that inevitably has to be given up."

Continually refining ICU stress research and conducting meta-analyses such as these will ensure greater understanding of the ICU experience and the further humanizing of ICU care.

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