Job Satisfaction Among Critical Care Nurses:

A Systematic Review of Contributing Factors, Individual and Organizational

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"Our greatest weakness lies in giving up. The most certain way to succeed is always to try just one more time."

Thomas A. Edison

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Thesis Abstract

The purpose of this thesis was to conduct a systematic review of studies on critical care nurses' job satisfaction. Specific research questions addressed were: 1) What are the conceptual definitions and theories of job satisfaction that are used in studies of critical care nurses?; 2) What instruments have been used to quantitatively measure and operationally define job satisfaction among critical care nurses?; 3) What is the level of job satisfaction among critical care nurses?; and 4) What factors are correlated to critical care nurses' job satisfaction? Sixty-one studies were identified from five electronic databases. Definitions and theories of job satisfaction were inconsistent or absent in the literature. Forty-two different quantitative measures of job satisfaction were identified. The weighted mean job satisfaction score for critical care nurses was 56% and demonstrated a cyclical trend over time. Operating room and other (labour and delivery, pediatric, and neonatal) critical care, and undefined critical care nurses reported lower levels of job satisfaction compared to emergency and mixed critical care nurses. The following factors showed positive significant relationships to critical care nurses' job satisfaction in four or more studies: shift worked, autonomy, personnel resources and staffing, and teamwork and cohesion. One factor, job stress showed a positive and negative significant relationship to critical care nurses' job satisfaction depending on the study. Only one factor explored in the included studies (burnout emotional exhaustion) showed a negative significant relationship with job satisfaction. These factors hold promise as targets for critical care nurse job satisfaction interventions.

Acknowledgements

I would like to dedicate this thesis to all my fellow emergency nurses at the Jewish General Hospital. I admire each and every one of you, for all your hard work, talent, dedication, and teamwork ethic. Thank you a million times for always managing to provide great care despite all the challenges and frustrations you face. Know that you are very much appreciated even when you feel as though you are not rewarded for all you do. I appreciate you! I can only hope for better and safer working conditions for you, to enable you to provide the quality care that you aspire to and that your patients deserve. You were the driving force of my research.

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Declaration of Thesis Committee Members

Janet E. Squires, PhD, RN. Dr. Janet Squires was the primary thesis supervisor of my graduate research. She helped determine my thesis topic and helped coordinate and plan the completion of my master's thesis. Dr. Squires also assisted in assembling my thesis committee. Dr. Squires, knowledgeable in systematic reviews, assisted in guiding me throughout this systematic review process. Dr. Squires participated in editing thesis drafts and making recommendations. Dr. Squires also continues to guide and assist me in the thesis publication process.

Amanda Vandyk, PhD, RN. Dr. Amanda Vandyk was a member of my thesis committee. She played an integral part in reviewing and making recommendations concerning the thesis's search strategy, tables, and methodology. She also contributed to the editing process of the entire thesis.

Ian Graham, PhD, FCAHS. Dr. Ian Graham was a thesis committee member who played an integral role in reviewing and making recommendations to the methodology and overall structure and design of the systematic review. He also contributed to the editing of the entire thesis.

Chapter One: Introduction

This chapter provides an introduction to my thesis including: my personal impetus for conducting the thesis; a summary of relevant literature related to nursing shortages, critical care nursing, nursing turnover, the concept of job satisfaction, conceptual models and frameworks of job satisfaction, and previous systematic reviews on job satisfaction in nursing; the aim of the thesis; the research questions; and, finally, the layout of the thesis.

Introduction

Adequate staffing of nurses is fundamental to the provision of high quality patient care and to the improvement of patient outcomes (Cho, June, Kim, Cho, Yoo, Yun, & Sung, 2009). Today, nursing shortages, particularly in critical care units, are a major worldwide concern (Aiken, Clarke, Sloane, Sochalski, Busse, Clarke, … Shamian, 2001; Baggs & Ryan, 1990; Kalisch & Liu, 2009; Lu, Barriball, Zhang, & While, 2012; Nantsupawat, Srisuphan, Kunaviktikul, Wichaikhum, Aungsuroch, & Aiken, 2011). Critical care nurses, who possess specialized knowledge and skills and play an integral role in caring for critically ill individuals, are leaving the profession to seek out less stressful and demanding jobs with better working conditions that will enhance the quality of their work-life (Hussain, Rivers, Glover, & Fottler, 2012). Low levels of job satisfaction and poor working conditions are among key factors contributing to these high attrition rates in critical care units (Bai, Zhang, Wang, Yu, Pei, Cheng, & Hsu, 2015; McDonald, Rubarth, & Miers, 2012). In light of this worldwide healthcare concern, critical care nurses' job satisfaction and the factors, both individual and organizational, influencing their job satisfaction merit special attention from healthcare administrators.

Personal Impetus for this Research

Working in an emergency department has come with its fair share of highlights and prestige as well as challenges and frustrations over the past five years. Following the budget constraints placed on the Canadian healthcare system, the nationwide nursing shortages have been further exacerbated by organizational restructuring, lay-offs, inadequate staffing, poor working conditions, and a promotion of heavier nursing workloads. When I began to think of a thesis topic three years ago, I felt that my morale, as well as that of my fellow nursing colleagues was beginning to decline. Nursing support staff and the security of full-time nursing positions were reduced and difficult to obtain, and resources, such as medical equipment, were scarce or mostly non-functional. During that time, the hospital I worked for was constructing a new extension to the building into which the emergency department was to transfer. In the "old emergency," as we called it, most nurses were frustrated with the small workspaces, lack of privacy for our patients, lack of functional material resources, and inadequate staffing. I was very interested to see how the "new emergency" would be different and how it could potentially affect the satisfaction of the nursing staff, including myself. Most of my colleagues were very excited about the prospect of moving to a newer, cleaner, and bigger emergency department. We knew we would have new and updated materials that would be readily available to us, as well as a more technologically advanced work environment. Hospital administrators were boasting about our new "state-of-the-art" emergency department and the general public was thrilled and anxious to see positive results. Unfortunately, we were victims of our own success. Once the emergency department moved, the "honeymoon" phase of transition quickly faded. In fact, the nurses' anger, frustrations, levels of stress, and job dissatisfaction appeared to increase once we made the transition to the new building and began to settle into the space. At first, the tension and frustrations were attributed to

the stress of various changes occurring and the staff's adaptation to a new work environment. Although the emergency department had bigger and cleaner workspaces, which increased patient privacy, nursing staff received heavier patient workloads and the emergency department saw a larger influx of patients requiring increased complexity of care. Furthermore, the financial constraints and budget cuts resulted in the laying off of many nursing support personnel, thus further exacerbating the increased workloads on all the emergency nurses. The working conditions of the nurses and other healthcare team members were perceived as unsafe, both for them and, ultimately for patients and their families. Many nurses were falling ill or suffering injuries, consequently increasing absenteeism. Many nurses eventually left the emergency department altogether to find healthier, less stressful, and safer working conditions that could provide them with a better quality of life. I had thought the newer and bigger emergency department would help improve working conditions and lead to a healthier work environment and happier nurses, but what I witnessed was almost the complete opposite. This experience and the other issues I faced instigated an interest in studying the organizational and individual factors affecting critical care nurses' job satisfaction.

I also had the pleasure of working in an adult intensive care unit and coronary care unit for two years at the beginning of my nursing career. Working in different critical care units is as exhilarating as it is challenging and frustrating. There is nothing more rewarding for me than to be able to help critically ill patients back to health or to "save a life." I have also been fortunate in having invaluable learning experiences and working with a talented and knowledgeable group of professionals. It is my hope that I can contribute to the knowledge and practice of critical care nursing by conducting this research into critical care nurses' job satisfaction. In studying for this thesis, I have learned that job satisfaction is a key element in nursing retention, the enhancement

of nurses' quality of life, and the promotion of high-quality patient care. My hope was to identify the most significant factors associated with nurses' job satisfaction, and possibly to determine which of these factors could be promoted within "my" emergency department in such a way as to improve my colleagues' overall job satisfaction. I am aware that all the issues cannot be resolved simultaneously, but I am hoping that my research can inspire and induce critical care managers to evaluate their nursing staff's satisfaction levels, and to identify the specific individual and organizational factors within their units that contribute to safer work environments and higher satisfaction levels among their staff nurses. Healthier and happier work environments lead to nursing empowerment and to high-quality patient care, increased efficiency and productivity, and higher rates of both retention and recruitment of critical care nurses (Bai, Zhang, Wang, Yu, Pei, Cheng, & Hsu, 2015).

Literature Review

Nursing Shortage

Nursing shortages are a critical situation experienced by healthcare systems worldwide (Aiken, Clarke, Sloane, Sochalski, Busse, Clarke, …Shamian, 2001; Kalisch & Liu, 2009; Lu, Barriball, Zhang, & While, 2012; Nantsupawat, Srisuphan, Kunaviktikul, Wichaikhum, Aungsuroch, & Aiken, 2011). Many experts expect nursing shortages to persist and even escalate over the next decade (Aiken & Cheung, 2008; American Association of Colleges of Nursing, 2014; International Council of Nurses, 2004; Rochefort & Clarke, 2010). The causes of nursing shortages are many and complex. With the current nurses' mean age approaching 50 years, approximately 70% of the nursing workforce will be reaching retirement age by 2025 (Robinson, Jagim, & Ray, 2004; Sawatzky & Enns, 2012). In addition, population growth, an aging population, decreased enrolment and retention in nursing education programmes, increasing

demands and acuity of patients, role conflict and ambiguity, and decreased professional and organizational commitment renders the current supply of nurses inadequate to meet current needs (Adriaenssens, De Gucht, & Maes, 2015; Hayes, Bonner, & Pryor, 2010; Kalisch, Lee, & Rochman, 2010; Purdy, Laschinger, Finegan, Kerr, & Olivera, 2010). It is predicted that nursing vacancy rates will reach 29% by 2020 (Carlbom & Rubenfeld, 2007). In Canada, job satisfaction and the work environment are key factors influencing the nursing shortage that is expected to reach nearly 60,000 vacant full-time nursing positions in 2022 (Hussain, Rivers, Glover, & Fottler, 2012; Murphy, Birch, MacKenzie, Alder, Lethbridge, & Little, 2012).

Critical Care Nursing

In critical care units, the nursing shortage is particularly acute (Baggs & Ryan, 1990). Critical care nursing emerged in the late 1950s in the United States after World War II, when hospitals started reserving spaces for their sickest and most critically ill patients who required 1:1 nursing care (Fairman & Lynaugh, 2000). Critical care units have since evolved but remain stressful and chaotic work environments. Critical care nurses are frequently exposed to ethical and moral dilemmas, work-related stressors, challenging responsibilities arising out of the need for specialization and requirements to handle urgent situations that often include end-of -life care, extraordinary life-saving measures such as cardiopulmonary resuscitations and artificial life support, and post-mortem care (Benoliel, McCorkle, Georgiadou, Denton, & Spitzer, 1990; Chen, Lin, Wang, & Hou, 2009; Mealer, Shelton, Berg, Rothbaum, & Moss, 2007; Su, 1993). Critical care nursing is a physically, mentally, and emotionally demanding job that can be overwhelming and extremely stressful (Sorour & El-Maksoud, 2012).

In addition to unhealthy and stressful critical care work environments and conditions, critical care nursing shortages have also been attributed to inadequate recruitment and retention

of qualified nurses (Moneke & Umeh, 2013). Critical care nurses are experts in their field and possess specialized training, experience, knowledge, and skills, which take time to acquire (Choi, Bakken, Larson, Du, & Stone, 2004; Heinrich, 2001; Kramer & Schmalenberg, 1991). Preparation of critical care nurses for these responsibilities requires meticulous attention to assessment skills, critical thinking skills, judgement, intuition, and ability to perform under pressure (Dear, Weisman, Alexander, & Chase, 1982). Critical care units are settings where nursing care is provided to individuals who require high levels of assessment and intervention (Robinson, 2001). The complex nature of critical care also increases the prevalence of medical errors and adverse events (Abdi, Delgoshaei, Ravaghi, Abbasi, & Heyrani, 2015; Camire, Moyen, & Stelfox, 2009; Cullen, Sweitzer, Bates, Burdick, Edmondson, & Leape, 1997; Rothschild, Landrigan, Cronin, Kaushal, Lockley, Burdick, … Bates, 2005; Stockwell & Slonim, 2006).

Nursing Turnover

Nursing turnover is a major issue in Canadian hospitals with an average rate of 19.9% a year (O' Brien-Pallas, Murphy, Shamian, Li, & Hayes, 2010). Kirchhoff and Dahl (2006) revealed an 11.2% nursing turnover rate in critical care units alone, the highest turnover rate of any hospital unit. Nursing turnover is a recurring and costly problem for healthcare organizations (Bratt, Broome, Kelber, & Lostocco, 2000) and it is estimated to reach 150% of the employee's annual income, and includes the costs for the employees leaving, the hiring process, and training costs to replace them (Bliss, 2001; Moneke & Umeh, 2013). The cost of replacing one nurse is estimated to be between $22,000 and $64,000 and higher costs are associated with nurses' level of education and experience (McDonald, Rubarth, & Miers, 2012). Furthermore, newer nurses with

less experience are found to have lower productivity than more experienced colleagues, which also results in increased costs for the organization (McDonald, Rubarth, & Miers, 2012).

Job satisfaction and nursing turnover have been closely linked in the literature (Blegen, 1993; Cavanagh, 1990; Wakefield, Curry, Price, Mueller, & McCloskey, 1988). Job satisfaction is significantly and directly related to nurses' intent to stay, which is predictive of turnover (Weisman, Alexander, & Chase, 1981). Nursing administrators must broaden their understanding of the specific factors, individual and organizational, that significantly influence nurses' job satisfaction, in order to enhance the nurses' quality of work-life and create a more positive work environment that attracts new nurses to work and encourages current nurses to stay (Freeman & O'Brien-Pallas, 1998).

Concept of Job Satisfaction

Job satisfaction is the most frequently studied variable in organizational behavioural research (Lu, Barriball, Zhang, & While, 2012). Interestingly, job satisfaction has not been consistently defined by experts in the field. Traditional definitions of job satisfaction focus on the global affective response or attitude an individual has towards the job (Locke, 1969; Price, 2002). It can be positive in nature, producing job satisfaction, or negative in nature, leading to job dissatisfaction. The global approach is used when the overall feeling an individual has towards the job is of interest (Lu, Barriball, Zhang, & While, 2012; Lu, While, & Barriball, 2005). Other definitions encompass both the overall nature and different facets of a job in relation to a person's expectations and perceptions of the components of the work environment (Spector, 1997). These definitions consider which factors make a job satisfying or not and examine different aspects of the job that can produce satisfaction or dissatisfaction (Lu, Barriball, Zhang,

& While, 2012; Lu, While, & Barriball, 2005). Spector (1997) summarized the following facets of job satisfaction:

- appreciation-appreciation for work done;
- recognition-recognition and rewards for good work;
- pay-compensation, pay raises, and remuneration for work;
- fringe benefits-monetary and nonmonetary benefits offered at work;
- communication-communication within the organization and workplace;
- co-workers-relationship with people the individual works with;
- supervision-attitudes towards the immediate supervisor;
- job conditions-physical conditions of the workplace;
- nature of the work-quantity and quality of the job tasks themselves;
- the nature of the organization-goals of the organization;
- organizational policies and procedures-implemented rules (policies) and procedures in the organization;
- personal growth-opportunities for personal improvement at work;
- promotion opportunities-chance for job promotions and professional advancement; and
- security-assurance that individual will remain employed at their current job.

Nurses leave the profession due to high levels of stress, job dissatisfaction relating to poor working conditions, devaluation, and a suspicion that organizational profits are prioritized over the quality of patient care (Bratt, Broome, Kelber, & Lostocco, 2000; Fletcher, 2001; Hayes, Bonner, & Pryor, 2010; Kettle, 2002; Purdy, Laschinger, Finegan, Kerr, & Olivera, 2010). Decreased job satisfaction has a profoundly negative effect on the physical, psychological, and social health of the individual, and negative consequences to nursing work-life outcomes that

include high workloads, burnout, increasing expenses, poor quality of patient care, and rising rates of turnover as nurses increasingly leave their jobs or profession prematurely (Advisory Committee on Healthy Human Resources, 2002; Aiken, Clarke, & Sloane, 2002; Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Browning, Ryan, Thomas, Greenberg, & Rolniak, 2007; Holtom & O'Neill, 2004; Moneke & Umeh, 2013).

Conceptual Models and Frameworks of Job Satisfaction

Currently, two types of theoretical approaches have been established to conceptualize job satisfaction: content and process theories. Both theoretical approaches identify two groups of variables associated with job satisfaction, namely individual and environmental factors.

Content theories focus on identifying and prioritizing individuals' needs, motives, and goals. When these needs are met, individuals experience satisfaction and empowerment (Saif, Nawaz, Jan, & Khan, 2012). Most content theories of job satisfaction stem from Maslow's Theory of Motivation and Satisfaction (1943). Maslow's hierarchy consists of five levels of individual needs: physical needs, the need for safety, social needs, the needs for esteem and achievements, and the need for self-actualization. Herzberg's Two-Factor Theory was developed following Maslow's theory in 1959 and updated in 1966. Herzberg's theory postulates that satisfaction and dissatisfaction are distinct and independent elements arising from various aspects of the work environment, rather than polar opposites on the same continuum. Intrinsic factors, also referred to as "satisfiers" or "motivators," including achievement, responsibility, and the actual tasks performed are thought to promote job satisfaction. Extrinsic factors, known as "hygiene" factors, including supervision, salary, interpersonal relations, job security, physical working conditions, benefits, and organizational policies, are postulated to be related to job dissatisfaction.

Other content theories include McGregor's X and Y Theory (1960) and McClelland's Theory of Needs-Achievement (1961). McGregor's X and Y Theory proposes that managers adjust their managerial styles according to two different types of employees. The 'X'-type employee is characterized through negative 'assumptions,' which include the employee disliking the job or lacking motivation and requiring a stricter supervision. Conversely, 'Y' employees are described with the help of more 'positive' assumptions, which include their being motivated and responsible, and benefitting from a more participative managerial style. McClelland's Theory of Needs-Achievement postulates that some individuals are 'high achievers,' motivated to succeed and striving for personal achievement instead of rewards. The Theory of Needs-Achievement recognizes three types of motives: achievements (the drive to excel and achieve success), power (the desire to be influential and have an impact on others), and affiliation (the desire to have close interpersonal relationships).

Process job satisfaction theories focus on how motivation, needs, and goals are fulfilled (Perry, Mesch, & Paarlberg, 2006). Process theories include Locke's Goal-Setting Theory (1968), Hackman and Oldham's Job Characteristics Theory (1975, 1976), Adam's Equity Theory (1963), Vroom's Expectancy Theory (1964), and Porter and Lawler's Expectancy Model (1968). Locke's Goal-Setting Theory is the most researched process theory of job satisfaction, which asserts that an employee's intentions (goals) can influence his or her motivation, performance, and satisfaction (Saif, Nawaz, Jan, & Khan, 2012). Hackman and Oldham's Job Characteristics Theory describes how employees perceive their role in the organization through their individual job characteristics. Clarity in job characteristics and tasks, roles and responsibilities, is postulated to lead to greater job satisfaction, commitment, and involvement (Moynihan & Pandey, 2007). Adam's Equity Theory suggests that equity−employee satisfaction−exists when the work put in

by employees equals the rewards they receive for their work. Vroom's Expectancy Theory postulates that employees are motivated to work if the task is deemed worthy and assists in achieving their goal(s). This Theory is based on three variables: 1) valance, the strength of an individual's preference towards specific tasks; 2) expectancy, the notion that the expended effort will lead to the achievement of a need; and 3) instrumentality, the achievement of one need leading to the achievement of other needs. Porter and Lawler's Expectancy Model states that an employee's performance is determined by his or her effort, motivation, traits, abilities, and role perception and satisfaction is achieved from the reception of perceivably fair rewards for their performance.

With the apparent diversity in job satisfaction theories, researchers have commented that the use of one theoretical approach is a common error in job satisfaction research, as it overlooks the need to blend conceptualizations of any given phenomenon. It is for that reason I chose to use both content and process theories when conceptualizing job satisfaction and to investigate which job satisfaction theories are being used in studies of critical care nurses' job satisfaction.

Previous Job Satisfaction Systematic Reviews

To date, two systematic reviews have been conducted regarding job satisfaction among nurses. The first systematic review was conducted by Lu and colleagues in 2005, and updated in 2012. This systematic review examined and synthesized the sources and predictors of job satisfaction among hospital nurses from 100 studies. They identified nine sources of hospital nurses' job satisfaction that included: working conditions, interaction (between patients, co-workers, and managers), the work itself (workload, challenges, routinization, and task requirements), remuneration (pay and salary), self-growth and promotion (professional training, opportunity of advancement, job promotion, and personal achievement), praise and recognition, control and

responsibility (autonomy and decision-making), job security, leadership styles, and organizational policies (Lu, Barriball, Zhang, & While, 2012; Lu, While, & Barriball, 2005). Factors that were found to be substantially related to (correlation coefficient >0.5) hospital nurses' job satisfaction were job stress, organizational commitment, depression, and cohesion. Factors that were found to have a moderate relationship (correlation coefficient between 0.2-0.5) with hospital nurses' job satisfaction were affectivity, role ambiguity, professional commitment, routinization, supervisor and co-worker support, collaboration with medical staff, job performance, job involvement, hostility, staff organization, autonomy, recognition, fairness, locus of control, and communication with supervisors and peers. Factors that were found to have only a slight effect (correlation coefficient <0.2) on hospital nurses' job satisfaction included role conflicts, job involvement, age, years of experience, education level, professionalism, anxiety, and supervisor satisfaction. Predictors (regression analysis) of hospital nurses' job satisfaction were depression, organizational commitment, cohesion, collaboration with medical staff, perception of professional practices, the team building skills of managers, job stress, psychological stress, supervisor satisfaction, occupation type, physical conditions of workspace, routinization, affectivity, co-worker support, and education level.

Another systematic review was conducted by Squires and colleagues in 2015. This systematic review examined 42 studies relating to job satisfaction among nursing care aids in long-term care facilities. The purpose of their systematic review was to synthesize the evidence regarding the factors associated with nursing care aids' job satisfaction in long-term care residences. Squires and colleagues (2015) found 11 individual and 5 organizational factors' relationships with nursing care aids' job satisfaction. Two individual factors, empowerment and autonomy, were found to have a positive and significant relationship with job satisfaction, while

age, gender, educational level, special training, and years of experience were not significantly related to job satisfaction. Ethnicity, current position tenure, employment status and stress showed an equivocal relationship (undetermined significance) with job satisfaction. Two organizational factors, resources and workload, had a significant effect on job satisfaction. Resources demonstrated a positive significant relationship to job satisfaction whereas workload had a negative significant relationship with job satisfaction. Salary, benefits, and job performance were not significantly related to job satisfaction among nursing care aids in long-term care residences. Support from co-workers showed an equivocal relationship with job satisfaction.

Comparing the two systematic reviews revealed six major differences. These differences were (See Table 1.0):

1) Participants−Lu and colleagues (2005, 2012) examined registered nurses while Squires and colleagues (2015) examined nursing care aids;

2) Work Setting−Lu and colleagues (2005, 2012) focused on hospitals whereas Squires and colleagues (2015) focused on long-term care facilities;

3) Nurses valued team cohesiveness and physical conditions as important for job satisfaction (Lu, Barriball, Zhang, & While, 2012; Lu, While, & Barriball, 2005), whereas nursing care aids valued a balanced workload and resources important to their level of job satisfaction (Squires, Hoben, Linklater, Carleton, Graham, & Estabrooks, 2015);

4) Age and years of experience were significant to nurses' job satisfaction (Lu, Barriball, Zhang, & While, 2012; Lu, While, & Barriball, 2005), whereas age and experience were not consistently significant to nursing care aids' satisfaction (Squires, Hoben, Linklater, Carleton, Graham, & Estabrooks, 2015);

5) Stress was a significant factor in nurses' job satisfaction (Lu, Barriball, Zhang, & While, 2012; Lu, While, & Barriball, 2005), but not in that of nursing care aids (Squires, Hoben, Linklater, Carleton, Graham, & Estabrooks, 2015); and

6) Co-worker support had a moderate and positive impact on nurses' job satisfaction Lu, Barriball, Zhang, & While, 2012; Lu, While, & Barriball, 2005), but not on that of nursing care aids (Squires, Hoben, Linklater, Carleton, Graham, & Estabrooks, 2015).

Evidently, there are many differences between the factors, both individual and organizational, affecting registered nurses working in a hospital setting and nursing care aids in a long-term care setting. Given the different roles and responsibilities of registered nurses versus nursing care aids, and the different working conditions in hospitals versus long-term care facilities, may explain the differences between the factors affecting levels of job satisfaction in these two nursing populations.

Table 1.0− Differences between two previous systematic reviews on job satisfaction

	Lu and colleagues (2005, 2012)	**Squires and colleagues (2015)**
Participants	Nurses	Nursing care aids
Work Setting	Hospitals	Long-term care facilities
Individual Factors		
Age	Slight relationship (correlation coefficient <0.2) with job satisfaction	Non-Significant 9/12 studies showed a non-significant relationship to job satisfaction
Years of Experience	Slight relationship (correlation coefficient <0.2) with job satisfaction	Non-Significant 3/5 studies showed a non-significant relationship to job satisfaction
Stress	Substantial to very strong relationship (correlation coefficient>0.5) with job satisfaction	Equivocal 2/4 studies showed a negative significant relationship with job satisfaction 2/4 studies showed a non-significant relationship with job satisfaction

Table 1.0 (Continued.)− Differences between two previous systematic reviews on job satisfaction

	Lu and colleagues (2005, 2012)	**Squires and colleagues (2015)**
Organizational Factors		
Cohesiveness	Substantial to very strong relationship (correlation coefficient>0.5) with job satisfaction	NA
Physical Condition	Predictor of job satisfaction	NA
Balanced Workload	NA	Significant All 5 studies showed a significant relationship with job satisfaction. 4 studies showed a negative relationship whereas 1 study showed a positive relationship.
Resources	NA	Significant 2/3 studies showed a positive significant relationship with job satisfaction
Co-worker Support	Moderate to substantial relationship (correlation coefficient 0.2−0.5)	Equivocal 3/6 studies showed a non-significant relationship with job satisfaction 3/6 studies showed a mixed (positive and negative) significant relationship with job satisfaction

Aim of Thesis and Research Questions

Nursing policies and procedures are guided by the principles of evidence-based practice. Evidence-based practice is often linked to the concept of knowledge synthesis. Science is a cumulative process of generating knowledge that evolves with time and repeated observation. Individual studies alone are often not sufficient to influence change where healthcare practices or policies are concerned. Individual studies can be misleading due to chance or bias. Knowledge synthesis summarizes all evidence in a particular domain, in this case nursing, in a way that promotes understanding and makes sense of the literature, and enables the making of informed clinical decisions (Canadian Institutes of Health Research, 2009; Grimshaw, 2010). Knowledge synthesis takes different forms. A systematic review is, given the rigorous and meticulous

methodological design, considered to be the highest form of knowledge synthesis and the most reliable source of evidence to guide clinical practice (Clarke, 2011). To date, no systematic reviews have been conducted of critical care nurses' job satisfaction. Systematic reviews aim to critically analyze the literature and synthesize evidence, thus making it the most appropriate study design for my thesis to address my research questions. Therefore, the purpose of this thesis is to conduct a systematic review that appraises, analyzes, and synthesizes studies on critical care nurses' job satisfaction. I sought to answer the following questions:

1) What are the conceptual definitions and theories of job satisfaction that are used in studies of critical care nurses?

2) What instruments have been used to quantitatively measure and operationally define job satisfaction among critical care nurses?

3) What is the level of job satisfaction among critical care nurses? How has it changed over time? Do nurses' level of job satisfaction differ by type of critical care unit?

4) What factors are correlated to critical care nurses' job satisfaction?

The results of the systematic review will provide a better understanding of how job satisfaction is defined and conceptualized, what instruments are used to quantitatively measure job satisfaction, what we currently know about critical care nurses' level of job satisfaction, about possible trends in levels of job satisfaction over time, and about what individual and organizational factors are associated with critical care nurses' job satisfaction. This information is useful for healthcare leaders and managers. Through this systematic review, I also provide evidence of gaps in literature that require further investigation and promote future nursing research.

Thesis Layout

This thesis is composed of four chapters:

- Chapter 1 is introductory in nature, describing the impetus for the topic, listing the aim and research questions, and including a literature review of the nursing shortage, critical care nursing, nursing turnover, job satisfaction, conceptual models and frameworks of job satisfaction, and previous job satisfaction systematic reviews.
- Chapter 2 describes the methods used in the study, including the thesis design, data collection procedures, search strategy, selection criteria, screening process, methodological quality assessment, data extraction, and data analysis procedures.
- Chapter 3 describes the results of the systematic review of literature on critical care nurses' job satisfaction. First, the characteristics of each included study are described, followed by the demographic profile of the participants of the included studies, methodological quality assessment results, and finally, the results relating to each of the four research questions.
- Chapter 4 is conclusive in nature, presents a summary of the findings, comparing these findings to those of the two previous job satisfaction systematic reviews, identifying key findings from my systematic review including limitations in job satisfaction literature in critical care nursing, implications of this systematic review for nursing practice and future research, the strengths and limitations of this thesis, and an assessment of the methodological quality of my systematic review.
- Chapter 4 is followed by a bibliography and appendices including additional results tables and figures not included in Chapter 3.

Chapter Two: Methods

Chapter two denotes the methods I used in my thesis research to conduct a systematic review of the literature examining critical care nurses' job satisfaction.

Thesis Design

This thesis is a systematic review of job satisfaction among critical care nurses designed to answer the following questions:

1) What conceptual definitions and theories of job satisfaction are used in studies of critical care nurses?

2) What instruments have been used to quantitatively measure job satisfaction and operationally define job satisfaction among critical care nurses in studies?

3) What is the level of job satisfaction among critical care nurses? How has it changed over time? Do nurses' level of job satisfaction differ by type of critical care unit?

4) 'What factors are correlated to critical care nurses' job satisfaction?

Purpose and Types of Knowledge Synthesis

Knowledge synthesis is "the contextualization and integration of research findings of individual research studies into a larger body of knowledge on the topic" (Grimshaw, 2010, p. 2). A synthesis must be reproducible, hence methodologically transparent, whether the methods used are quantitative and/or qualitative. A knowledge synthesis is preferred to the results of individual research studies because individual studies may be misleading due to chance or bias, and therefore cannot safely form the basis for change in practice or policy (Grimshaw, 2010). A review is based on the examination, critical analysis, and synthesis of evidence on a particular topic (Clarke, 2011). There are different types of reviews. Grant and Booth (2009) list 14 of the most common types of reviews: critical reviews, narrative or literature reviews, mapping or

systematic map reviews, meta-analyses, mixed studies or mixed methods reviews, overviews, qualitative systematic reviews or qualitative evidence syntheses, rapid reviews, scoping reviews, state-of-the-art reviews, systematic search and reviews, systematized reviews, systematic reviews, and umbrella reviews. A critical review presents, analyzes, and synthesizes evidence/literature from diverse sources and its results typically manifest in a hypothesis or a model, rather than an answer. A narrative or literature review is broad and covers a wide range of topics at various levels of comprehensiveness and completeness based on the analysis of the literature: it may include research findings, and is often difficult to generalize. A mapping review or systematic map review is used to map out and categorize literature on a specific subject, identifying the gaps in the literature for future reviews and/or primary research. A meta-analysis is a review of the results from quantitative studies to describe a more precise effect of the results. A mixed studies or mixed methods review refers to a combination of quantitative and qualitative studies on interventions. An overview is any summary of medical literature that focuses on surveying the literature and describing its characteristics. A qualitative systematic review, also known as a qualitative evidence synthesis, is a method of integrating or comparing themes or constructs from qualitative studies, which can lead to development of a new theory, an overarching narrative, a wider generalization, or an interpretive translation. A rapid review is an assessment of what is known about a policy or practice issue through a systematic search and critical appraisal of existing research (Grant & Booth, 2009). A scoping review is a preliminary assessment of the potential size and scope of available research on a particular topic (Arksey & O'Malley, 2005). A state-of-the-art review is a sub-type of a literature review, characterized by offering new perspectives on a more current issue or highlights an area that requires further research. A systematic search and review combines a critical review and a comprehensive search

on broad questions, resulting in evidence synthesis. A systematized review is usually conducted by postgraduate students as they are not able to draw upon the resources required for a full systematic review (Grant & Booth, 2009). A systematic review is the most common and well-known type of review, which seeks to systematically search for, appraise, and synthesize evidence. Systematic reviews are often based on precise, transparent, replicable, and rigorous methodological guidelines (Clarke, 2011). An umbrella review is the compilation of evidence from multiple Cochrane systematic reviews into one accessible and usable document. An emerging type of review, known as a realist review, has an exploratory approach that is not judgemental and focuses on how complex programmes or interventions work or fail in particular contexts and settings (Pawson, Greenhalgh, Gill, & Walshe, 2005).

Out of these various different forms of reviews for knowledge synthesis, I have chosen to perform a systematic review given its explicit, precise, and rigorous process, which is deemed to result in the most reliable source of evidence. Systematic reviews require clear and specific objectives and questions, a systematic and meticulous search of all possible and relevant evidence, a rigorous screening and data extraction process, critical appraisal of the methodological quality and validity of the findings, an in-depth synthesis, and a systematic presentation of the information and findings in the included studies. (Clarke, 2011)

Methods

The methods of my systematic review were primarily based on those proposed by the Joanna Briggs Institute. However, to assess the methodological quality of the studies, two critical appraisal tools based on guidelines proposed by Cochrane Collaboration (2001) were used in this systematic review. The Joanna Briggs Institute conducts systematic reviews to answer questions regarding health issues of interest to health care professionals (Tricco, Tetzlaff, & Moher, 2011).

Cochrane Collaboration is one of the leading producers of systematic reviews and often addresses questions relating to the efficacy of an intervention, which is not the case for this systematic review (Clarke, 2011; Tricco, Tetzlaff, & Moher, 2011).

Data Collection Procedures

Search Strategy. A search strategy to identify published and peer-reviewed literature was developed in consultation with a health science librarian (EW). The following bibliographic databases were searched: MEDLINE (January 1980−May 2015), CINAHL (January 1980−May 2015), PsychINFO (January 1980−May 2015), EMBASE (January 1980−May 2015), and Proquest Nursing & Allied Health Source (January 1980−May 2015). Key words and Mesh headings/index terms related to critical care nurses' job satisfaction, as well as instruments and theories relating to the conceptualization and quantitative measurement of critical care nurses' job satisfaction, were used. A draft of the search strategies for all five electronic databases is presented in Additional Table 1.0 in the Appendix.

Selection Criteria. Studies published in English and French between January 1980 and May 2015 were included if they reported on primary research using an experimental or observational quantitative design to investigate job satisfaction in Registered Nurses (RN) who provide direct patient care in a critical care unit. For complete eligibility criteria, see Table 2.0.

Table 2.0− Eligibility Criteria

	Inclusion Criteria	**Exclusion Criteria**
Phenomenon of Interest **(Dependent Variable)**	• Job Satisfaction • Work Satisfaction • Employee Satisfaction • Job Dissatisfaction • Work Dissatisfaction • Employee Dissatisfaction	• Absenteeism • Turnover • Burnout • Occupational Stress • Patient Satisfaction • Compassion Satisfaction • Moral Distress
Types of Studies	• Peer-reviewed • Published • Experimental (intervention) • Non-experimental (quantitative observational) **<u>Including:</u>** • Randomized Controlled Trials • Non-randomized Controlled Trials • Quasi-experimental • Before and After Studies Prospective and Retrospective Cohort Studies • Case-control • Cross-sectional Studies	• Qualitative Studies • Duplicates • Commentaries • Abstracts • Editorials • Reports • Conferences • Reviews • Thesis • Dissertation • Unpublished studies • Grey Literature (reference)
Date & Location	• Date Range: 1980−2015(current) (oldest study from a recent scoping review was published in 1982. Four studies from the scoping review were published in the 1980's.) • No restrictions will be placed on the studies' country of origin.	• Studies published before 1980.
Language	• English • French (Languages of the researchers)	• Any other language other than English and French.

Table 2.0 (Continued.)− Eligibility Criteria

	Inclusion Criteria	**Exclusion Criteria**
Types of Participants	• Registered Nurse • Nurse Clinician • Nurse Practitioners • Nurse Midwife • Scrub Nurse	• Nurse Manager/Leader • Head Nurse/Assistant Head Nurse • Nurse Administrator • Clinical Nurse Specialist • Nursing Educator • Nurse-Teacher • Nurse Researcher/Academia • Nursing Student • Graduate Pending License or Candidate Pending entry to Nursing Profession • Physician • Physician Assistant • Licensed Practical Nurse • Nursing Assistant • Bedside Attendant • Orderly • Respiratory Therapist • Health Care Support Staff • Any other health care professional other than registered nurses

Table 2.0 (Continued.)− Eligibility Criteria

	Inclusion Criteria	**Exclusion Criteria**
Context	• Critical Care Units (Tertiary or Primary Care Setting−Hospital- or Clinic-based) defined as units where the nurse to patient ratio is 1:1 **Including:** • Emergency Department or Emergency Room (Trauma, Emergency Services, Triage, Resuscitation, Burn Unit) • Intensive Care Unit (Neonatal, Pediatric, Adult, Medical, Surgical, and Neurological) • Coronary Care Unit or Cardiac Care Unit • Operating Room • Post-Anesthesia Care Unit or Recovery Room • Case Room/Labour & Delivery Room	• Acute Medical • Acute Surgical (Post-operative) • Specialty Units • Intensive Therapy Unit • Intermediate Care Unit (where critical care units included are not specified) • Step-down Units • Long-term (Geriatric) Care Unit or Facility • Rehabilitation or Convalescence • Respite Care • Palliative Care Unit • Oncology Unit • Dialysis • Post-partum Unit • Ambulatory (non-urgent and non-critical) Care and Follow-up Clinics−CLSC/CSSS, ENT, Infectious Diseases, Hematology, Rheumatology, Orthopedic, Urology, Diabetic, Gastroenterology, Dermatology, and Plastics. • Home Care • Telehealth
Outcome Measure	• Quantitative Measure of Job Satisfaction **Including:** • Single-item Measure • Pre-developed and Validated Instrument or Tool	• No Quantitative Measure of Job Satisfaction • Nurses are not separately analyzed from other health care professionals and support staff.

Screening Process. After removal of duplicates, citations were screened for inclusion using a three-step process. First, I (ADR) independently screened all citations by title and abstract to determine eligibility. Citations deemed potentially relevant were kept and full-text articles were retrieved. Excluded citations were screened to ensure accuracy of the screening decision. If, at this time, there was disagreement, a second member of the supervisory committee was consulted until consensus was reached. Second, I (ADR) assessed the full texts of all citations deemed potentially eligible. Finally, all relevant citations underwent verification by the thesis supervisory committee.

Methodological Quality Assessment. The methodological quality of the included studies was assessed by one reviewer (ADR) using two previously validated assessment tools. For cross-sectional and longitudinal studies, I used the Quality Assessment and Validity Tool for Cross-Sectional Studies, and for intervention (pre-/post-test) studies the Quality Assessment and Validity Tool for Before/After-Cohort Studies was used. Quality assessments considered appropriateness of study design based on the research objectives, sample, measurement of key variables (individual and organizational factors) and the outcome of interest (job satisfaction), and appropriateness of the statistical analysis employed. The tools were both based on Cochrane guidelines (2001) and medical literature (Khan, ter Riet, Popay, Nixon, & Kleijnen, 2001; Kmet, Lee, & Cook, 2004). The Quality Assessment and Validity Tool for Cross-Sectional Studies has a maximum score of 16 points and assesses studies in three methodological core areas: sampling (eight points), measurement (four points), and statistical analysis (four points). The Quality Assessment and Validity Tool for Before/After-Cohort Studies has a maximum score of 18 points and assesses studies in six methodological core areas: sampling (four points), design (two points), control of confounders (four points), data collection and outcome measurement (three

points), statistical analysis (four points), and dropout (one point). To obtain a final quality score for each article, we divided the total points scored in all core areas by the total points possible (16 or 18) subtracting the number of inapplicable points in each article. The quotient score obtained for each study was then classified in one of four categories of methodological quality: weak (≤ 0.50), low − moderate (0.51 to 0.65), high − moderate (0.66 to 0.79), or strong (≥ 0.80). This rating system has been used in multiple systematic reviews (Estabrooks, Cummings, Olivo, Squires, Giblin, & Simpson, 2009; Estabrooks, Floyd, Scott-Findlay, O'leary, & Gushta, 2003; Squires, Hoben, Linklater, Carleton, Graham, & Estabrooks, 2015) and is based on a scoring system developed by De Vet and colleagues (1997).

*Data Extraction***.** One reviewer (ADR) extracted data from all included studies into Excel spreadsheets and these were verified for accuracy by a second person Ibo MacDonald a post-doctorate student. Discrepancies in data extraction were resolved through discussion and consensus with thesis committee members.

Extracted data included study information (author(s), year of publication, journal of publication, study's country or countries of origin, study design, critical care department studied, year of data collection, data collection method, sample size, response rate, and statistical analyses conducted); socio-demographic characteristics of participants (age, sex, ethnicity, marital status, education, certification, years of nursing, critical care and hospital experience, employment status−full-time, part-time or occasional–and the length and type of shifts worked−days, evenings, nights, 8- or 12-hour); conceptual definitions of job satisfaction; theoretical frameworks used; information on the job satisfaction quantitative measure used (developer(s), year of development, number of items, domains and subscales, scoring, reliability, and validity); and main outcome(s) (overall job satisfaction scores and the statistical tests employed, and the

results of the individual and organizational factors' relationship to job satisfaction).

Data Analysis

Characteristics of Sampled Studies

The included studies and their information (author(s), year and journal of publication, sample size, demographics of participants, critical care unit, study design, type of results, and quality) were organized in chronological order in a table. The table offers an overview and brief summary of each study's characteristics and all relevant results to answer the research questions. Using this table, frequencies for the study characteristics were determined. (see Additional Table 2.0 in the Appendix for characteristics of sampled studies)

Socio-Demographics of Participants

The reported socio-demographic data (age, sex, ethnicity, marital status, education, certification, employment status, shift type, shift length, and years of experience being a nurse, being in critical care, and being in a hospital setting) from each study were organized in an Excel spreadsheet to facilitate viewing of trends, comparisons, and calculations of frequencies, percentages, and averages where applicable, for each variable. (see Table 3.1 for socio-demographics of participants)

Research Question 1

Conceptual Definitions of Job Satisfaction of Critical Care Nurses

To analyze conceptual definitions, a guided content analysis (deductive analysis) followed by an inductive thematic analysis was performed where definitions were categorized in order to facilitate comparison and synthesis, and to formulate conclusions. First, a guided content analysis was performed where definitions were categorized in to a global affective approach or a facet

approach when defining job satisfaction. If definitions could not be categorized in to one of the two categories, an inductive thematic analysis of the definition(s) for common themes was performed and other categories were identified.

Theories in Job Satisfaction Literature

Theories and conceptual frameworks were also listed, along with their descriptions and implications in the study, if reported. Theories were then separated into two groups: "job satisfaction"-related theories with a subcategory for content and process theories, and "other" theories not related to job satisfaction. Frequencies for each of the theories were calculated. To examine how the job satisfaction theory was used in each study, Field and colleagues (2014) five categories for assessing the degree of usage of the theory in a study was used. The five categories are: integrated (the theory is integral to the design, delivery, and evaluation of the implementation activities), directed (the theory has influenced project design, but no examples are provided), adapted/combined (the theory is modified or combined with another theory), informed (the theory influences the study in a non-specified general way), and referenced (the theory is cited with little or no further explanation).

Research Question 2: Quantitative Measures of Job Satisfaction of Critical Care Nurses

Quantitative measures of job satisfaction and the corresponding psychometric properties and characteristics were extracted from each study for analysis. Frequencies for each measure were calculated. Quantitative measures were also analyzed in relation to the year of publication of the study, to explore possible trends in its use over time.

Research Question 3: Level of Job Satisfaction Among Critical Care Nurses

To facilitate comparison and analysis of the overall level of critical care nurses' job satisfaction, the job satisfaction scores in each included study were standardized on a scale from 0 to 100. To calculate the standardized job satisfaction score, the reported job satisfaction score in the study was divided by the maximum possible score for job satisfaction from the quantitative measure used, and then multiplied by 100. For example, Arikan, Köksal, and Gökçe (2007) use the Minnesota Work Satisfaction Questionnaire (MSQ) that measures job satisfaction items on a 5-point Likert scale. They report an overall standard mean for general satisfaction of 2.26. The result of this standardization calculation yields a job satisfaction score of 45% (on a scale of 0−100%). This standardization allows comparisons and examinations of trends in critical care nurses' job satisfaction scores across all studies. Nurses who score higher than 60% are considered to demonstrate satisfaction with their jobs.

Three different analyses were conducted to answer the third research question:

(1) The average of all the reported job satisfaction scores, as well as the weighted mean were calculated to determine the overall level of job satisfaction among nurses working in critical care units. Both the average and weighted mean were calculated to compare the results and determine the effects that sample size can have on the overall job satisfaction score;

(2) All reported job satisfaction scores were organized in chronological order, according to the study's year of publication, in a table and plotted on a graph to identify trends in critical care nurses' level of job satisfaction over time;

(3) Reported job satisfaction scores were categorized by the corresponding critical care units of the study and averages calculated to compare differences in nurses' level of job satisfaction in each critical care unit.

Research Question 4: Analysis of Individual and Organizational Factors Associated with Critical Care Nurses' Job Satisfaction

First, the factors extracted from the studies were categorized under "individual factors" and "organizational factors." Frequencies were calculated for each unique factor (individual and organizational) and placed in a table. Statistical tests employed (bivariate versus multivariate analysis) and their corresponding results for each factor were also added to the frequency table. The following a priori rules (Squires, Estabrooks, Gustavsson, & Wallin, 2011) were applied to guide the synthesis of the factors, individual and organizational, associated with job satisfaction:

(1) A factor, individual or organizational, was assessed four or more times (this could mean two assessments of different variables comprising the same factor from one study) to draw conclusions regarding its relationship with job satisfaction. If a factor was assessed fewer than four times, it was coded as inconsistent, meaning there was insufficient evidence to reach a conclusion.

(2) Two separate tables displaying the results from multivariate and bivariate analysis of the factors, individual or organizational, assessed four or more times were created. If both bivariate and multivariate statistical analyses were performed for one factor, results were examined for possible inconsistencies between the tests and the results from the higher model (multivariate test result) were relied on.

(4) I used a vote-counting approach to synthesize the quantitative data regarding the relationship between a factor examined four or more times and critical care nurses' job satisfaction. Vote

counting is based on the percentage of studies demonstrating, or failing to demonstrate, a statistically significant relationship. I supplemented vote-counting with recommendations made by Grimshaw and colleagues (2003) to extract the direction and magnitude of effect for all factors demonstrating a statistically significant effect ($p < 0.05$). Factors, individual or organizational, assessed four or more times were coded as:

(a) significant to critical care nurses' job satisfaction if more than 60% of the statistical or quantitative tests show a significant relationship between the factor and job satisfaction;

(b) not significant to critical care nurses' job satisfaction if more than 60% of the statistical or quantitative test show an insignificant relationship between the factor and job satisfaction;

(c) equivocal meaning inconsistent significance to critical care nurses' job satisfaction if fewer than 60% of the statistical or quantitative tests show a significant or no significant relationship between the factor and job satisfaction.

(4) Factors assessed in fewer than four studies were identified and examined for trends only.

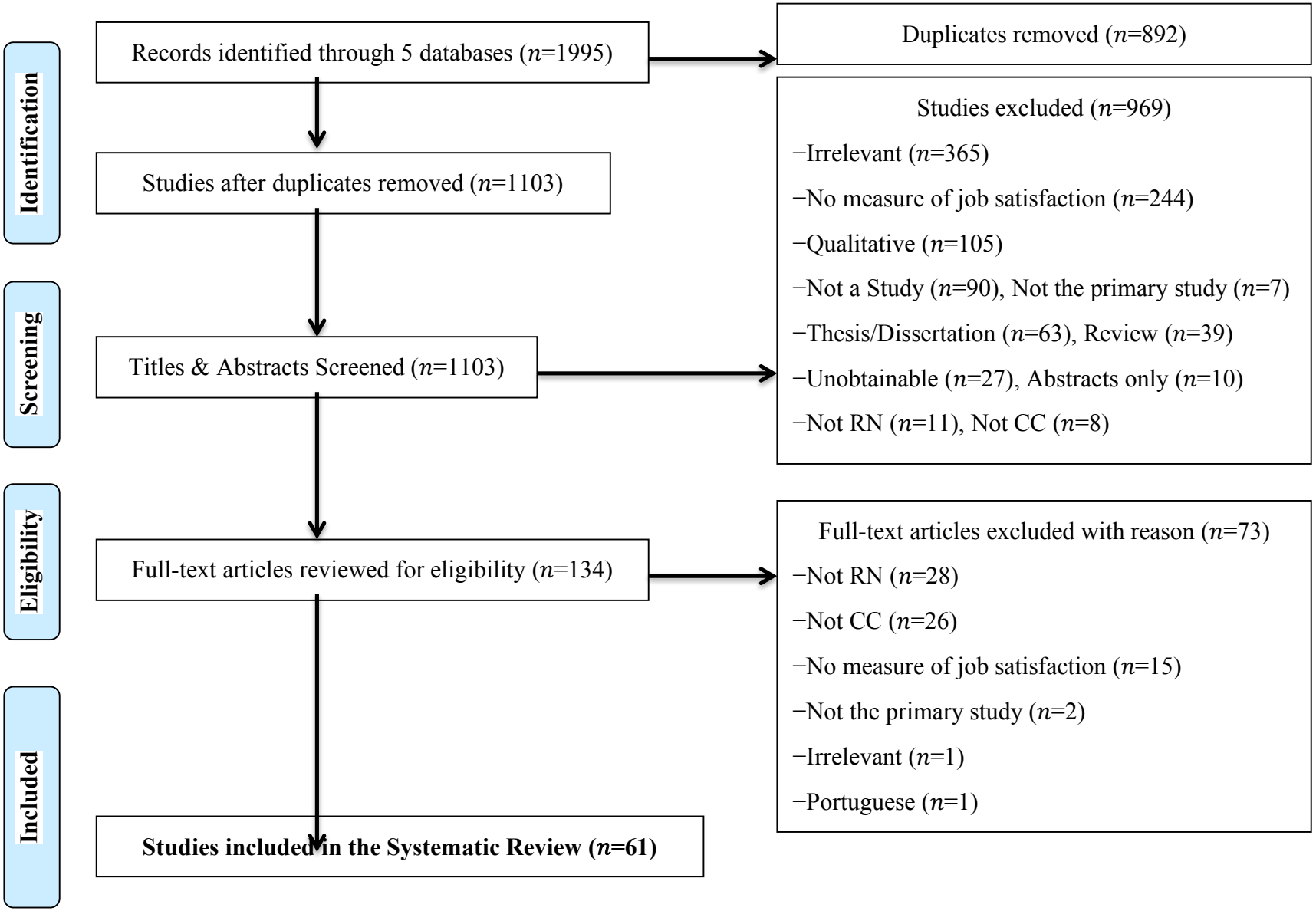
Chapter Three: Results

This chapter describes the results from the systematic review of the critical care nurses' job satisfaction literature. First, the results from the systematic search are described. Second, the study characteristics of the included studies are reported followed by the demographic profile of the participants in the studies. Then, the methodological quality assessment results are described. Lastly, results addressing each of the four research questions are reported and described.

Systematic Search

The systematic search from the five bibliographic databases yielded 1,995 articles. Once duplicates (*n*=892) were removed, one reviewer (ADR) independently screened the remaining 1,103 titles and abstracts for eligibility. A total of 969 articles were excluded in the primary screening, leaving 134 citations for full-text review. A final sample of 61 studies remained after the full-text screening. Reasons for exclusion included: irrelevant (contains ≥ 2 exclusion criteria) (*n*=366), no quantitative measure of job satisfaction (*n*=259), qualitative study (*n*=105), not an empirical study (*n*=90), thesis/dissertations (*n*=63), reviews (*n*=39), unobtainable (*n*=27), not related to registered nurses or nurses not separately analyzed from nurse managers or other health care professionals and support staff (*n*=39), not in a critical care setting or critical care unit not separately analyzed (*n*=34), abstract only (*n*=10), not the primary study (*n*=9), and written in Portugese (*n*=1). (See Additional Table 1.0 in the Appendix for the search strategy of the five electronic databases and the PRISMA flow chart presented in Figure 3.1)

Figure 3.1− PRISMA



Study Characteristics

Of the 61 studies included in the systematic review, the majority used a survey design−cross-sectional (*n*=50, 82%) or longitudinal (*n*=4, 7%)−while the remaining studies used a pre-and post-intervention design (*n*=7, 11%). Most studies were conducted in the United States (*n*=24, 39%) and in adult intensive care units (ICU) and cardiac/coronary care units (CCU) (*n*=25, 41%). The earliest studies were published in 1982 (Blair et al., 1982; Dear et al., 1982). Since then, research on critical care nurses' job satisfaction has steadily increased, with the highest proportion of the research published in the past five years (*n*=21, 34%). (See Additional Table 2.0 for a summary of included studies' characteristics and Additional Tables and Figures 3.0 to 6.0 in the Appendix for frequency tables and graphs on the study design, county/countries of origin of the study, and critical care units of included studies)

Description of Participants in Sampled Studies

A total of approximately 22,741 critical care nurses participated in the included 61 studies. Demographic data on these participants varied significantly and demographic variables were inconsistently reported. Authors most frequently reported on sex (*n*=36 studies, N=16,279 participants), with females comprising 89% (N=14,500) and males 11% (N=1,713) of the total sample for the systematic review. Critical care nurses' mean age was the second most frequently reported demographic variable (*n*=27 studies), the mean age being 33 years. Other demographic variables were examined in fewer than 40% of the 61 studies making it difficult to draw conclusions on demographics for the overall sample. All demographic data of the 61 included studies are presented in Table 3.1. (Also see Additional Table 2.0 in the Appendix for summary of demographic data of the participants in the included studies)

Table 3.1− Demographics for participants (N=22741) in the included studies (η=61)

Demographic Variable	No. of Studies Reporting the Variable out of total included studies	Total No. of Participants in the Studies reporting on the Variable	Average Value	Value No. of Participants (%)
Sex	36	16279		
Female				14500 (89)
Male				1713 (11)
Age	27	11797	33	
Marital Status				
Married/Cohabiting	17	3946		2103(53)
Single	14	4459		2361(58)
Divorced/Widowed	10	2359		119(5)
Education				
Diploma/Associates	20	5595		3320(59)
Bachelor's	23	15664		7937(51)
Master's or Higher	14	11164		489(4)
Certification	7	8688		3773(43)
Employment Status				
Full-time	19	12488		9877(79)
Part-time	8	1548		512(33)
Occasional	2	363		19(5)
Shift Type				
Rotation	9	4483		2599(58)
Days	7	3423		1020(30)
Evening	1	163		23(14)
Nights	5	3024		744(25)

Table 3.1 (Continued.)− Demographics for participants (N=15840) in the included studies (η=61)

Demographic Variable	No. of Studies Reporting the Variable out of total included studies	Total No. of Participants in the Studies reporting on the Variable	Average Value	Value No. of Participants (%)
Shift Length				
8-hour	4	3511		349(10)
12-hour	4	3511		1768(50)
Years of Experience				
Nursing	20	13344	10.34	
Critical Care	19	10759	7.23	
Hospital	4	882	8.53	
Ethnicity				
Caucasian	7	8563		6936(81)
Asian/Pacific Islander	2	64		11(17)
African American	2	156		28(18)
Hispanic	1	137		14(10)
Other	1	45		3(7)

Methodological Quality Assessments

With respect to methodological quality, 2 studies, both cross-sectional, were strong (3%); 15 studies, all cross-sectional, were "high−moderate" (25%); 22 studies (20 cross-sectional and 2 before/after studies) were "low−moderate" (36%); and 22 studies (17 were cross-sectional or longitudinal and 5 before/after studies) were rated as "weak" (36%). Main reasons for lower-quality scores were: a lack of probability sampling or justification for sample size (η=54); a self-reported questionnaire to measure job satisfaction (η=61); failure to report how missing data were managed (η=60); failure to report on confidence intervals in cross-sectional studies (η=50); and failure to create or assess equivalence of the groups at baseline (η=5) and to report on validity (η=7) and reliability (η=5) in before and after cohort studies. All methodological quality assessments of the 61 included studies are presented in Table 3.2.1 and Table 3.2.2 below. (Also see Additional Table 2.0 in the Appendix for a summary of the methodological quality assessment for each included study and Additional Tables 7.0 and 8.0 and Figure 7.0 in the Appendix for a frequency tables and graph of methodological quality of all included studies)

Table 3.2.1− Quality assessments for included cross-sectional and longitudinal survey studies (η=54)

First Author, Year	Sample							Measurement			Statistical Analysis				Total Points[1]	Score	Quality
	Probability Sample Used	Representative	Sample Size Appropriate for Power	Sample Drawn > 1 site	Matching, Design	Statistically Adjusted	Response Rate > 50%	DV Directly Measured/Administrative	DV Reliability	DV Validity	Appropriate Tests Used	ρ Values Reported	CI Reported	Missing Data Managed Appropriately			
Dear, 1982	0	1	0	1	2		1	0	0	0	1	1	N	N	7/13	0.54	Low-Moderate
Duxbury, 1984	1	1	0	1	N		1	0	1	1	1	1	N	N	8/12	0.67	High-Moderate
Norbeck, 1985a	0	2	0	1	N		1	0	1	1	1	1	N	1	9/12	0.75	High-Moderate
Norbeck, 1985b	0	2	0	1	N		1	0	0	1	1	1	N	N	7/11	0.64	Low-Moderate
Carnevale, 1987	0	0	0	0	N		1	0	0	0	1	1	N	N	3/11	0.27	Weak
Landeweerd, 1988	0	1	0	0	2		N	0	1	0	1	1	N	N	6/12	0.50	Weak
Baggs, 1990	0	0	0	0	0		N	0	1	0	1	1	N	N	3/12	0.25	Weak
Ehrendeld, 1990	0	0	0	0	N		1	0	0	0	1	1	N	N	3/11	0.27	Weak
Williams, 1990	0	0	0	0	2		N	0	1	0	0	N	N	N	3/11	0.27	Weak
Ehrenfeld, 1991	0	1	0	1	N		1	0	1	1	1	1	N	N	7/11	0.64	Low-Moderate
Medcof, 1992	0	1	0	0	2		N	0	1	0	1	1	N	N	6/12	0.50	Weak
Neubauer, 1992	0	1	0	1	N		1	0	1	1	1	1	N	N	7/11	0.64	Low-Moderate
Pike, 1993	0	0	0	0	0		0	0	0	0	0	N	N	N	0/10	0.00	Weak

Table 3.2.1 (Continued.)− Quality assessments for included cross-sectional and longitudinal survey studies (η=54)

First Author, Year	Sample							Measurement			Statistical Analysis				Total Points[1]	Score	Quality
	Probability Sample Used	Representative	Sample Size Appropriate for Power	Sample Drawn > 1 site	Matching, Design	Statistically Adjusted	Response Rate > 50%	DV Directly Measured/Administrative	DV Reliability	DV Validity	Appropriate Tests Used	ρ Values Reported	CI Reported	Missing Data Managed Appropriately			
Stechmiller, 1993	0	2	0	1	N		1	0	1	0	1	1	N	N	7/11	0.64	Low-Moderate
Boumans, 1994	1	2	0	1	2		1	0	1	0	1	1	N	N	10/13	0.77	High-Moderate
Al-Ma'aitah, 1996	0	1	N	1	2		1	0	1	0	1	1	N	N	8/12	0.67	High-Moderate
Boyle, Popkess, 1996	0	1	0	1	2		0	0	0	1	1	1	N	N	7/13	0.54	Low-Moderate
Iskra-Golec, 1996	0	1	0	0	2		N	0	0	0	1	1	N	N	5/12	042	Weak
Manley, 1996	0	0	0	0	2		1	0	0	0	1	1	N	N	5/13	0.38	Weak
Song, 1997	0	1	0	1	2		N	0	1	1	1	1	N	N	8/12	0.67	High-Moderate
Ecklund, 1998	0	0	0	0	2		0	0	1	0	1	N	N	N	4/12	0.33	Weak
Freeman, 1998	0	0	0	0	2		1	0	1	0	1	1	N	N	6/13	0.46	Weak
Bratt, 2000	0	2	0	1	N		1	0	1	0	1	1	N	N	7/12	0.58	Low-Moderate
Loke, 2001	0	1	0	0	2		1	0	1	1	1	1	N	N	8/13	0.62	Low-Moderate
Kuokkanen, 2003	1	2	0	1	2		1	0	0	0	1	1	N	N	9/13	0.69	High-Moderate
Boyle, Miller, 2006	0	2	0	1	2		1	0	1	1	1	1	N	N	10/13	0.77	High-Moderate

Table 3.2.1 (Continued.)− Quality assessments for included cross-sectional and longitudinal survey studies (η=54)

First Author, Year	Sample							Measurement			Statistical Analysis				Total Points[1]	Score	Quality
	Probability Sample Used	Representative	Sample Size Appropriate for Power	Sample Drawn > 1 site	Matching, Design	Statistically Adjusted	Response Rate > 50%	DV Directly Measured/Administrative	DV Reliability	DV Validity	Appropriate Tests Used	ρ Values Reported	CI Reported	Missing Data Managed Appropriately			
Mrayyan, 2006	0	1	0	0	2		1	0	1	1	1	1	N	N	8/13	0.62	Low-Moderate
Tummers, 2006	1	2	0	1	2		1	0	0	0	1	1	N	N	9/13	0.69	High-Moderate
Arikan, 2007	0	1	N	1	2		1	0	1	0	1	1	N	N	8/12	0.67	High-Moderate
Huang, 2007	0	1	0	0	2		1	0	1	0	1	1	N	N	7/13	0.54	Low-Moderate
Li, 2008	0	1	0	1	N		1	0	1	0	1	1	N	N	6/11	0.55	Low-Moderate
Chen, 2009	0	2	0	1	N		1	0	1	0	1	1	N	N	7/12	0.58	Low-Moderate
Cho, 2009	0	2	0	1	2		1	0	0	0	1	1	N	N	8/13	0.62	Low-Moderate
Dai, 2009	0	2	0	1	2		0	0	1	0	0	N	N	N	6/12	0.50	Weak
Forsgren, 2009	0	1	0	1	N		1	0	1	1	1	1	N	N	7/11	0.64	Low-Moderate
Rochefort, 2010	0	2	0	1	N		1	0	0	0	1	1	N	N	6/11	0.55	Low-Moderate
Adriaenssens, 2011	0	1	0	1	2		1	0	1	1	1	N	0	N	9/13	0.69	High-Moderate
Lin, Hsu, 2011	1	2	0	1	2		N	0	0	0	1	1	N	N	8/12	0.67	High-Moderate
Cilingir, 2012	0	1	0	0	2		1	0	1	0	1	1	N	N	6/13	0.46	Weak
Klopper, 2012	0	2	0	1	N		N	0	1	0	1	1	N	N	6/10	0.60	Low-Moderate

Table 3.2.1 (Continued.)− Quality assessments for included cross-sectional and longitudinal survey studies (η=54)

First Author, Year	Sample							Measurement			Statistical Analysis				Total Points[1]	Score	Quality
	Probability Sample Used	Representative	Sample Size Appropriate for Power	Sample Drawn > 1 site	Matching, Design	Statistically Adjusted	Response Rate > 50%	DV Directly Measured/Administrative	DV Reliability	DV Validity	Appropriate Tests Used	ρ Values Reported	CI Reported	Missing Data Managed Appropriately			
Lin, Wan, 2012	1	2	0	1	2		0	0	1	1	1	1	N	N	10/13	0.77	Strong
McDonald, 2012	0	1	0	1	2		N	0	1	0	1	1	N	N	7/12	0.58	Low-Moderate
Sawatzky, 2012	0	2	1	1	N		0	0	0	0	1	1	N	N	6/11	0.55	Low-Moderate
Bai, Hsu, 2013	0	2	1	1	0		1	0	1	1	1	1	N	N	9/13	0.69	High-Moderate
Choi, 2013	0	2	0	1	2		N	0	1	0	1	1	N	N	8/12	0.67	High-Moderate
Iglesias, 2013	0	1	0	1	N		1	0	1	0	1	1	N	N	6/11	0.55	Low-Moderate
Moneke, 2013	0	1	0	0	N		1	0	1	0	1	1	1	N	6/12	0.50	Weak
Myhren, 2013	0	1	0	0	2		1	0	0	0	1	1	1	N	7/14	0.50	Weak
Ozden, 2013	0	1	0	1	N		1	0	1	0	1	1	N	N	6/11	0.55	Low-Moderate
Panunto, 2013	0	2	0	1	N		1	0	0	0	1	N	N	N	5/10	0.50	Weak
Zhang, 2013	0	2	0	1	2		1	0	1	1	1	1	N	N	10/13	0.77	High-Moderate
Abdi, 2015	0	0	0	0	N		1	0	1	1	1	1	0	N	5/13	0.38	Weak
Adriaenssens, 2015	1	2	1	1	N		1	0	1	0	1	1	N	N	9/12	0.75	High-Moderate
Bai, Zhang, 2015	0	2	1	1	2		N	0	1	1	1	1	N	N	10/12	0.83	Strong

Table 3.2.2− Quality assessments for included pre/post-test survey studies (η= 7)

First Author, Year	Sample			Design	Control of Cofounders		Measurement			Statistical Analysis				Dropout	Total Points[1]	Score	Quality
	Probability Sample Used	Sample Size Appropriate for Power	Representative	Number pretest and posttest measures	Employ Comparison Strategy	Group Comparisons	DV Directly Measured/Administrative	DV Reliability	DV Validity	Appropriate Tests Used	ρ Values Reported	Missing Data Managed Appropriately	Conclusions Reasonable & Supported	Attrition Rate <30%			
Blair, 1982	0	0	0	1	2	2	0	0	0	1	1	N	1	1	9/17	0.53	Low-Moderate
Oermann, 1995	0	0	1	1	2	2	0	1	0	1	1	N	N	1	10/16	0.62	Low-Moderate
Dodd-McCue, 2004	0	0	1	0	0	2	0	1	0	1	1	N	0	1	7/17	0.41	Weak
Bailey, 2005	0	0	0	1	0	2	0	0	0	0	0	N	0	1	4/17	0.24	Weak
Block, 2013	0	0	1	1	0	2	0	0	0	1	1	N	1	1	8/17	0.47	Weak
Bornemann-Shephard, 2015	0	0	1	1	0	2	0	0	0	0	0	N	1	1	6/17	0.35	Weak
Gauthier, 2015	0	0	1	2	0	2	0	0	0	1	1	N	0	1	8/17	0.47	Weak

Research Question 1

Conceptual Definitions of Job Satisfaction Among Critical Care Nurses

Definitions of job satisfaction were not consistent in the literature. Of the 61 included studies, only 24 (39%) offered a conceptual definition for critical care nurses' job satisfaction while 37 (61%) did not provide a definition of job satisfaction. Of the 24 studies that defined the concept, there were 21 separate definitions, 3 being cited in 2 studies each, and the other 18 appearing in a single study each. The three conceptual definitions of job satisfaction appearing more than once were: "positivity about the work experience" (Sexton, Helmreich, Neilands, Rowan, Vella, Boyden, … Thomas, 2006) cited in Abdi and colleagues (2015) and Huang and colleagues (2007); "the extent to which nurses are satisfied with their job" (van der Doef & Maes, 1999) cited in Adriaenssens and colleagues (2011, 2015); and "the degree to which nurses like their job" (Price & Mueller, 1986) cited in Boyle and colleagues (1996) and Mrayyan (2006). (see Table 3.3)

The deductive guided content analysis and inductive thematic analysis revealed four dominant approaches tied to the 24 definitions termed: global affective approach (overall feeling of job satisfaction), facet approach related to the work environment (outlines different facets of the work environment that affects overall job satisfaction), expectations and needs approach (overall job satisfaction is based on the fulfillment of an individual's needs and expectations), and well-being approach (job satisfaction is based on the individual's well-being). Eleven definitions were categorized under the global affective approach, which consists of the three definitions that were cited more than once. Nine definitions were categorized in the facet approach related to the work environment. Three definitions were classified under the expectations and needs approach for defining critical care nurses' job satisfaction. Finally, one

definition was categorized under the well-being approach for definition of job satisfaction among critical care nurses. All conceptual definitions of job satisfaction are presented in Table 3.3 below.

Table 3.3− Conceptual definitions of job satisfaction for critical care nurses

Theme Conceptual Definitions (Author(s) of Definition, Year)	**Frequency (Citation for Article from SR)**
No Conceptual definition	37
Global Approach & Overall Personal Feelings (Positivity & Affect)	
−The extent to which nurses are satisfied with their job. (Van der Doef & Maes, 1999a)	2 (Adriaenssens, 2011; Adriaenssens, 2015)
−Positivity about the work experience (Sexton et al., 2006)	2 (Abdi, 2015; Huang, 2007)
−The degree to which nurses like their job. (Price & Mueller, 1986)	2 (Boyle, 1996; Mrayyan, 2006)
−Overall measure of the degree to which employees are satisfied and happy with their job. (Boumans & Landeweerd, 1994)	1 (Boumans, 1994)
−The extent to which people like their jobs (Stamps, 1997, p.13)	1 (Boyle, 2006)
−The feeling employees have about their jobs in general. (Smith et al., 1975)	1 (Loke, 2001)
−Nurses' affective response to the job. (Smith, Kendall, & Hulin, 1979)	1 (Dear, 1982)
−The affective orientation that employees have towards their work. (Lu et al., 2005)	1 (Sawatzky, 2012)
−An emotional response and behavioural expression that reflects an individual's evaluation of his or her work, working life, and working environment. (Golbasi, Kelleci, & Dogan, 2008; Cam et al., 2005; Kahraman et al., 2011)	1 (Ozden, 2013)
−Liking or enjoying one's job. (McDonald, Rubarth & Miers, 2012)	1 (McDonald, 2012)
−One's overall satisfaction in the ED setting. (Lin, 2011)	1 (Lin, 2011)
Facet Approach Related to Work Environment	
−Consists of feelings the worker has towards various aspects of the job. (Herzberg, 1979; Walrath et al., 1979)	1 (Blair, 1982)
−The degree of positive affect towards a job or its components. (Adams & Bond, 2000)	1 (Zhang, 2013)
−Individual employee's evaluation of the work environment. (Smith, 1963)	1 (Duxbury, 1984)
−A multidimensional construct made up of elements essential to enjoyment and fulfillment in a person's job. Professional JS is a more global measure. Organizational work satisfaction is a multifactorial measure composed of elements related to the performance of the job and the larger organization. (Hinshaw & Atwood, 1985)	1 (Bratt, 2000)

Table 3.3 (Continued.)− Conceptual definitions of job satisfaction for critical care nurses

Theme Conceptual Definitions (Author(s) of Definition, Year)	**Frequency (Citation for article from SR)**
Facet Approach & Related to Work Environment	
−Satisfaction with extrinsic rewards, scheduling, family/work balance, co-workers, interaction, professional opportunities, praise/recognition, and control/responsibility. (Mueller & McCloskey, 1990)	1 (Mrayyan, 2006)
−A complex phenomenon explained by multiple work-related variables such as commitment, stress. Autonomy, communication with supervisor, recognition, routinization, and communication with peers. (Blegen, 1993)	1 (Song, 1997)
−A multifaceted construct encompassing specific facets of satisfaction related to pay, work, supervision, professional opportunities, and benefits. Organizational practices and relationships with co-workers. (Misener et al., 1996)	1 (Loke, 2001)
−A complex, multidimensional construct that captures reactions to specific components of work and the work environment. (Stamps, 1997, p.13)	1 (Boyle, 2006)
−Where a task is experienced as stimulating. JS is a multi-faceted term and its meaning can vary from individual to individual. (Antonovsky, 1987; Mullins, 2002)	1 (Forsgren, 2009)
Expectations & Needs Approach	
−Professional satisfaction is the feeling of contentment formed by how a job is perceived by an individual and is one of the most significant requirements for success and productivity. (Berns, 1984; Akasayan & Velioglu, 1992; Musal, Elci, & Ergin, 1995)	1 (Arikan, 2007)
−A personal attitude towards the job is the positive emotional state that workers experience when they have reached their professional goals and expectations (Kirkcaldy & Martin, 2000; Lu et al., 2002; Sahin & Yilmaz, 2007)	1 (Cilingir, 2012)
−A good fit between what a person does and has in his or her job and what he or she ideally wants to have. (Mumford, 1986)	1 (Manley, 1996)
Well-being	
−Key indicator of well-being for employees. (Lin, 2012)	1 (Lin, 2012)

Theories and Operational Definitions of Job Satisfaction in Critical Care Nursing Literature

Out of the 61 studies included in this systematic review, 38 (62%) did not supply a theoretical framework to describe the key concepts and justify the basis of their study. Of the 23 studies with a framework, 16 used theories unrelated to job satisfaction. Of the seven studies reporting a job satisfaction theory, five used two different content theories including: 1) Maslow's (1943) Hierarchy of Needs, which was used in 2 included studies (Manley, Cruse, & Keogh, 1996, and Moneke & Umeh, 2013); and 2) the Theory of Motivation, also known as the Dual Factor Theory of Job Satisfaction or the Motivation-Hygiene Theory by Herzberg (1959), which was used in five studies (Blair, Sparger, Walts, & Thompson, 1982, Duxbury, Armstrong, Drew, & Henly, 1984, Manley, Cruse, & Keogh, 1996, Moneke & Umeh, 2013, Williams, 1990). One study used a process job satisfaction theory: Blegen and Mueller's (1987) Causal Model of Job Satisfaction for Nurses (Freeman & O'Brien-Pallas, 1998). Finally the one other study used a conceptual model they developed from job satisfaction and turnover research (Bratt, Broome, Kelber, & Lostocco, 2000), which cannot be categorized as a content nor process theory of job satisfaction. All theories used in the 61 included studies are presented in Table 3.4.

Using Field and colleagues' (2014) five categories of how theory can be used in studies, the four job satisfaction-related theories were assessed regarding the degree to which they were used to in the respective studies. (see Table 3.4)

Blair and colleagues (1982) used an "integrated" approach to Herzberg's theory (1959), where the theory was used to guide the design and delivery of the study, as well as the actual evaluation of job satisfaction among critical care nurses. Williams' (1990) use of Herzberg's theory, on the other hand, falls into Field and colleagues' (2014) category of an "informed" approach, i.e. where the theory has a non-specified use and general influence. Duxbury and

colleagues (1984) referenced or cited Herzberg's theory with no further explanation as to how it guided the study. Two studies (Manley, Cruse, & Keogh, 1996, Moneke & Umeh, 2013) used the "adapted or combined" approach to Herzberg's and Maslow's theories to guide their studies.

Blegen and Mueller's Causal Model of Job Satisfaction for Nurses use in Freeman and O'Brien-Pallas' (1998) study reflects an "integrated" approach to theory. The theory was described in detail and guided the author's operational definition of job satisfaction, i.e. how job satisfaction among critical care nurses would be measured and evaluated in the study. Finally, Bratt and colleagues (2000) referenced the conceptual model of job satisfaction and turnover with no further explanation as to how it guided the study. (see Table 3.4 below)

Table 3.4− Theories of job satisfaction among critical care nurses

Theory (Developer of Theory, Year)	**Frequency**	**Citation of Article from SR**	**Taxonomy for Knowledge to Action Framework**
No Cited Theory	38		
Content Job Satisfaction Theories:			
1) Hierarchy of Needs (Maslow, 1970)	2	Manley Moneke	Adapted/Combined Adapted/Combined
2) Theory of Motivation Dual Factor Theory of Job Satisfaction Motivation-Hygiene Theory (Herzberg, 1959, 1966)	5	Blair Duxbury Williams Manley Moneke	Integrated Referenced Informed Adapted/Combined Adapted/Combined
Process Job Satisfaction Theories: The Causal Model of Job Satisfaction for Nurses (Blegen & Mueller, 1987)	1	Freeman	Integrated
Uncategorized Job Satisfaction Theory: The conceptual model of job satisfaction and turnover (Bratt, Broome, Kelber, & Lostocco, 2000)	1	Bratt	Referenced

Table 3.4 (Continued.)− Theories of job satisfaction among critical care nurses

Other Non-Job Satisfaction Theories:			
−Job Demand Control Support (JDCS) model (Karasek & Theorell, 1990)			
−Tripod accident causation model (Wagenaar et al., 1994)			
−The Structure-Process-Outcome (SPO) model (Donabedian, 1980, 1988, 1992)	3		
−Model of Leadership/Domain of Leadership Practices (Kouzes & Posner, 1988)	2		
−The Theoretical Framework of Work Stress (LaRocco, House & French, 1980)	2		
−Framework of collaboration (NR)	2		
−Job Characteristics Model (Hackman and Oldham, 1975)	1		
−The Modified Contingency Theory (Feldman, 1976)	1		
−Framework of Quality (Donebedian, 1966)	1		
−Technology variable (Leatt & Schneck, 1981)	1		
−Social Psychology Theory (Zerbe & Paulhus, 1987)	1		
−Competing Value Framework (NR)	1		
−The Conceptual Framework for Predicting Nurse Retention (NR)	1		
−Sociotechnical System Theory (Pasmore & Sherwood, 1978)	1		
−Burnout Theory (Maslach, 1982)	1		
−No-name Conceptual Model (NR)	1		

Research Question 2: Quantitative Measures of Job Satisfaction Among Critical Care Nurses

Of the 46 studies reporting a job satisfaction score, 42 measures were identified. Only 10 of these measures were used more than once. These 10 measures included: (1) the Index Work Satisfaction (IWS) (n=5 studies); (2) the Minnesota Satisfaction Questionnaire (MSQ) (n=5 studies); (3) the Nursing Job Satisfaction Scale (NJSS) (n=4 studies); (4) the Safety Attitudes Questionnaire (SAQ) (n=3 studies); (5) the Job Diagnostic Survey (JDS) (n=3 studies); (6) the

Leiden Quality of Work Questionnaire for Nurses (LQWQ-N) (n=2 studies); (7) the Job in General Scale (JIG) (n=2 studies); (8) The National Database of Nursing Quality Indicators (NDNQI) RN Satisfaction Survey (n=2 studies); and (9) the Job Satisfaction Survey (JSS) (n=2 studies). One additional measure, single-item Overall Job Satisfaction (OJS), was used in two different articles (Bai, Zhang, Wang, Yu, Pei, Cheng, & Hsu, 2015, Bai, Hsu, & Zhang, 2013), but with the same sample of critical care nurses, and reported the same overall job satisfaction score. This suggests that the study may have been done twice. (see Table 3.5)

Since most quantitative measures were only used in one or two studies each, trends in job satisfaction scores by measure over time could not be assessed. However, the data was examined qualitatively for trends when each measure was used. Of the 42 identified measures of job satisfaction, the Job Satisfaction/Job Dissatisfaction Questionnaire and the Job Descriptive Index were used in the earliest studies conducted in 1982 by Blair and colleagues and Dear and colleagues. Of the 10 quantitative measure used more than once, the Minnesota Satisfaction Questionnaire was used in the earliest study conducted in 1984 by Duxbury and colleagues. Shortly after, Norbeck (1985a, 1985b) used the Nursing Job Satisfaction Scale to measure job satisfaction among critical care nurses followed by the Index Work Satisfaction survey cited in Carnevale and colleagues' study in 1987. In the last five years, frequently used measures include the Safety Attitudes Questionnaire, the Minnesota Satisfaction Questionnaire, the Leiden Quality of Work Questionnaire for Nurses, the ED Employee Satisfaction Questionnaire, Overall Job Satisfaction, the National Database Nursing Quality Indicators Satisfaction Survey, and the Job Satisfaction Survey. Eight of the measures used more than once take the multi-facet approach when quantitatively measuring satisfaction with various factors in the work environment, as well as measuring the overall level of job satisfaction among critical care nurses. The eight measures

include: the Index Work Satisfaction, the Minnesota Satisfaction Questionnaire, the Nursing Job Satisfaction Scale, the Job Diagnostic Survey, the Safety Attitudes Questionnaire, the Leiden Quality of Work Questionnaire for Nurses, the National Database Nursing Quality Indicators Satisfaction Survey, and the Job Satisfaction Survey. One measure, the Job in General Scale, takes a more global affective approach to quantitatively measure overall job satisfaction in critical care nurses. See Table 3.5 for all quantitative measures of job satisfaction used more than once.

In the remaining studies, 32 other quantitative measures were identified, nine of which were unique single-item measures of overall job satisfaction. One of the nine single-item measures evaluates overall job dissatisfaction. The remaining 23 quantitative measures of job satisfaction were used in only one study. (See Additional Table 8.0 in the Appendix for all quantitative measures of job satisfaction used once)

Table 3.5− Quantitative measures of job satisfaction among critical care nurses used in 2 or more studies

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/Domain(s)	Scoring	Reliability	Validity
The Index of Work Satisfaction (IWS)	Stamps & Piedmonte (1986) Slavitt et al. (1978)	5 (Baggs, 1990; Carnevale, 1987; Ecklund, 1998; Oermann, 1995; Williams, 1990)	Part A 15 Part B 44	Part A: participants are asked to describe their current work situation with 15 paired comparisons to determine the hierarchy of relative importance of 6 workplace concerns: 1) Autonomy 2) Pay 3) Nursing interaction Physician−Nurse interaction 4) Task requirements 5) Organizational policies 6) Professional status Part B: an attitude questionnaire. Respondents are asked to rate their degree of agreement/disagreement with work satisfaction. Obtains the current level of JS.	7-point Likert scale: 1 (strongly disagree) to 7 (strongly agree). Total summed scores range from 44 to 308. The IWS score for each respondent is calculated using weighting coefficients for the 6 subscales.	Cronbach's α 0.64−0.88	Used extensively to measure JS in health care (Stamps & Piedmont, 1986). Validity was established in earlier research by use of factor analysis.

Table 3.5 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in 2 or more studies

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
The Minnesota Satisfaction Questionnaire-Short Form	Weiss et al. (1967)	5 (Al-Ma'aitah, 1996; Arikan, 2007; Cilingir, 2012; Duxbury, 1984; Ozden, 2013)	20	1) General Satisfaction (GS) 2) Internal Satisfaction (IS) 3) External Satisfaction (ES)	5-point Likert scale. A score of GS is obtained by dividing the total scores of the 20 items into 20. The scale's scores range between 1 and 100. Job satisfaction increases as the score increases.	Cronbach's α 0.66−0.91 (GS)0.88 (IS)0.85 (ES)0.76	Investigated in Turkey by Ergin. Content validity is well-established (Weiss et al., 1967) Validity of Turkish version established by Baycan.
The Nursing Job Satisfaction Scale (NJSS)	Hinshaw & Atwood (1985, 1987)	4 (Bratt, 2000; Neubauer, 1992; Norbeck, 1985a, 1985b)	23−35	1) Enjoyment 2)Quality of care 3) Time to do job 4) Comfort measures 5) Job interest 6) Feedback	5-point Likert scale: 1 (strongly agree) to 5 (strongly disagree). Total JS score calculated by adding the ratings for 35 items (scores for negatively worded items are reversed)	Cronbach's α Overall 0.72−0.88 Subscales 0.62−0.82 Test/ retest reliability 0.53	Construct validity was moderate (predictive modeling and factor analysis) Convergent and discriminant validity were adequate (met all predictors for rank and direction) Factor loadings for subscales averaged 0.63.

Table 3.5 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in 2 or more studies

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
The Job Diagnostic Survey (JDS)	Hackman & Oldham (1975)	3 (Dodd-McCue, 2004; Song, 1997; Stechmiller, 1993)	25−83	1) Autonomy 2) Task identity 3) Task significance 4) Variety 5) Feedback 7 job characteristics subscales 3 personal affective outcome subscales −general JS: 3 items −specific JS: 14 items −internal work motivation: 14 items 17 Subscales −4 personal variables −13 occupational variables (including job satisfaction)	7-point Likert scale: 1 (very little or strongly disagree) 7 (very much or strongly agree). The summative score of the items are used for each subscale, the higher the score indicates greater JS	Cronbach's α Overall 0.66−0.81 Subscales 0.80−0.86	Internal validity 0.59−0.71

Table 3.5 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in 2 or more studies

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
Safety Attitudes Questionnaire (ICU-version)	Sexton et al. (2006)	3 (Abdi, 2015; Block, 2013; Huang, 2007)	64	1) Safety climate 2) Teamwork climate 3) Job satisfaction 4) Perceptions of management 5) Stress recognition 6) Working conditions	5-point Likert scale: strongly agree to strongly disagree Converted to 0−100 scale: 0: strongly disagree 25: slightly disagree 50: neutral 75: slightly agree 100: strongly agree. Negatively worded items are reverse scored. A positive score is defined as ≥75 out of 100	Cronbach's α 0.674−0.89 ICC>0.73 (modest)	Verified by 5 MDs & 5 RNs
Job in General (JIG) Scale	Smith et al. (1989)	2 (Loke, 2001; Moneke, 2013)	18	18 one- to three-word adjectives describing the employee's feelings about their job in general	"yes," "no," or "?" if uncertain about their feelings. A positive response is scored 3, negative response is scored 0, and "?" or blank is scored 1. A higher overall score indicates greater satisfaction and vice versa.	Cronbach's α 0.87−0.90	Convergent validity was demonstrated through correlations with 4 other JS scales (r=0.66−0.80). (Smith et al., 1989)

Table 3.5 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in 2 or more studies

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
Leiden Quality of Work Questionnaire for Nurses (LQWQ-N)	Maes et al. (1999) Gelsema et al. (2006)	2 (Adriaenssens, 2015; Adriaenssens, 2011)	79 or 58	7 work characteristics: 1) Work/time demands 2) Physical demands 3) Job demands 4) Skill discretion 5) Decision authority 6) Job control 7) Social support-supervisor, colleagues 6 Organizational characteristics: 1) Work agreements 2) Material resources 3) Personnel resources 4) Internal-communication 5) Nurse-doctor collaboration 6) Rewards 2 Outcome variables 1) Job satisfaction 2) Turnover intention	4-point Likert scale: 1 (totally disagree) to 4 (totally agree) Higher scores on LQWQ-N subscale indicate a more favorable situation for the respondent in her or his workplace.	Cronbach's α 0.68−0.75	Factor structure through factor analyses and reliability analyses was established in previous studies

Table 3.5 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in 2 or more studies

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
The National Database of Nursing Quality Indicators (NDNQI) RN Satisfaction Survey	American Nurses Association (1998)	2 (Boyle, 2006; Choi, 2013)	71	1) Task 2) Nurse-to-nurse interactions 3) Nurse-to-physician interactions 4) Decision making 5) Autonomy 6) Professional status 7) Pay 8) Professional development 9) Supportive nursing management 10) Nursing administration 11) Job enjoyment	6-point Likert scale: 1 (strongly disagree) to 6 (strongly agree).	Cronbach's α 0.81−0.92 Workgroup-level: ICC(1,k) 0.80−0.87 Cronbach's α 0.91−0.97 Within-group: ICC(1)=0.20 (adequate) Unit-level: ICC(2)=0.86 (substantial)	Concurrent Validity: scores on the dimension-specific scales explained 56% variance on the general satisfaction measure of job enjoyment in a regression analysis. Workgroup-level validity is supported when variability within the workgroup is less than variability between workgroups. F-ratios for all scales were significant ($p \leq .05$) and eta2=0.21−0.32.

Table 3.5 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in 2 or more studies

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
The Job Satisfaction Scale (JSS)	Warr et al. (1979)	2 (Iglasias, 2013; Myhren, 2013)	10-15	1) Responsibility 2) Variation 3) Collaborators 4) Physical work conditions 5) Possibility of using own skills 6) Choice between work methods 7) Feedback for good work 8) Pay 9) Work hours	7-point Likert scale: 1 (extremely dissatisfied) to 7 (extremely satisfied). The total score is obtained by summing the score for each separate response, ranges from 10-105.	Test/ retest correlation coefficient 0.63.	The validity of the scale has been evaluated (Warr et al., 1979). Translated previously in Norway and found valid
Overall Job Satisfaction (single-item measure)	–	2 (Bai, 2013; Bai, 2015)	1	"Considering all aspects of your job as well as your own values, ideals and goals, how satisfied are you with your current nursing job?" Satisfaction with their current nursing jobs taking into account aspects of their jobs: personal, professional, and organizational factors.	10-point scale: 0: it's terrible 5: I'm satisfied 10: I love it	–	–

Research Question 3

Overall Job Satisfaction Score of Critical Care Nurses

Of the 61 studies included in the systematic review, three-quarters (*n*=46, 75%) reported a job satisfaction score, standard mean, or average score for critical care nurses. After standardizing all job satisfaction scores on a scale of 0 to 100, an average and weighted mean was calculated to obtain the overall job satisfaction score for critical care nurses. Four of the 46 reported satisfaction scores were not standardized as the scoring system was not described for the job satisfaction measure. Of the 42 standardized scores, the average overall job satisfaction score from the 41 studies was 66%, within a range of 43% (Dai, Chao, Kuo, Liang, & Chen, 2009) to 88% (Forsgren, Forsman, & Carlström, 2009, Moneke & Umeh, 2013). To determine the effects of sample size of each study reporting a job satisfaction score, a weighted mean was also calculated. By taking sample size into account, the overall level of critical care nurses' job satisfaction was determined to be 56%, which is 10% lower than the average overall level of job satisfaction score of 66% (see Table 3.6).

Job Satisfaction of Critical Care Nurses Over Time

The reporting of job satisfaction scores has not been consistent over time. Dear and colleagues reported the earliest job satisfaction score among intensive care nurses in 1982, whereas the highest proportion of job satisfaction scores were reported in the past 5 years (*n*=16 studies).

When the satisfaction scores are plotted on a graph over time (in years), a cyclical trend is apparent (see Figure 3.2). The highest job satisfaction score (88% satisfied) reported by Forsgren and colleagues in 2009, and Moneke and Umeh in 2013, was among emergency nurses in Sweden and mixed critical care nurses in the United States. The lowest job satisfaction score

(43%) reported by Dai and colleagues in 2009, was among nurse anaesthetists in Taiwan. When satisfaction scores are categorized into 5-year intervals and averages are calculated, the highest level of critical care nurses' job satisfaction are found to occur between 1991 and 1995 (n=2 studies, job satisfaction score=79%), followed by 2001 to 2005 (n=3 studies, job satisfaction score=76%, range 69−85), 1981 to 1985 (n=3 studies, 2 of which report the same results, job satisfaction score 75%), 2011 to 2015 (n=16 studies, job satisfaction score=65%, range 47−88), 1996 to 2000 (n=6 studies, job satisfaction score=63%, range 55−71), 1986 to 1990 (n=2 studies, job satisfaction score=60%, range 57−63), and the lowest level of job satisfaction was seen between 2006 and 2010 with a job satisfaction score of 55% (n=10 studies, range 43−88). (see Table 3.6)

Table 3.6− Job satisfaction scores of critical care nurses over time

First Author(s)	Year of Publication	Total Sample Size of CC RNs	Reported Overall or Mean JSS	Maximum Score	Standardized Overall Mean JSS
Dear	1982	234	175	216	81%
Norbeck[i]	1985a	180	123.9	175	71%
Norbeck[i]	1985b	164	123.9	175	71%
Carnevale	1987	25	63	100	63%
Williams	1990	17	57	100	57%
Pike	1993	48	4	5	80%
Oermann	1995	59	188.38	240	78%
Al-Ma'aitah	1996	118	57	100	57%
Boyle, Popkess-Vawter	1996	119	25.615	36	63%
Iskra-Golec	1996	126	21.625	35	62%
Song	1997	109	65.6	119	55%
Freeman	1998	38	20.45	30	68%
Bratt	2000	1973	3.19	5	64%
Loke	2001	97	2.07	3	69%
Kuokkanen	2003	121	78	100	78%

Table 3.6 (Continued.)− Job satisfaction scores of critical care nurses over time

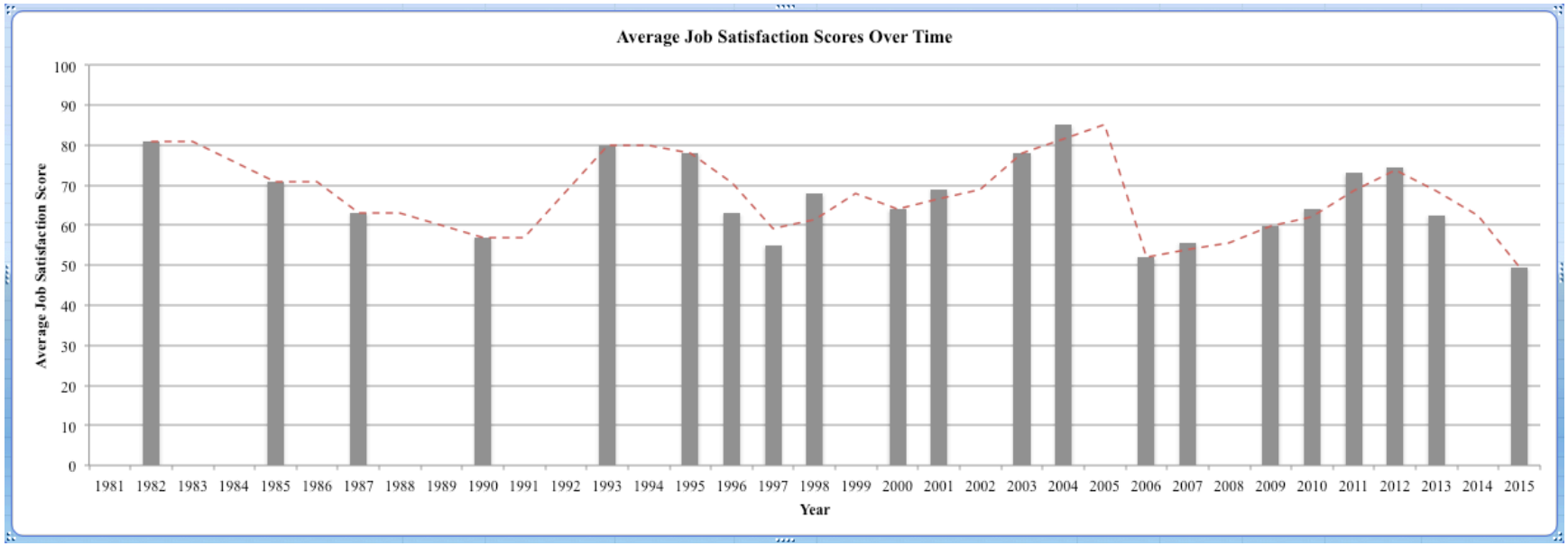
First Author	Year of Publication	Total Sample Size of CC RNs	Reported Overall or Mean JSS	Maximum Score	Standardized Overall Mean JSS
Dodd-McCue	2004	19	5.95	7	85%
Boyle, Miller	2006	7677	46.86	100	47%
Mrayyan	2006	200	2.55	5	51%
Tummers	2006	184	3.58	5	72%
Arikan	2007	100	2.26	5	45%
Huang	2007	237	62.63	100	63%
Chen	2009	112	2.96	5	59%
Dai	2009	1452	42.87	100	43%
Forsgren	2009	74	88	100	88%
Rochefort	2010	339	2.57	4	64%
Lin , Hsu	2011	224	72.94	100	73%
Cilingir	2012	97	3.425	5	66%
Klopper	2012	935	695	891	78%
Lin, Wan	2012	234	3.295	5	66%
McDonald	2012	109	4.07	5	81%
Bai[ii]	2013	706	4.66	10	47%
Block	2013	55	71.3	100	71%
Choi	2013	729	3.765	6	63%
Iglasias	2013	74	63.03	105	60%
Moneke	2013	137	2.63	3	88%
Myhren	2013	129	43.9	70	63%
Ozden	2013	138	59.41	100	59%
Panunto	2013	129	91	129	71%
Zhang	2013	446	3.15	5	63%

Table 3.6 (Continued.)− Job satisfaction scores of critical care nurses over time

First Author	Year of Publication	Total Sample Size of CC RNs	Reported Overall or Mean JSS	Maximum Score	Standardized Overall Mean JSS
Abdi	2015	18	57.7	100	58%
Bai[ii]	2015	706	4.66	10	47%
Average Standardized OJSS		**66%**			
Weighted Mean Standardized OJSS		**56%**			
Average OJSS		**61%**			

Legend: i and ii- Indicates same sample

Figure 3.2− Standardized overall job satisfaction score over time



Nurses' Overall Job Satisfaction in Different Critical Care Departments

There were 42 studies in which job satisfaction scores for nurses working in seven different critical care departments were analyzed. The departments being the Adult Intensive Care Unit and Coronary Care Unit, the Emergency Department, the Neonatal Intensive Care Unit and Pediatric Intensive Care Unit, Labour and Delivery (or Case Room), Operating Room, undefined Critical Care (where specific critical care units were unidentified), and mixed Critical Care units (a specific mix of critical care units). The lowest job satisfaction score (43%) was reported by nurses working in the operating room (Dai, Chao, Kuo, Liang, & Chen, 2009) and the highest job satisfaction score (88%) was reported by nurses working in the emergency department and the mixed critical care setting (Forsgren, Forsman, & Carlström, 2009; Moneke & Umeh, 2013). Job satisfaction scores were reported on nurses employed in: adult intensive and coronary care units (n=18), undefined critical care units (n=10), mixed critical care units (n=4), pediatric or neonatal intensive care units (n=4), emergency departments (n=3), operating room units (n=2), and labour and delivery units (n=1). Given the low number of studies reporting a job satisfaction score within somewhat similar workplace settings, the neonatal and pediatric intensive care units, operating room, and labour and delivery units were combined and subcategorized under the label "Other" (critical care units) (n=7). (see Table 3.7)

Across the types of critical care departments, mean job satisfaction scores were calculated for each unit. Nurses in the mixed critical care setting and emergency department reported the highest job satisfaction score (74%), followed by nurses working in the adult intensive and coronary care units (61%), while nurses working in the undefined critical care setting and from other critical care units were the least satisfied with their jobs (60%). (see Table 3.7)

Table 3.7− Overall reported job satisfaction scores of nurses by critical care department

CC Department Categories	Average Standardized Overall Mean Job Satisfaction Score	# Studies Reporting an Overall Mean Job Satisfaction Score	Total # Participants in Studies
Critical Care Mixed	74%	4	371
ED/ER	74%	3	532
Adult ICU & CCU	61%	18	4455
Critical Undefined	60%	10	10630
OTHERS (NICU/ PICU/OR/L&D)	60%	7	4065

Research Question 4: Individual and Organizational Factors Associated with Critical Care Nurses' Job Satisfaction

Across the 61 studies using a priori rules (see the methodological discussion in Chapter 2 methods), 10 factors were identified as being related to critical care nurses' job satisfaction in four or more studies (see Table 3.8). Twenty-eight individual factors and 90 organizational factors were identified in fewer than four studies as being related to critical care nurses' job satisfaction (see Additional Tables 10.0 and 10.1 in the Appendix).

Statistical results of the 10 factors were then categorized and displayed in bivariate and multivariate analysis tables. Of the 61 included studies, 25 studies reported on one of the 10 factors, individual or organizational, examined four or more times. Of these 25 studies, 17 employed bivariate analyses and 10 employed multivariate analyses (see Additional Tables 9.0 and 9.1 in the Appendix).

Factors were then sorted into three separate categories: 1) sociodemographic (individual) factors, including age, sex, career experience, education, and shift worked; 2) organizational healthcare characteristics, including level of perceived job stress, autonomy, and burnout-

emotional exhaustion; and 3) facility (organizational) factors, including personnel resources and staffing, and teamwork climate or group cohesion. (see Table 3.8)

Of the sociodemographic variables, shift worked (rotating) was significantly related to job satisfaction with three of the four studies reporting a positive relationship with job satisfaction in undefined critical care and emergency nurses (Adriaenssens, De Gucht, Van Der Doef, & Maes, 2011, Norbeck, 1985a, 1985b). Age was shown to be not significantly related to job satisfaction, with six of seven studies reporting an insignificant relationship to job satisfaction and one study showing a statistically significant positive relationship for adult intensive and coronary care nurses' job satisfaction (Loke, 2001). Sex was not significantly related to job satisfaction in all seven studies. Level of education was also not significantly related to job satisfaction, according to four of five studies, with one of five studies revealing a significantly negative relationship to the job satisfaction of adult intensive care nurses (Dear, Weisman, Alexander, & Chase, 1982). Finally, career experience was equivocal, or of inconsistent significance to job satisfaction, with four of seven studies (57%) reporting a significantly positive relationship between the job satisfaction and career experience of adult intensive and coronary care and undefined critical care nurses' (Bai, Zhang, Wang, Yu, Pei, Cheng, & Hsu, 2015; Loke, 2001; Norbeck, 1985a, 1985b). (see Table 3.8)

As for the organizational healthcare characteristics, perceived level of job stress was significantly related to level of job satisfaction in five of the seven studies. Four of the five studies reported a negative relationship between perceived job stress and job satisfaction among nurses working in intensive coronary care, undefined critical care, pediatric critical care, and neonatal intensive care (Bratt, Broome, Kelber, & Lostocco, 2000, Ehrenfeld, 1991, McDonald, Rubarth, & Miers, 2012, Norbeck, 1985a, 1985b), whereas only one study reported a positive

relationship between perceived job stress and job satisfaction among adult intensive care nurses (Iglesias & de Bengoa Vallejo, 2013). Autonomy was significantly related to job satisfaction, with five of the six studies revealing a positive relationship to job satisfaction among nurses in neonatal intensive care units as well as adult intensive and coronary care units (Bai, Zhang, Wang, Yu, Pei, Cheng, & Hsu, 2015, Bai, Hsu, & Zhang, 2013, Boumans & Landeweerd, 1994, Dear, Weisman, Alexander, & Chase, 1982, Freeman & O'Brien-Pallas, 1998, McDonald, Rubarth, & Miers, 2012). Finally, burnout, specifically emotional exhaustion, was significantly related to job satisfaction with four of six studies revealing a negative relationship to job satisfaction among nurses in emergency departments, labour and delivery units, undefined critical care units, and adult intensive care units (Adriaenssens, De Gucht, & Maes,, 2015, Block, Ehrenworth, Cuce, Ng'ang'a, Weinbach, Saber, … Sexton, 2013, Klopper, Coetzee, Pretorius, & Bester, 2012, Özden, Karagözoğlu, & Yıldırım, 2013) (see Table 3.8).

For the organizational factors categorized under facility, six of the seven studies showed that personnel resources and staffing was significantly and positively related to job satisfaction among nurses in adult intensive care units, labour and delivery, undefined critical care, neonatal intensive care units, and emergency departments (Bai, Zhang, Wang, Yu, Pei, Cheng, & Hsu, 2015, Bai, Hsu, & Zhang, 2013, Block, Ehrenworth, Cuce, Ng'ang'a, Weinbach, Saber, … Sexton, 2013, Klopper, Coetzee, Pretorius, & Bester, 2012, McDonald, Rubarth, & Miers, 2012, Sawatzky & Enns, 2012). Teamwork climate and group cohesion was also found to be significantly and positively related to job satisfaction in four of the five studies, for nurses working in labour and delivery, pediatric and neonatal critical care, and emergency departments (Block, Ehrenworth, Cuce, Ng'ang'a, Weinbach, Saber, … Sexton, 2013, Bratt, Broome, Kelber,

& Lostocco, 2000, Forsgren, Forsman, & Carlström, 2009, McDonald, Rubarth, & Miers, 2012).

(see Table 3.8)

Table 3.8− The relationship between job satisfaction among critical care nurses and factors studied four or more times

Category	First Author (Year)	Significance, S: ρ≤.05 (Direction and Magnitude)	Sample Size	Conclusion
(1) *Sociodemographics−Individual*				
Age (*n= 7 studies*)	Dear (1982) Ehrenfeld (1990) Loke (2001) Tummers (2006) Adriaenssens (2011) Moneke (2013) Adriaenssens (2015)	S (+ F=2.973)	234 167 97 184 254 137 170	Not significant 1/7 found a significantly positive relationship between age and RN JS. 6/7 studies found an insignificant relationship between age and RN JS.
Sex (*n=7 studies*)	Ehrenfeld (1990) Loke (2001) Tummers (2006) Adriaenssens (2011) Moneke (2013) Adriaenssens (2015) Bai (2015)		167 97 184 254 137 170 706	Not significant All 7 studies found an insignificant relationship between sex and nurses' JS

Legend: RN-nurse, JS-job satisfaction

Table 3.8 (Continued.)− The relationship between job satisfaction among critical care nurses and factors studied four or more times

Category	First Author (Year)	Significance, S: ρ≤.05 (Direction and Magnitude)	Sample Size	Conclusion
		(1) *Sociodemographics−Individual*		
Career Experience (*n= 7 studies*)	Norbeck (1985a)	S (+ r=23, F=10.3)	180	Equivocal 4/7 studies found a statistically significantly positive relationship between JS and RN work experience
	Norbeck (1985b)	S (− r(= 26, F= 11.85), job dissatisfaction	164	
	Oermann (1995)		59	
	Loke (2001)	S (+ r=0.340, F=12.438, t=3.527)	97	
	Adriaenssens (2011)		254	
	Moneke (2013)		137	
	Bai (2015)	S (+ F=20.77)	706	
Education (*n= 5 studies*)	Dear (1982)	S (− r=0.06)	234	Not significant 1/5 studies found a significantly negative correlation between education and RN JS. 4/5 studies found an insignificant correlation between education and JS.
	Loke (2001)		97	
	Adriaenssens (2011)		254	
	Moneke (2013)		137	
	Bai (2015)		706	
Shift Worked (*n= 4 studies*)	Norbeck (1985a)	S (+ F=9.8)	180	Significant 3/4 studies found a statistically significant positive relationship between shift worked and JS
	Norbeck (1985b)	S (+ F=0.45)	164	
	Adriaenssens (2011)	S (+ β= 0.12)	254	
	Moneke (2013)		137	

Legend: RN-nurse, JS-job satisfaction

Table 3.8 (Continued.)− The relationship between job satisfaction among critical care nurses and factors studied four or more times

Category	First Author (Year)	Significance, S: ρ≤.05 (Direction and Magnitude)	Sample Size	Conclusion
(2) *Individual Healthcare Characteristics*				
Job Stress (*n= 7 studies*)	Norbeck (1985a) Norbeck (1985b) Ehrenfeld (1991) Bratt (2000) McDonald (2012) Iglasias (2013) Gauthier (2015)	S (− r=24) S (− r=0.16) S (− r=0.54) S (+ Tb=0.39) S (− r=0.372)	180 164 248 1973 109 74 45	Significant 5/7 studies found a statistically significant relationship. Interestingly, 4 found negative correlations (Bratt, Ehrenfeld, McDonald & Norbeck) and 1 found positive correlations (Iglasias) to JS.
Autonomy (*n= 6 studies*)	Dear (1982) Boumans (1994) Ecklund (1998) Freeman (1998) McDonald (2012) Bai (2013, 2015)	S (+ r=0.45) S (+ r=0.14) S (+ β=0.331, B=0.62) S (+ Tb= 0.44) S (+ r=0.34)	234 305 76 38 109 706	Significant 5/6 studies found a statistically significant positive relationship between JS and RN autonomy
Burnout-Emotional Exhaustion (*n= 6 studies*)	Stechmiller (1993) Klopper (2012) Block (2013) Iglasias (2013) Ozden (2013) Adriaenssens (2015)	 S (− r=0.39) S (− r=0.452) S (− r=0.416) S (− r=0.30)	300 935 55 74 138 170	Significant 4/6 studies showed a statistically significant negative relationship between BO: emotional exhaustion and JS.

Legend: RN-nurse, JS-job satisfaction

Table 3.8 (Continued.)− The relationship between job satisfaction among critical care nurses and factors studied four or more times

Category	First Author (Year)	Significance, S: ρ≤.05 (Direction and Magnitude)	Sample Size	Conclusion
		(3) *Facility*		
Personnel Resources & Staffing (*n= 7 studies*)	Adriaenssens (2011)	NS	254	Significant 6/7 studies found statistically significant positive relationships between staffing/personnel resources and JS
	Klopper (2012)	S (+ Spearman rank coefficient=0.378)	935	
	McDonald (2012)	S (+ Tb= 0.46)	109	
	Sawatzky (2012)	S (+ Estimate=1.11)	261	
	Bai (2013, 2105)	S (+ r= 0.47)	706	
	Block (2013)	S (+ r= 0.307)	55	
	Adriaenssens (2015)	S (+ r=0.24)	170	
Teamwork & Group Cohesion (*n= 5 studies*)	Freeman (1998)	NS (+NA)	38	Significant 4/5 studies found statistically significant positive relationships between teamwork & group cohesion and JS
	Bratt (2000)	S (+ r(OWS)=0.52, r(PJS)=0.29)	1973	
	Forsgren (2009)	S (+ r=0.24)	74	
	McDonald (2012)	S (+ Tb=0.53)	109	
	Block (2013)	S (+ r=0.610)	55	

Legend: RN-nurse, JS-job satisfaction

Trends in Individual and Organizational Factors Examined in <4 Studies

Of the 28 individual factors and 90 organizational factors examined in relation to critical care nurses' job satisfaction in fewer than four studies, some important trends can be reported. The individual factors, burnout-depersonalization and burnout-personal accomplishment, were examined in three studies, where depersonalization showed a trend towards a negative significant relationship, and personal accomplishment showed a trend towards a positive significant relationship with critical care nurses' job satisfaction. Organizational factors such as nurse−physician collaboration, job control, turnover intention, and work engagement were examined in three studies and all factors were reported to have a trend that was positive and significantly related to critical care nurses' job satisfaction. Finally, leadership support and various specific types of leadership styles and behaviours were examined in eight different studies and all reported a trend that was positively and significantly related to critical care nurses' job satisfaction (see Additional Tables 10.0 and 10.1 in the Appendix).

Chapter 4: Integrated Discussion & Conclusion

This chapter presents a summary of the findings of the systematic review, discusses a few of the most important findings, compares these findings to those of the two previous systematic reviews of job satisfaction, and discusses the implications of the findings to nursing practice and research.

Summary of Findings

This systematic review examined the available evidence on critical care nurses' levels of job satisfaction and the factors, individual and organizational, associated with it. The body of evidence revealed that definitions, theories, quantitative measures, job satisfaction scores, and factors associated with job satisfaction by critical care nurses were all inconsistently reported. There were multiple definitions and approaches to conceptualize nurses' job satisfaction. Traditional definitions of job satisfaction encompassed both a global affective approach, along with a facet approach to define the overall level of job satisfaction while taking into account different individual and organizational factors affecting the job satisfaction of nurses. Theories of job satisfaction varied significantly between each of the studies, as did the quantitative measures used to assess job satisfaction. The literature indicated that critical care nurses were not very satisfied with their jobs (56%) and that job satisfaction fluctuated over time. Nurses working in mixed critical care units and the emergency department had the highest levels of job satisfaction, whereas nurses working in the operating room or 'other' critical care units and 'undefined' critical care units had the lowest levels of job satisfaction. Six factors emerge as being significantly associated with critical care nurses' job satisfaction. These were: shift worked (rotating), job stress, autonomy, burnout-emotional exhaustion, staffing and other personnel resource issues, and teamwork and group cohesion. Sex, age, and level of education were not

related to job satisfaction while career experience showed an equivocal relationship with job satisfaction, meaning it was inconsistently related to critical care nurses' job satisfaction.

Comparison of Findings of Individual and Organizational Factors Examined in Four or More Studies in this Systematic Review with the Two Previous Systematic Reviews on Job Satisfaction

No previous systematic reviews specifically examining critical care nurses' job satisfaction were located. However, job satisfaction among registered nurses in a hospital setting which may have included some studies with critical care nurses as a part of larger samples (Lu, Barriball, Zhang, & While, 2012, Lu, While, & Barriball, 2005) and job satisfaction among care aids in long-term care residences (Squires, Hoben, Linklater, Carleton, Graham, & Estabrooks, 2015) were subjected to systematic reviews. These previous systematic reviews did not report on conceptual definitions, quantitative measures, or overall levels of job satisfaction as done in this review. However, both of these previous systematic reviews, as well as my systematic review, explored the factors, individual and organizational, associated with job satisfaction. (see Table 4.0)

Comparison of this Systematic Review and Lu and Colleagues' Review

The first three columns in Table 4.0 compares the factors assessed in this systematic review and that of Lu and colleagues (2005, 2012). As seen in Table 4.0, this systematic review revealed that cohesion and teamwork were positively and significantly associated with job satisfaction among critical care nurses. This was also found to be the case for hospital nurses in Lu and colleagues' (2005, 2012) reviews. This review also revealed that job stress has a significant and mixed relationship to job satisfaction among critical care nurses (four of seven studies reported a positive relationship to job satisfaction in critical care while one of the seven studies reported a significantly negative relationship to critical care nurses' job satisfaction). Lu and colleagues

(2005, 2012) reported job stress as also having a substantial to very strong negative relationship to job satisfaction among hospital nurses.

This systematic review revealed that age is not significantly related to critical care nurses' job satisfaction, whereas Lu and colleagues' (2005, 2012) systematic reviews reported age to have a slight positive relationship (r=0.13) to job satisfaction among hospital nurses. Similarly, this systematic review reported that level of education was not significantly related to critical care nurses' job satisfaction, whereas Lu and colleagues' (2005,2012) reviews revealed that level of education had a slight negative relationship (r=-0.07) to hospital nurses' job satisfaction. I suspect that age is not significantly related to critical care nurses' job satisfaction as critical care nurses in this review were younger with a mean age of 33. In the Lu and colleagues' (2005,2012) reviews, hospital nurses may have had more variance in age (although not reported), with older nurses who are more satisfied with their jobs in comparison to the younger nurses. As for level of education, critical care nurses were evenly distributed between having a diploma versus a degree in nursing, which could indicate why job satisfaction was not significantly associated to education. On the contrary, there may have been more variance in level of education among hospital nurses, which may account for why nurses with higher levels of education were less satisfied with their jobs. This can be due a variety of reasons including: greater responsibilities, more complex roles, experience more stress, and hospital nurses with higher levels of education may expect more opportunities for professional growth and advancement, recognition and rewards which are not being met.

Burnout-emotional exhaustion, shift worked, and staffing and personnel resources were shown to have a significant relationship to job satisfaction of critical care nurses in this review, but not assessed in Lu and colleagues' (2005, 2012) reviews among hospital nurses. Finally, in

this systematic review sex was reported not to be significantly related to critical care nurses' job satisfaction, whereas Lu and colleagues (2005, 2012) did not assess this among hospital nurses. (see Table 4.0)

Comparison of this Systematic Review and Squires and Colleagues' Review

In this systematic review, staffing and personnel resources were shown to have a positive and significant relationship with the job satisfaction of critical care nurses. This is also found among nursing care aids in Squires and colleagues' (2015) review. This systematic review revealed that age, sex, level of education, and career experience were not significantly related to critical care nurses' job satisfaction and the same holds true for nursing care aids (Squires, Hoben, Linklater, Carleton, Graham, & Estabrooks, 2015). These similarities in these findings may be because both reviews use the same apriori rules for determining if a factor was related to job satisfaction. This would suggest that these factors are important to job satisfaction of nursing care providers irrespective of role (registered nurse or nursing care aid) and setting (critical care or long-term care).

This review revealed that job stress has a significant and mixed relationship to job satisfaction among critical care nurses (four of seven studies found a positive relationship to job satisfaction in critical care while one of the seven studies reported a significantly negative relationship to critical care nurses' job satisfaction). However, in the review by Squires and colleagues (2015) job stress was found to be equivocal to, or of inconsistent significance to the job satisfaction of nursing care aids (Squires, Hoben, Linklater, Carleton, Graham, & Estabrooks, 2015). This may be because critical care nurses may experience higher levels of stress compared to nursing care aids in long-term care homes due to the nature of their work. Critical care nurses

work in faster pace environments and are dealing with life and death situations on a regular basis, compared to care aides working in long-term care settings.

This systematic review also revealed that cohesion and teamwork were positively and significantly associated to job satisfaction among critical care nurses. The review by Squires and colleagues (2015) did not include these factors, thus a comparison could not be made between this review and their findings on these two factors. (see Table 4.0)

Comparison of All Three Systematic Reviews of Job Satisfaction

Burnout-emotional exhaustion and the shift worked are two factors that were found to have significant relationships with job satisfaction in this systematic review but not in Lu's and Squires' reviews. Burnout-emotional exhaustion had a negative relationship whereas shift worked had a positive relationship to critical care nurses' job satisfaction. Autonomy is the only factor assessed in all three reviews and found to have a significant positive relationship with job satisfaction among all three subject groups (critical care nurses, hospital nurses and care aids).

Overall, some of the differences in findings between the three reviews may be explained, as discussed above, by differences in role (registered nurse versus nursing care aid), and setting (critical care, general hospital, and long-term care). Some differences, mainly those between this review and the review by Squires and colleagues (2015) compared to the Lu and colleagues (2005, 2012) reviews may also be explained by the differences in the methodological approaches taken. For example, Lu and colleagues (2012) reported on all the factors examined in all of the 100 included studies, whereas this review and Squires and colleagues' (2015) systematic review focus on individual and organizational factors examined in four or more included studies. Furthermore, some differences between factors relating to nurses and nursing care aids' job satisfaction in the three systematic reviews could suggest differences between their roles and

responsibilities, and the settings in which they work (hospital, long-term care facility, and critical care). The differences and similarities of the findings in the three systematic reviews may illustrate the importance of rigorous criteria and methodology when examining factors, individual and organizational, relating to and predicting job satisfaction. (see Table 4.0)

Table 4.0− Comparison of factors from three systematic reviews

Factors (Individual/ Organizational)	**Dilig-Ruiz and colleagues (2016)**	**Lu and colleagues (2005, 2012)**	**Squires and colleagues (2015)**
Burnout− Emotional Exhaustion	Significant: 4/6 report − significant relationship	N/A	N/A
Shift worked	Significant: 3/4 report + significant relationship	N/A	N/A
Autonomy	Significant: 5/6 report + significant relationship	Moderate to substantial	Significant: 3/4 report + significant relationship
Job Stress	Significant: 4/7 report − significant relationship, 1/7 report + significant relationship	Substantial to very strong − relationship	Equivocal: 2/4 report – significant relationship
Staffing/ Personnel Resources	Significant: 6/7 report + significant relationship	N/A	Significant: 3/4 report + significant relationship
Cohesion/ Teamwork	Significant: 4/5 report + significant relationship	Substantial to very strong	N/A
Age	Not significant: 6/7 report insignificant relationship	Slight relationship	Non-significant: 9/12 report non-significant relationship
Sex	Not significant: 7/7 report insignificant relationship	Not Assessed (N/A)	Non-significant: 6/6 report non-significant relationship
Level of Education	Not significant: 4/5 report insignificant relationship	Slight relationship	Non-significant: 8/11 report non-significant relationship
Career Experience	Equivocal: 4/7 report + significant relationship and 3/7 report a insignificant relationship	Slight relationship	Non-significant: 3/5 report non-significant relationship

Critical Care Nurses' Job Satisfaction

From this systematic review, critical care nurses are understood to be, on average, 56% satisfied with their jobs, but since the 1980s when data on critical care nurses' job satisfaction first emerged, one can also discern a cyclical trend over time in their level of job satisfaction. Interestingly, the findings suggests a more negative evolution than expected, where critical care nurses in the 1980s reported being more satisfied with their jobs than current critical care nurses reported to be. I did expect job satisfaction to fluctuate with time, however, I thought critical care nurses' level of job satisfaction was going to be generally higher now than it was in the 1980s given the technological, medical, and professional advancements that have taken place in nursing practice. In an attempt to understand this finding, I explored possible explanations. What I found, by identifying the 42 quantitative measures of job satisfaction from the 61 included studies, was that, for one thing, researchers have not operationally defined and measured job satisfaction among critical care nurses in the same way. If researchers are not measuring job satisfaction the same way, how can we accept the reliability and validity of the scores and treat them equally in order to make comparisons between reported scores of job satisfaction? Other plausible explanations include: self-reported measurement bias, inconsistent reporting of job satisfaction scores, low methodological quality of the included studies, and lack of validity reporting on the quantitative measures of job satisfaction. Each of these indicate a need to examine job satisfaction among critical care nurses more closely; it calls not only for more research on this topic, but for increased consistency in the way job satisfaction is measured.

In addition to job satisfaction scores, I was surprised to find that organizational factors, such as work engagement and leadership, were studied in fewer than 4 of the 61 studies. Granted, organizational factors are studied more recently (since 2000), whereas individual factors are

studied since the very beginning of job satisfaction research. Nevertheless, I thought leadership and work engagement would have been examined more frequently, especially since job satisfaction is frequently and directly linked to nursing outcomes such as quality of patient care and staff turnover (McDonald, Rubarth, & Miers, 2012; Moneke & Umeh, 2013; Özden, Karagözoğlu, & Yıldırım, 2013; Rochefort & Clarke, 2010). In this systematic review, although it is not further discussed in the results chapter as leadership and work engagement were examined in less than four studies, both factors were shown to have significant relationships to the job satisfaction of critical care nurses according to the trends in the included studies. Different aspects of leadership, including leadership behaviours, are reported to have a significant effect on critical care nurses' job satisfaction (Loke, 2001; Moneke & Umeh, 2013). Work engagement has also been frequently cited as being related to critical care nurses' job satisfaction, organizational commitment, quality of patient care, and productivity (Sawatzky & Enns, 2012). In this systematic review, the results demonstrated that work engagement had a positive and significant relationship to job satisfaction among critical care nurses in all three studies where it has been examined (Adriaenssens, De Gucht, & Maes, 2015; Adriaenssens, De Gucht, Van Der Doef, & Maes, 2011; Sawatzky & Enns, 2012). Evidently, organizational factors such as leadership and work engagement require more attention in future job satisfaction research. The hesitancy of accepting job satisfaction scores, coupled with the lack of consistency in examining factors affecting job satisfaction, suggests the need for advances in the field of nursing research.

Limitations of Job Satisfaction Literature in Critical Care Nursing

Methodological Quality

In this systematic review of the literature on critical care nurses' job satisfaction, the majority of studies (N=44) were assessed as being of "weak" (N=22) to "low−moderate" (N=22) methodological quality. Few studies (N=17) included in this review were of "high−moderate" (N=15) or "strong" (N=2) methodological quality. Reasons for lower quality scores include: lack of probability sampling or justification for sample size; failure to report how missing data were managed; failure to report on confidence intervals in cross-sectional studies (η=50); and failure to create or assess equivalence of the groups at baseline or report on validity and reliability in before and after cohort studies. This demonstrates the need for well-designed and robust studies in the field of critical care nurses' job satisfaction research, to reduce bias and increase confidence in the research, its results, and in the field of knowledge as a whole. In turn, the implications of the findings from well-designed studies should lead to better-informed interventions and strategies that could potentially improve job satisfaction, quality of care, and recruitment and retention of critical care nurses.

Statistical Rigour

In addition to methodological quality, few studies (N=10) in this review performed a multivariate analysis of the individual and organizational factors influencing critical care nurses' job satisfaction. In order to effectively design interventions targeted at individual and organizational factors that improve job satisfaction among critical care nurses, we need to determine which factors predict job satisfaction instead of just which factors are related to job satisfaction. This indicates the need for multivariate and more sophisticated statistical analyses that control for extraneous or confounding factors. Currently, research on job satisfaction in critical care nursing

field is dominantly based on simple bivariate analysis examining the association between a single factor and job satisfaction. There is no need for continued bivariate statistical analysis; future studies need to use multivariate statistics such as a multiple regression analysis, to identify which factors most strongly predict critical care nurses' job satisfaction in the presence of other contributing and confounding variables. It is important to identify predictors of critical care nurses' job satisfaction so that health care managers and others can develop interventions to promote greater job satisfaction among critical care nurses.

Conceptual Clarity

Few studies defined (N=24) or used theories (N=23) to conceptualize job satisfaction. The importance of conceptual clarity and consistency can be linked to the way job satisfaction is viewed and measured. Researchers need to try to be consistent and clear about what job satisfaction is, as well as the factors that are associated with and predict it. Future research should include an examination of the definitions and theories of nurses' job satisfaction to produce a more comprehensive conceptualization of nurses' job satisfaction and the individual and organizational factors associated with it.

Quantitative Measures

Related to conceptual clarity, quantitative measurements of job satisfaction varied across the studies included in this systematic review. Of the 42 quantitative measures identified, only Ten were used in more than one study. A few (N=9) authors developed their own single-item measure of job satisfaction, and 23 other quantitative measure of job satisfaction were used in one study each. In order to be able to compare job satisfaction levels across studies and be confident in the reliability and validity of the results, a consistent quantitative measurement is required. Individual and organizational factors were also inconsistently reported and quite difficult to

examine, synthesize, and compare. Furthermore, there is inconsistent reporting of demographic variables across the included studies in this review, which made it difficult to analyze, compare, and synthesize results. No one demographic variable was consistently reported across all the studies and some studies (N=17) fail to report on any participants' socio-demographics. In order to properly measure nurses' job satisfaction and the factors associated with it, future research should utilize the same quantitative measures of nurses' job satisfaction in order to facilitate the comparison of results.

Implications

Implications for Nursing Practice

This systematic review found that critical care nurses were not very satisfied with their jobs (56%), but also that their satisfaction varied over time. There is a need to increase critical care nurses' job satisfaction to ensure retention and to prevent the attrition of these specialized nurses. The systematic review highlights some critical factors, including staffing and personnel resources and nurses' levels of autonomy, which health care managers can focus on to significantly enhance critical care nurses' level of job satisfaction. Specifically, if health care managers ensure adequate staffing levels on their units and promote a culture that supports and encourages nurses' autonomy, critical care nurses' level of job satisfaction should increase. Further, health care managers will learn from this systematic review that burnout and nurses' level of stress should be monitored and evaluated regularly, as these factors negatively impact critical care nurses' level of job satisfaction.

Implications for Future Research

To date, this is the first systematic review of literature on critical care nurses' job satisfaction. From the findings the following is needed in future research: more consistent reporting on demographic variables; consistency in the conceptualization of job satisfaction; increase in the use of theories to guide how job satisfaction is conceptualized and operationally defined; use of a consistent quantitative measure of job satisfaction to facilitate comparison of results; and the need, more generally, for robust and rigorous studies on critical care nurses' job satisfaction.

Limitations and Strengths of the Thesis

While rigorous methods were used to conduct this systematic review, there are some limitations to be mentioned. First, although the search was systematic and co-conducted with a health science librarian, grey literature was not searched. This could mean that this systematic review does not include all relevant literature on critical care nurses' job satisfaction. Second, where details of study methods were not clear, I did not attempt to clarify these details by contacting the authors of the study. This may have resulted in aspects of methods being scored lower in the quality assessment phase, possibly reflecting quality of the reporting rather than the actual methods used. Third, while ten randomly selected quality assessments were verified by two researchers, the remaining fifty-one quality assessments were performed by one researcher. However, the random sample of ten quality assessments was verified twice and agreed upon. Fourth, while studies published in two languages−English and French−were included, papers written in languages other than those understood by the members of the research team were excluded, which may have resulted in the exclusion of relevant studies. Finally, because of the inconsistency in reporting of the relationships between individual and organizational factors of critical care nurses' job satisfaction in the included studies, a vote-counting approach was used.

Several disadvantages can be associated with using a vote-counting approach for analyzing factors associated to critical care nurses' job satisfaction. For instance, vote-counting does not take in to account effect sizes, does not give magnitudes to associations, nor precision of the reported scores. To compensate for the use of vote-counting, I reported the number of comparisons revealing a statistically significant relationship (regardless of direction) and reported the magnitude of effect for significant associations (when it was provided in the study) (Grimshaw, McAuley, Bero, Grilli, Oxman, Ramsay, ... Zwarenstein, 2003; Squires, Estabrooks, Gustavsson, & Wallin, 2011).

Quality of this Systematic Review

Since this was my first research endeavour and it is a systematic review, as well as the fact that the methodological quality of the included studies were mostly weak to low-moderate, I wanted to ensure that the methods of this systematic reviews were done appropriately. Despite the aforementioned limitations, using the Assessment of Methodological Quality of Systematic Reviews (AMSTAR), this systematic review received an AMSTAR score of 9 out of 11, indicating a high methodological quality. This systematic review lost points for excluding grey literature and not performing a test to assess homogeneity of studies. (See Additional Table 11.0 in the Appendix for the Amstar scoring of this systematic review.)

Conclusion

Since job satisfaction is a robust and consistent predictor of nursing retention (Hayes, Bonner, & Pryor, 2010), and the work environment is significantly associated to job satisfaction, investigations into the factors within the organization that fosters nurses' job satisfaction are necessary. Several factors, such as shift worked (rotating), job stress, autonomy, burnout-emotional exhaustion, staffing, and teamwork climate, were related to critical care nurses' job

satisfaction. With the current nursing shortage, improving the work environment is crucial for the retention of specialized nurses in critical care settings and fundamental to ensure an attractive work environment for the recruitment of new nurses (Hayes, Bonner, & Pryor, 2010; Hussain, Rivers, Glover, & Fottler, 2012; Ning, Zhong, Libo, & Qiujie, 2009; Wilkins & Shields, 2009). It is important that healthcare administrators and managers understand the impact and relationships of these identified factors and implement interventions to empower and retain the critical care nursing workforce.

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Appendices: Additional Tables & Figures

Additional Table 1.0− Search strategy for five databases

Database (Year) ***Number of Studies***	**Search Terms**	**Results**
CINAHL (1980−2015) *618 Studies*	1. (MH "Critical Care+") 2. (MH "Emergency Service+") 3. (MH "Emergency Services, Psychiatric") OR (MH "Triage") 4. (MH "Intensive Care Units") OR (MH "Coronary Care Units") OR (MH "Intensive Care Units, Pediatric+") OR (MH "Operating Rooms") OR (MH "Burn Units") OR (MH "Delivery Rooms") 5. TI "critical care" OR AB "critical care" 6. TI "intensive care" OR AB "intensive care" 7. TI (emergency N1 (room* OR department*)) OR AB (emergency N1 (room* OR department*)) 8. TI (trauma N1 (room* OR department*)) OR AB (trauma N1 (room* OR department*)) 9. TI "operating room*" OR AB "operating room*" 10. TI "coronary care" OR AB "coronary care" 11. TI "cardiac care" OR AB "cardiac care" 12. TI "recovery room*" OR AB "recovery room*" 13. TI "delivery room*" OR AB "delivery room*" 14. 1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 15. (MH "Nurses") OR (MH "Nurses by Educational Level+") OR (MH "Advanced Practice Nurses") OR (MH "Nurse Anesthetists") OR (MH "Nurse Midwives") OR (MH "Nurse Practitioners+") OR (MH "Pediatric Nurse Practitioners+") OR (MH "Nursing Staff, Hospital") OR (MH "Staff Nurses") OR (MH "Emergency Nurse Practitioners") OR (MH "Gerontologic Nurse Practitioners") OR (MH "Expert Nurses") OR (MH "Foreign Nurses") OR (MH "New Graduate Nurses") OR (MH "Novice Nurses") OR (MH "Nurses, Disabled") OR (MH "Nurses, Male") OR (MH "Nurses, Minority") OR (MH "Registered Nurses")	14215 29192 5727 33330 11915 24187 24438 152 3358 725 644 311 476 103639 113039

Additional Table 1.0 (Continued.)− Search strategy for five databases

Database (Year) ***Number of Studies***	**Search Terms**	**Results**
CINAHL (1980−2015) *618 Studies*	16. TI ((nurses OR nurse OR nursing)) OR AB ((nurses OR nurse OR nursing))	336288
	17. 15 OR 16	382283
	18. 14 AND 17	22066
	19. (MH "Critical Care Nursing") OR (MH "Burn Nursing") OR (MH "Coronary Care Nursing") OR (MH "Pediatric Critical Care Nursing+")	20290
	20. 18 OR 19	34543
	21. (MH "Job Satisfaction")	11913
	22. TI ((job OR professional OR work* OR employee*) N3 (satisf* OR dissatisf*)) OR AB ((job OR professional OR work* OR employee*) N3 (satisf* OR dissatisf*))	6315
	23. TI ((job OR professional OR work* OR employee*) N2 well-being) OR AB ((job OR professional OR work* OR employee*) N2 well-being)	600
	24. 21 OR 22 OR 23	14680
	25. 20 AND 24	711
	26. 25 (Limiters-Language: English, French)	644
	27. PT Commentary OR PT Editorial OR PT Dissertation (Limiters-Language: English, French)	311801
	28. 26 NOT 27	**618**

Additional Table 1.0 (Continued.)− Search strategy for five databases

Database (Year) ***Number of Studies***	**Search Terms**	**Results**
Medline (1980−2015) *604 Studies*	1. exp emergency service, hospital/ or exp intensive care units/ or operating rooms/	121593
	2. exp Critical Care/	45411
	3. Delivery Rooms/	1232
	4. critical care.ti,ab.	18428
	5. intensive care.ti,ab.	96620
	6. (emergency adj1 (room* or department*)).ti,ab.	65738
	7. (trauma adj1 (department* or room*)).ti,ab.	334
	8. operating room*.ti,ab.	18822
	9. coronary care.ti,ab.	4478
	10. cardiac care.ti,ab.	1558
	11. recovery room*.ti,ab.	2726
	12. delivery room*.ti,ab.	1636
	13. or/1−12	269032
	14. nurse clinicians/ or exp nurse practitioners/ or nurses, international/ or nurses, male/ or exp nursing staff/	78481
	15. nurses/ or nurse anesthetists/ or nurse midwives/	38275
	16. (nurse or nurses or nursing).ti,ab.	339749

Additional Table 1.0 (Continued.)− Search strategy for five databases

Database (Year) ***Number of Studies***	**Search Terms**	**Results**
Medline (1980−2015) *604 Studies*	17. or/14−16	387575
	18. 13 and 17	28045
	19. Critical Care Nursing/	438
	20. or/18−19	28244
	21. Job Satisfaction/	19550
	22. ((job or professional or work* or employee*) adj3 (satisf* or dissatisf*)).ti,ab.	9801
	23. ((job or professional or work* or employee*) adj2 well-being).ti,ab.	712
	24. or/21−23	24639
	25. 20 and 24	679
	26. limit 25 to yr= "1980−current"	675
	27. limit 26 to (English or French)	623
	28. Editorial/	378480
	29. Comment/	628428
	30. News/	168847
	31. or/28−30	1042686
	32. 27 not 31	**604**

Additional Table 1.0 (Continued.)− Search strategy for five databases

Database (Year) ***Number of Studies***	**Search Terms**	**Results**
EMBASE (1980−2015) *645 Studies*	1. emergency health service/(emergency adj1 (room* or department*)).ti,ab. 2. intensive care/ or newborn intensive care/ or pediatric advanced life support/ or resuscitation/ 3. intensive care unit/ 4. operating room/ 5. delivery room/ 6. coronary care unit/ 7. recovery room/ 8. critical care.ti,ab. 9. intensive care.ti,ab. 10. (emergency adj1 (room* or department*)).ti,ab.operating room*.ti,ab. 11. (trauma adj1 (department* or room*)).ti,ab. 12. operating room*.ti,ab 13. coronary care.ti,ab. 14. cardiac care.ti,ab. 15. recovery room*.ti,ab. 16. delivery room*.ti,ab. 17. or/1−16 18. nurse/ or expert nurse/ or male nurse/ or pediatric nurse/ or practical nurse/ or registered nurse/ or staff nurse/	72774 196635 96064 25446 2249 8272 3930 30012 132906 94343 395 25348 6286 2177 3804 2374 494335 91123

Additional Table 1.0 (Continued.)− Search strategy for five databases

Database (Year) ***Number of Studies***	**Search Terms**	**Results**
EMBASE (1980−2015) *645 Studies*	19. advanced practice nurse/ or nurse anesthetist/ or nurse midwife/ or exp nurse practitioner/	27303
	20. nursing staff/	59249
	21. (nurse or nurses or nursing).ti,ab.	395841
	22. or/18−21	452400
	23. 17 and 22	41672
	24. exp intensive care nursing/	910
	25. or/23−24	42062
	26. job satisfaction/	23238
	27. ((job or professional or work* or employee*) adj3 (satisf* or dissatisf*)).ti,ab.	12198
	28. ((job or professional or work* or employee*) adj2 well-being).ti,ab.	840
	29. or/26−28	28602
	30. 25 and 29	808
	31. conference abstract.pt.	1858285
	32. editorial.pt.	477966
	33. or/31−32	2336251
	34. 30 not 33	715
	35. limit 34 to yr= “1980−current”	706
	36. limit 35 to (English or French)	**645**

Additional Table 1.0 (Continued.)− Search strategy for five databases

Database (Year) ***Number of Studies***	**Search Terms**	**Results**
PsychINFO (1980−2015) *108 Studies*	1. exp intensive care/	3818
	2. emergency services/	5973
	3. critical care.ti,ab.	1161
	4. intensive care.ti,ab.	5335
	5. (emergency adj1 (room* or department*)).ti,ab.	7770
	6. (trauma adj1 (department* or room*)).ti,ab.	19
	7. operating room*.ti,ab.	349
	8. coronary care.ti,ab.	196
	9. cardiac care.ti,ab.	123
	10. recovery room*.ti,ab.	61
	11. delivery room*.ti,ab.	93
	12. or/1−11	18039
	13. nurses/ or psychiatric nurses/	22709
	14. nursing/	15508
	15. (nurse or nurses or nursing).ti,ab.	70633
	16. or/13−15	71934
	17. 12 and 16	3370

Additional Table 1.0 (Continued.)− Search strategy for five databases

Database (Year) ***Number of Studies***	**Search Terms**	**Results**
PsychINFO (1980−2015) *108 Studies*	18. job satisfaction/ or employee attitudes/ or role satisfaction/ 19. "work (attitudes toward)"/ 20. ((job or professional or work* or employee*) adj3 (satisf* or dissatisf*)).ti,ab. 21. ((job or professional or work* or employee*) adj2 well-being).ti,ab. 22. or/18−21 23. 17 and 22 24. limit 23 to yr= "1980−current" 25. limit 24 to (English or French) 26. limit 25 to ("0120 non-peer-reviewed journal" or "0400 dissertation abstract") 27. 25 not 26	27917 5750 19594 1708 39721 142 141 138 30 **108**
Proquest Nursing & Allied Health Source (1980−2015) *20 Studies*	1. MESH.EXACT("Nurses, Male") OR MESH.EXACT("Nurse Clinicians") OR MESH.EXACT("Nurses, International") OR MESH.EXACT.EXPLODE("Nurse Practitioners:N.02.360.650.640") 2. 1 OR MESH.EXACT.EXPLODE("Nursing staff:M.01.526.485.680") 3. 2 AND (MESH.EXACT.EXPLODE("Emergency Service, Hospital:N.02.278.354.422.336") OR MESH.EXACT("Surgery Department, Hospital") OR MESH.EXACT.EXPLODE("Intensive Care Units")) AND MESH.EXACT("Job satisfaction")	2 645 10 435 **20**

Additional Table 2.0− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Blair *Journal of Emergency Nursing* (1982)	USA	23	ED	Employment Status: FT (23)	Pre- & Post-intervention (Survey)	96 (max score unknown)	−	−	Low−Mod
Dear *Critical Care Management* (1982)	USA	234	ICU	Age: M(SD) years= 26.4(5.2) Education: Bach (115) Master/higher (75) Diploma/Assoc (44) Employment Status: FT (234)	Cross-sectional (Survey)	175 (out of 216)	Age, Education, First position*, Locus of control, Turnover intention	Autonomy, ICU type*	Low−Mod
Duxbury *Nursing Research* (1984)	USA	283	NICU	−	Cross-sectional (Survey)	−	Burnout***	Head nurse consideration and structure***	High−Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Norbeck *Research in Nursing & Health* (1985a)	USA	180[i]	CC Undef	Age: M years= 31.7 Sex: F(167), M(16) Marital status: Married/Cohabit (84) Single (59) Widow/Divorced (42) Education: Bach (74) Experience: RN-M(SD) years= 7.5(6.4) CC-M(SD) years= 4.6(3.8) Ethnicity: Caucasian(161)	Cross-sectional (Survey)	124 (out of 175)	Work experience, Shift, Psychological symptoms***	Job stress	High− Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Norbeck *Nursing Research* (1985b)	USA	164[i]	CC Undef	Age: M(SD) years= 31.7(7) Sex: F(164) Marital status: Married/Cohabit (71) Single (56) Widow/Divorced (38) Experience: RN- M(SD) years= 7.7(6.6) CC-M(SD) years= 4.7(3.9) Ethnicity: Caucasian (144)	Cross-sectional (Survey)	124 (out of 175)	Work experience, Shift, Psychological symptoms***	Job stress, Social support *	Low− Mod
Carnevale *Canadian Critical Care Nursing Journal* (1987)	Canada	25	Ped ICU	−	Cross-sectional (Survey)	63 (out of 100)	−	−	Weak

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Landeweerd *Work & Stress* (1988)	Netherlands	21	CCU	Age: M years= 27.8 Sex: F(12), M(9) Experience: CC-M years= 4.6	Cross-sectional (Survey)	4 (max score unknown)	–	–	Weak
Baggs *Nursing Economics* (1990)	USA	68	ICU	Age: M(SD) years= 31.8(5.7) Sex: F(65), M(3) Education: Bach (31) Diploma/Assoc (30) Certification: (10) Experience: RN-M(SD) years= 9.6(5.8) CC-M(SD) years= 4.4(5.5)	Cross-sectional (Survey)	–	–	–	Weak
Ehrenfeld *Intensive Care Nursing* (1990)	Israel	167	ICU	Age: M years=32.4 Sex: F(150), M(17) Marital Status: Married/Cohabit(122) Education: Diploma/Assoc(198)	Cross-sectional (Survey)	–	Age, Sex, # Professional activities**, Preference to be involved*, Willingness to adapt new methods**, #Books/Journals*, Ready to invest time*, Coping modes	–	Low−Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)– Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	Country	Sample Size (η)	Unit	Demographics (η) Type of RN	Study Design (Data Collection Method)	Type of Results			Quality
						JSS[a]	Ind. Factor[b]	Org. Factor[c]	
Williams *Nursing Management* (1990)	USA	17	ICU CCU	–	Cross-sectional (Survey)	57 (out of 100)	–	–	Weak
Ehrenfeld *International Journal of Nursing Studies* (1991)	Israel	248	ICU CCU	Sex: F(223), M(25) Education: Diploma/Assoc(198) Employment status: PT(119)	Cross-sectional (Survey)	–	# Children*, Education, Need**/Adequacy of education***, # Professional activities***, Preference to be involved***, Willingness to adapt new methods*, #Books*, #Journals**, Ready to invest time***	Job stress, Structure of work***, Collegial support***	Weak
Medcof *Journal of Organizational Behavior* (1992)	Canada	86	CC Mixed CCU L&D ED ICU OR	Age: M years= 37 Experience: RN-M years= 13 CC-M years= 6	Cross-sectional (Survey)	5 (max score unknown)	–	–	Weak

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Neubauer *Medical Psychotherapy* (1992)	USA	163	CC Undef	Age: M years= 32 Sex: F(163) Marital Status: Married/Cohabit (95) Single (68) Education: Bach (82) Diploma/Assoc (78) Master/higher (3) Employment Status: FT(143) Shift Worked: Days(49), Rotating(46) Evening(23) Night (46) Experience: CC- M years= 6	Cross-sectional (Survey)	–	–	–	Low−Mod
Pike *Nursing RSA* (1993)	South Africa	48	ICU	–	Cross-sectional (Survey)	4 (out of 5)	–	–	Weak

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Stechmiller *Heart & Lung* (1993)	USA	300	CC Undef	Age: M(SD) years= 34.32(7.82) Sex: F(300) Education: Diploma/Assoc (168) Bach(102) Master/higher(30) Experience: RN- M(SD)years= 6.86(5.53)	Cross-sectional (Survey)	−	−	−	Low−Mod
Boumans *Heart & Lung* (1994)	Netherlands	305	ICU	Age: M years=30.37 Employment Status: FT(220), PT(85) Experience: RN- M years=11.47 CC- M years=4.97 Hosp- M years=8.53	Cross-sectional (Survey)	4 (max score unknown)	−	Complexity/ Difficulty of work, Work pressure***, Leadership***, Feedback/ Clarity***, Promotional growth/ Growth Opportunity, Autonomy	High−Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Oermann *Heart & Lung* (1995)	USA	59	CC Undef	−	Pre- & Post-intervention (Survey)	188 (out of 240)	Years as a RN, Years in CC*	Pay	Low−Mod
Al'Ma'aitah *Seminars in Perioperative Nursing* (1996)	Jordan	118	CC Mixed OR ICU CCU	−	Cross-sectional (Survey)	3 (out of 5)	−	−	High−Mod
Boyle *Heart & Lung* (1996)	USA	119	CC Undef	Age: M years= 26.9 Type of RN: New grad RN* (40) Exp RN* (79)	Longitudinal (Survey)	26 (out of 36)	−	−	Low−Mod
Iskra-Golec *Work & Stress* (1996)	Poland	126	ICU	Age: M years= 26 Marital status: Married/Cohabit(10) Single(116) Employment status: FT(126) Shift Length: 12h* (96) 8h * (30)	Cross-sectional (Survey)	12h: 21 8h: 22 (out of 35)	−	−	Weak
Manley *Nursing in Critical Care* (1996)	UK	18	ICU	−	Cross-sectional (Survey)	−	−	−	Weak

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Song *Research in Nursing & Health* (1997)	USA	109	ICU	Age: M(SD) years= 29.5(5.7) Sex: F(90), M(20) Education: Bach(79) Diploma/Assoc(21) Master/higher(10) Employment Status: FT(96), PT(14) Experience: RN- M(SD) years= 4.5(3.8) CC- M(SD) years= 3.2(2.9) Hosp- M(SD) years= 3.7(3)	Longitudinal (Survey)	66 (out of 119)	–	–	High− Mod
Ecklund *Journal of New York State Nurses Association* (1998)	USA	76	CC Undef	Age: Mentored- M years= 39.9 Non-mentored- M years= 41.3 Sex: F(72), M(4)	Cross-sectional (Survey)	–	Professional Status	–	Weak

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	Country	Sample Size (η)	Unit	Demographics (η) Type of RN	Study Design (Data Collection Method)	Type of Results			Quality
						JSS[a]	Ind. Factor[b]	Org. Factor[c]	
Freeman *Canadian Journal of Nursing Administration* (1998)	Canada	38	ICU CCU	–	Cross-sectional (Survey)	20 (out of 30)	General training**, Burnout, Technology*, Social integration, Motivation	Kinship responsibility, Job communication, Pay, Promotional growth/ Opportunity, Autonomy, Workload***, Unit Size**, Routinization, Distributive justice	Weak
Bratt *American Journal of Critical Care* (2000)	USA & Canada	1973	Ped CC	Education: Bach(1184) Employment status: FT(1973) Shift Worked: Rotating(616) Days(685) Nights(618) Shift length: 8h(239) 12h (1428)	Cross-sectional (Survey)	3 (out of 5)	–	Job stress, Leadership behaviour***, RN-MD Collaboration, Group cohesion	Low− Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Loke *Journal of Nursing Management* (2001)	Singapore	97	ICU CCU	Sex: F(88), M(9) Education: Diploma/Assoc (77) Bach (20)	Cross-sectional (Survey)	2 (out of 3)	Age, Sex, Education, Position held, Hospital experience*, Years under manager, Productivity, Organization commitment	Leadership* Leadership behaviour*	Low−Mod
Kuokkanen *Journal of Nursing Administration* (2003)	Finland	121	CC Undef	Sex: F(113), M(8) Education: Diploma/Assoc(52) Bach(16) Certification: 53	Cross-sectional (Survey)	78 (out of 100)	−	−	High−Mod
Dodd-McCue *Progress in Transplantation* (2004)	USA	19	CC Mixed N-ICU PICU	Sex: F(19) Ethnicity: Caucasian(16) African America(2) Asian/Pacific Islander(1)	Pre- & Post-intervention (Survey)	6 (out of 7)	−	−	Weak
Bailey *Journal of Trauma Nursing* (2005)	USA	47	ED	−	Pre- & Post-intervention (Survey)	−	−	−	Weak

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Boyle *Western Journal of Nursing Research* (2006)	USA	7677	CC Undef ED	Age: M years= 39.68 Sex: F(6718), M(958) Education: Bach(3794) Masters(280) Certification: 3228 Employment status: FT(5844) Experience: RN- M years= 13.19 CC- M years= 6.17 Ethnicity: Caucasian(6206)	Cross-sectional (Survey)	CCUndef: 48 ED: 46 (out of 100)	–	–	High−Mod
Mrayyan *International Nursing Review* (2006)	Jordan	200	CC Undef	–	Cross-sectional (Survey)	3 (out of 5)	–	–	Low−Mod
Tummers *Organization Studies* (2006)	Netherlands	184	ICU	Sex: F(118), M(66) Age: M(SD) years= 35.8(6.4) Experience: RN- M(SD) years= 17(6.5) CC- M(SD) years= 8.1(6.2)	Cross-sectional (Survey)	4 (out of 5)	Age, Sex	Decision authority**, Interaction uncertainty, Environment uncertainty*	High−Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Arikan *Dialysis & Transplantation* (2007)	Turkey	100	ICU	–	Cross-sectional (Survey)	2 (out of 5)	–	–	High−Mod
Huang *Critical Care Medicine* (2007)	USA	237	ICU	Age: M years= 35.85 Sex: F(181), M(56) Employment status: FT(202), PT(35) Experience: RN- M years= 9.35 CC- M years= 5.95 Type of RN: Bedside* (138) Charge* (99)	Cross-sectional (Survey)	Bedside 66 Charge 59 (out of 100)	–	–	Low−Mod
Li *International Nursing Review* (2008)	China	102	ICU	Sex: F(101), M(1) Age: M years= 29.2 Marital Status: Married/Cohabit(63) Single(34) Divorced/Widow(5) Education: Bach(65) Diploma/Assoc(34) Master/higher (3) Experience: RN-M years= 9.51 CC- M years= 8.01	Cross-sectional (Survey)	–	–	–	Low−Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	Country	Sample Size (η)	Unit	Demographics (η) Type of RN	Study Design (Data Collection Method)	Type of Results			Quality
						JSS[a]	Ind. Factor[b]	Org. Factor[c]	
Chen *Journal of Nursing Research* (2009)	Taiwan	112	OR	Age: M(SD) years= 32(5.8) Sex: F(112) Marital Status: Single(60) Married/Cohabit(50) Divorced/Widow(2) Education: Diploma/Assoc (71) Bach (40) Master's/higher (1) Shift Worked: Rotating (103)	Cross-sectional (Survey)	3 (out of 5)	–	–	Low−Mod
Cho *Journal of Clinical Nursing* (2009)	Korea	1365	ICU	Sex: F(1350), M(15) Education: Bach(849) Experience: RN- M(SD) years= 4.3(4.3) Marital Status: Single(1079)	Cross-sectional (Survey)	67 (out of 100)	–	–	Low−Mod
Dai *Acta Anaethesiologica Taiwan* (2009)	Taiwan	1452	OR	Type of RN: Nurse anesthetist (1452)	Cross-sectional (Survey)	43 (out of 100)	–	–	Weak

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	Country	Sample Size (η)	Unit	Demographics (η) Type of RN	Study Design (Data Collection Method)	Type of Results			Quality
						JSS[a]	Ind. Factor[b]	Org. Factor[c]	
Forsgren *International Emergency Nursing* (2009)	Sweden	74	ED	−	Cross-Sectional (Survey)	88 (out of 100)	Triage work is interesting***	Freedom in triage**, Good cooperation in ED, Others understanding of triage work/tasks**, MTS method, Sufficient time in triage, MTS method**	Low− Mod
Rochefort *Journal of Advanced Nursing* (2010)	Canada	339	NICU	Age: M(SD) years= 39.4(7) Sex: F(334), M(5) Education: Diploma/Assoc(217) Experience: RN- M(SD) years= 16.8(11.1) CC- M(SD) years= 12.4(9.7) Hosp- M(SD) years= 14.9(10.8) Employment Status: FT(178) Ethnicity: Caucasian(314)	Cross-sectional (Survey)	3 (out of 4)	−	−	Low− Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Adriaenssens *Journal of Advanced Nursing* (2011)	Belgium	254	ED	Age: M(SD) years= 37.61(8.82) Sex: F(140), M(114) Education: Bach(226) Certification: (203) Marital Status: Married/Cohabit(188) Experience: RN- M(SD) years= 15(8.96) CC- M(SD) years= 11(7.55) Employment Status: FT(160), Occasional(15) Shift Worked: Rotating(244)	Cross-sectional (Survey)	−	Age, Sex, Education, Certification, Seniority, Work regime, Shift, Psychosomatic distress**, Fatigue**, Work engagement**, Turnover intention**	Job demand**, Work Procedure**, Skills discretion**, Social Support-Supervisor & Colleagues**, Material** & Personnel resources, Reward**, Decision authority*	High−Mod
Lin *Social Science & Medicine* (2011)	Taiwan	224	ED	−	Cross-sectional (Survey)	73 (out of 100)	−	Leadership behavior*, ED characteristics	High−Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Cilingir *HealthMED* (2012)	Turkey	97	CC Mixed	ER(19) ICU(50) OR (19) CVICU(9)	Cross-sectional (Survey)	3 (out of 5)	−	−	Weak
Klopper *Journal of Nursing Management* (2012)	South Africa	935	CC Undef	Sex: F(836), M(61) Education: Diploma/Assoc(642)	Cross-sectional (Survey)	695 (out of 891)	Depersonalization***, Accomplishment***, Nurse involved in hospital affairs***, Quality care***	Leadership and support***	Low−Mod
Lin *Health Services Management Research* (2012)	Taiwan	234	ED	−	Cross-sectional (Survey)	3 (out of 5)	−	−	Strong
McDonald *Advances in Neonatal Care* (2012)	USA	109	NICU	Type of RN: RN(72), NP(37) Sex: F(109) Education: Bach(43) Master/higher(35) Diploma/Assoc(31) Employment Status: FT(95), PT(10), Occasional (4)	Longitudinal (Survey)	4 (out of 5)	Knowledge of specialty**, Amount of floating*	Org. Support*, Interdic. Comm.**	Low−Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Sawatzky *Journal of Nursing Management* (2012)	Canada	261	ED	Age: M(SD)years=41.1(11.2) Sex: F(230), M(29) Education: Diploma/Assoc (140) Bach(118) Certification: (80) Marital Status: Married/Cohabit(191) Experience: RN- M(SD)years=15.5(11.7) CC- M(SD)years=10.2(9.1) Employment Status: FT(77), PT(184) Shift Worked: Rotating (241) Days (20)	Cross-sectional (Survey)	−	Work overtime*, Competence**, Work engagement	Staffing	Low−Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	Country	Sample Size (η)	Unit	Demographics (η) Type of RN	Study Design (Data Collection Method)	Type of Results			Quality
						JSS[a]	Ind. Factor[b]	Org. Factor[c]	
Bai *British Association of Critical Care Nurses* (2013)	China	706[ii]	ICU	Sex: F(664), M(42) Education: Dipl/Assoc(398) Bach(299) Master/higher(9) Marital Status: Single(368) Married/Cohabit(333) Divorced/Widow(5) Experience: RN- M(SD) years= 6.65(5.7) Shift Worked: Rotating(544) Shift Length: 8h(40) 12h(122)	Cross-sectional (Survey)	5 (out of 10)	−	Control of nursing practice, Nurse manager support**, Support for education**, Staffing, Clinically competent peers**, Nurse-Physician Collaboration, Autonomy, Patient-centered values**, Quality care**	High− Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Block *The Joint Commission Journal on Quality and Patient Safety* (2013)	USA	55	L&D	Sex: F(55)	Pre- & Post-intervention (Survey)	71 (out 0f 100)	Burnout, Emotional Exhaustion, Know names you worked previous shift with, Events in this LD unit affect my life in an emotionally unhealthy way	Staffing, Teamwork Climate, Readily available inform.***, Quality Care, Important issues well communicated at shift change, Suggestions about safety would be acted upon if expressed to management***, My input is well received in this LD unit***, Communication breakdowns leading to delays in care are common, Shift change information quality, Shift change process quality*	Weak
Choi *Research in Nursing & Health* (2013)	USA	729	CC Undef	–	Cross-sectional (Survey)	4 (out of 6)	–	–	High− Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	Country	Sample Size (η)	Unit	Demographics (η) Type of RN	Study Design (Data Collection Method)	Type of Results			Quality
						JSS[a]	Ind. Factor[b]	Org. Factor[c]	
Iglasias *Dimensions of Critical Care Nursing* (2013)	Spain	74	ICU	Age: M(SD)years= 39.46(8.406) Sex: F(53), M(21) Marital Status: Married/Cohabit(48) Single(22) Divorced/Widow(4) Experience: CC- M(SD)years= 15(8.206) Employment Status: FT(74)	Cross-sectional (Survey)	63 (out of 105)	Emotional Exhaustion, Depersonalization*, Personal Accomplishment	Job stress	Low−Mod
Moneke *Journal of Nursing Administration* (2013)	USA	137	CC Mixed CCU CTICU MICU SICU NSICU Burn-CC	Sex: F(85), M(25) Education: Bach(73) Master/higher(23) Certification: (59) Employment Status: FT(116) Shift Worked: Days(63), Nights(54) Ethnicity: Caucasian(63) African American(26) Hispanic(14)	Cross-sectional (Survey)	2 (out of 3)	Organizational Commitment***	Leadership behavior*	Weak

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Myhren *Critical Care Research and Practice* (2013)	Norway	129	ICU	Sex: F(112), M(17)	Cross-sectional (Survey)	44 (out of 70)	–	–	Weak
Ozden *Nursing Ethics* (2013)	Turkey	138	ICU	Age: M years= 29.17 Sex: F(131), M(7) Education: Bach(102) Dipl/Assoc(36) Marital Status: Married/Cohabit(75) Single(61) Divorced/Widow(2) Shift Worked: Rotating(112) Days(26)	Cross-sectional (Survey)	59 (out of 100)	Depersonalization***, Accomplishment***	–	Low−Mod
Panunto *Rev. Latino-Am. Enfermagen* (2013)	Brazil	129	ICU	Age: M(SD)years=35.1(7.5) Sex: F(89), M(40) Marital Status: Single(50) Married/Cohabit(69) Divorced/Widow (10) Education: Master/higher(2) Experience: RN- M(SD)years= 8.4(7) CC- M(SD)years= 4.2(5) Hosp- M(SD)years= 7(6.7)	Cross-sectional (Survey)	91 (out of 129)	–	–	Weak

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Zhang *Journal of Advanced Nursing* (2013)	China	446	CC Undef	Sex: F(430), M(16) Marital status: Married/Cohabit(226) Single(220) Education: Bach(108) Dipl/Assoc(332) Masters/higher(6)	Cross-sectional (Survey)	3 (out of 5)	–	–	High−Mod
Abdi *Journal of Nursing Management* (2015)	Iran	18	ICU	Experience: RN- M years= 7.5 Employment Status: FT(18)	Cross-sectional (Survey)	58 (out of 100)	–	–	Weak
Adriaenssens *Journal of Nursing Management* (2015)	Belgium	170	ED	Age: M(SD)years= 39.64(8.57) Sex: F(98), M(72) Marital Status: Married/Cohabit (128) Education: Bach(145) Certification: (139) Experience: RN- M(SD)years= 16.26(8.83) CC- M(SD)years= 13.57(7.64) Work Status: FT(92) Shift: Rotating(149)	Longitudinal (Survey)	–	Age, Sex, Education, #Hours worked, Shift Type, Psychosomatic distress***, Burnout, Emotional Exhaustion, Turnover intention***, Work Engagement***	Job demand**, Work agreements* Job control, Social support, Social harassment, Material*** resources, Personnel resources, Reward***	High−Mod

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Bai *Journal of Nursing Management* (2015)	China	706[ii]	ICU	Sex: F(664), M(42) Education: Bach(299) Diploma/Assoc(398) Master/higher(9) Marital Status: Single (368) Married/Cohabit (333) Divorced/Widow (5) Experience: RN- M(SD)years= 6.65(5.7) Shift Worked: Days(154) Rotating(544) Nights(8) Shift Length: 8h(40), 12h(122)	Cross-sectional (Survey)	5 (out of 10)	Sex, Education, Professional title[*], Work experience	Control over nursing practice, Nurse manager support[**], Support for education[**], Staffing, Competent peers[**], RN-MD Collab, Autonomy, Patient-centered values[**], Quality care[**]	Strong
Bornemann-Shepherd *Journal of Emergency Nursing* (2015)	USA	49	ED	−	Pre- & Post-intervention (Survey)	−	−	−	Weak

(See Additional Table 2.1 for Legend)

Additional Table 2.0 (Continued.)− Characteristics of the sampled articles (η=61)

First author, *Journal* (Year of Publication)	**Country**	**Sample Size (η)**	**Unit**	**Demographics (η) Type of RN**	**Study Design (Data Collection Method)**	**Type of Results**			**Quality**
						JSS[a]	**Ind. Factor[b]**	**Org. Factor[c]**	
Gauthier *Journal of Pediatric Nursing* (2015)	USA	45	PICU	Age: M(SD) years= 28.65(1.27) Sex: F(42), M(3) Marital status: Married/Cohabit(18) Single(21) Divorced/Widow(6) Employment status: FT(41), PT(4) Shift worked: Days(23), Nights(18) Ethnicity: Caucasian(32) Asian/Pacific Islander(10) Other(3)	Pre- & Post-intervention (Survey)	−	Mind-fullness	Job stress	Weak

(See Additional Table 2.1 for Legend)

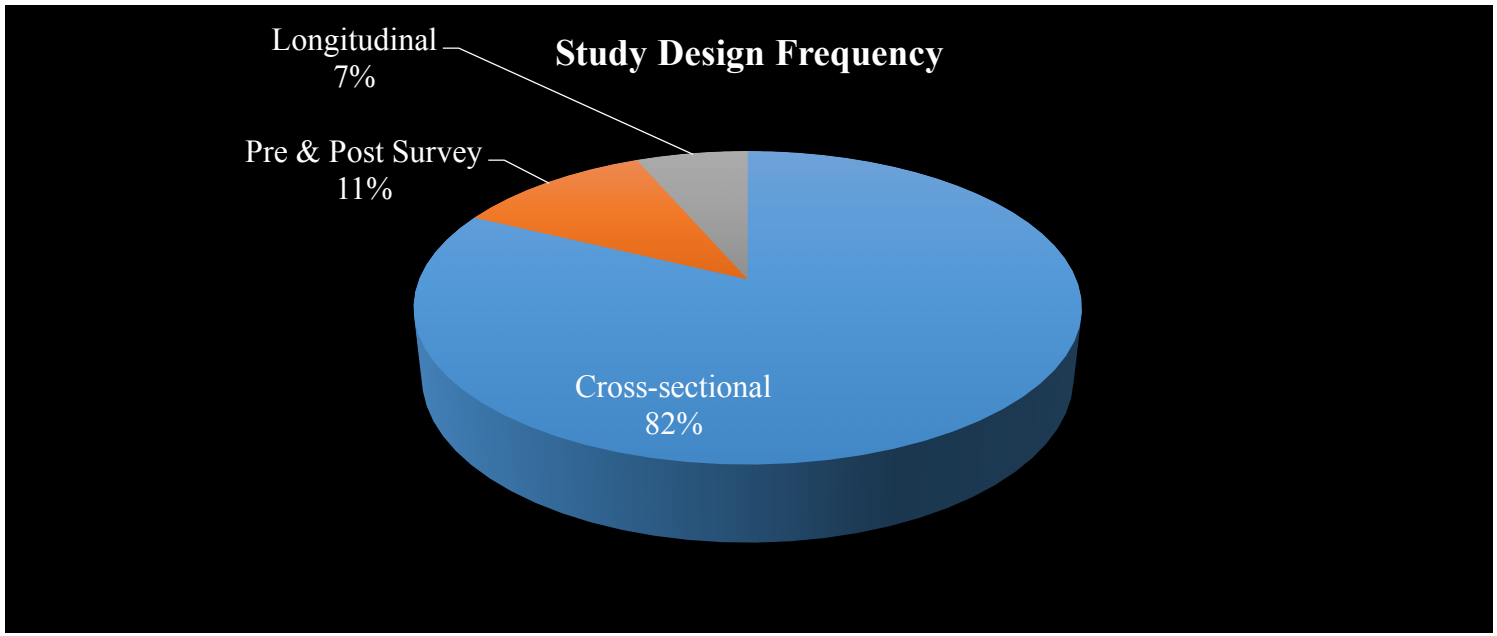
Additional Table 2.1− Legend for Additional Table 2.0

− (dash) – Indicates data was not reported or not measured
Country: USA – United States of America
Type of Results: a – Refer to Table 3.7 for Standardized overall job satisfaction scores, b – Refer to Table 3.9 for Results for individual factors associated with critical care nurses' job satisfaction, c – Refer to Table 3.9 for Results for individual factors associated with critical care nurses' job satisfaction
Unit: ED: Emergency Department; ICU: Intensive Care Unit; CCU: Coronary/Cardiac Care Unit; ICCU: Intensive Coronary/Cardiac Care Unit; CC Undef: Critical Care Undefined; CC Mixed: Critical Care Mixed; NICU: Neonatal Intensive Care Unit; PICU: Pediatric Intensive Care Unit; Ped CC: Pediatric Critical Care; L&D: Labor & Delivery; OR: Operating Room; N-ICU: Neurological Intensive Care Unit; NSICU: Neuro-surgical Intensive Care Unit
Sample Size: i and ii−Indicates the same sample
Demographic: Type of RN: RN:Registered Nurse; New grad: Newly graduate nurse; Exp RN: Experienced registered nurse; *: Different demographics for each group of participants Sex: F: Female; M: Male Age & Experience: M: Mean; SD: Standard Deviation; RN: Registered Nurse; CC: Critical Care; Hosp: Hospital Education: Bach: Bachelor's degree; Associ: Associate's degree Marital Status: Cohabit: Cohabiting Employment Status: FT: Full-time; PT: Part-time Shift Length: 8h: 8-hour shift; 12h: 12-hour shift
Individual & Organizational Factors: *-significant (ρ≤.05), **-significant (ρ≤.01), ***-significant (ρ≤.001)

Additional Table 3.0− Frequency table for study designs of included studies (η=61)

Study Design	Frequency (%)
Cross-sectional Survey	50(82)
Longitudinal Survey	4(7)
Pre/Post-test Survey	7(11)

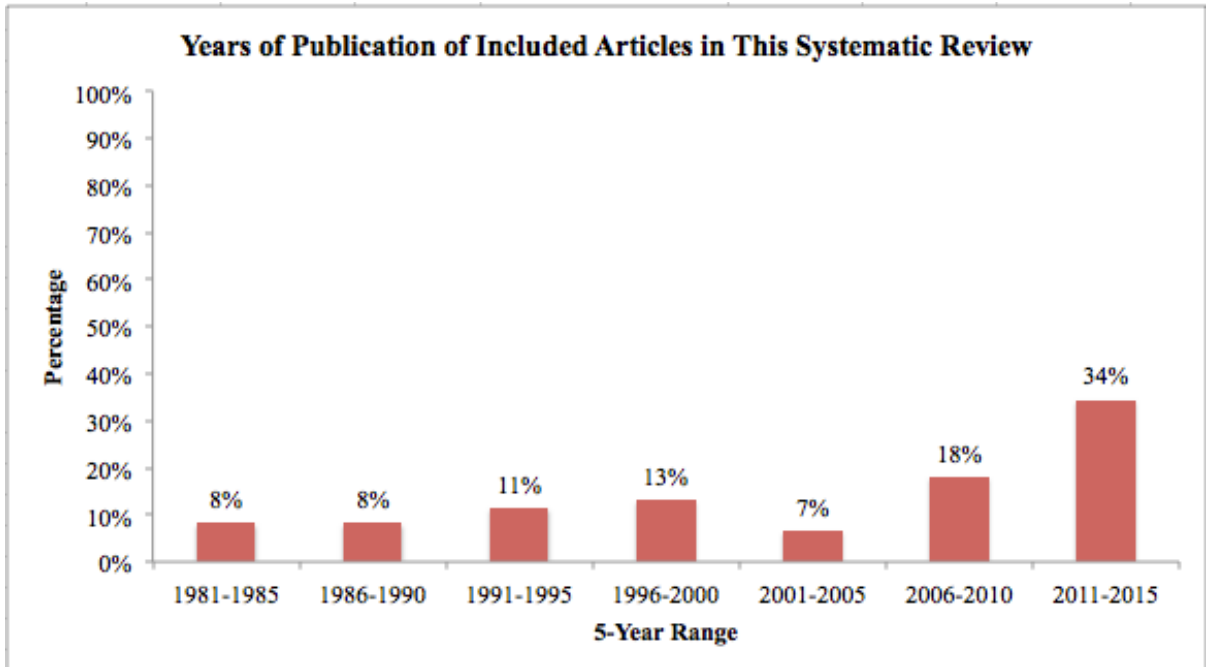
Additional Figure 3.0− Pie chart graph for study designs of included studies (η=61)



Additional Table 4.0− Frequency table for years of publication of included studies (η=61)

Year Range of Publication	Frequency (%)
1981-1985	5 (8)
1986-1990	5 (8)
1991-1995	7 (11)
1996-2000	8 (13)
2001-2005	4 (7)
2006-2010	11(18)
2011-2015	21 (34)

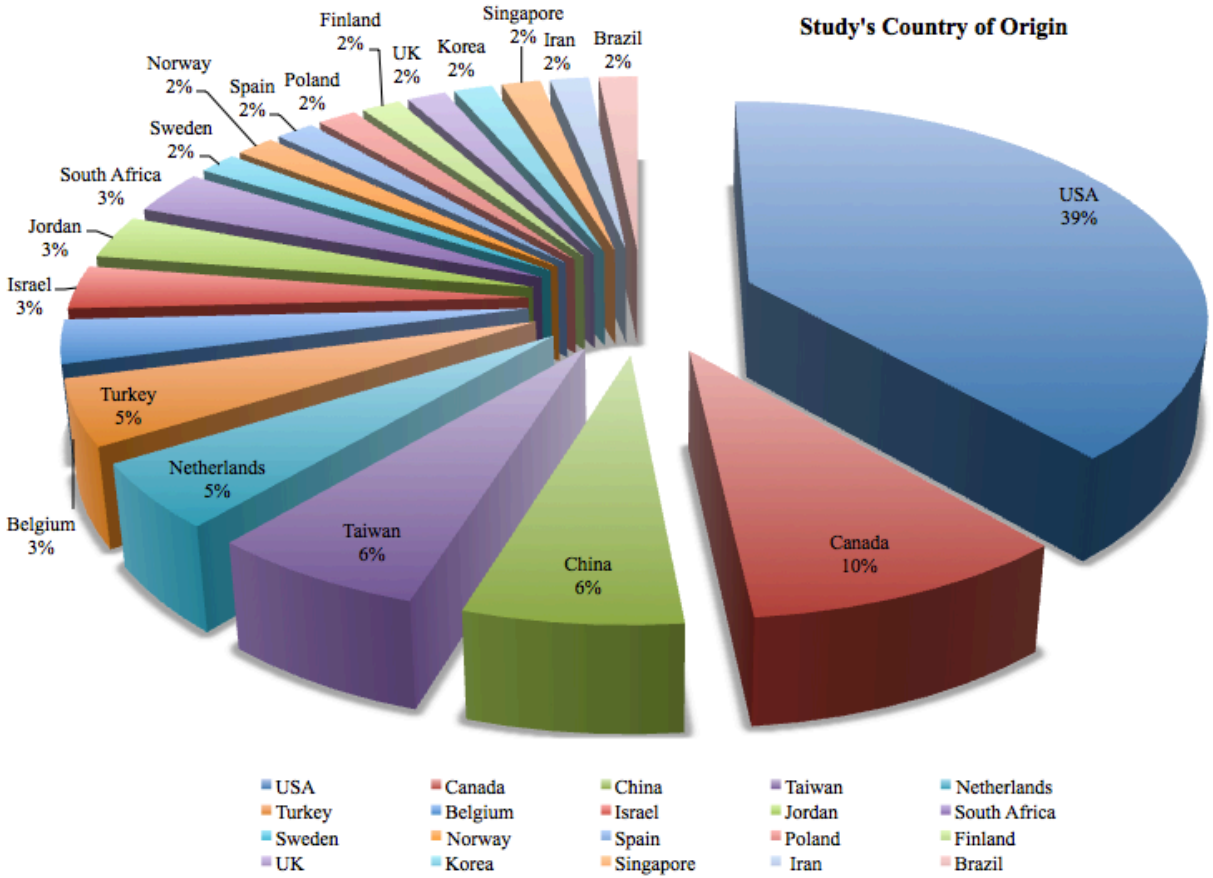
Additional Figure 4.0− Frequency graph for years of publication of included studies (η=61)



Additional Table 5.0− Frequency table for country/countries of origin for each included study (η=61)

Country of Study	Percentage
USA	39%
Canada	10%
China	7%
Taiwan	7%
Netherlands	5%
Turkey	5%
Belgium	3%
Israel	3%
Jordan	3%
South Africa	3%
Sweden	2%
Norway	2%
Spain	2%
Poland	2%
Finland	2%
UK	2%
Korea	2%
Singapore	2%
Iran	2%
Brazil	2%

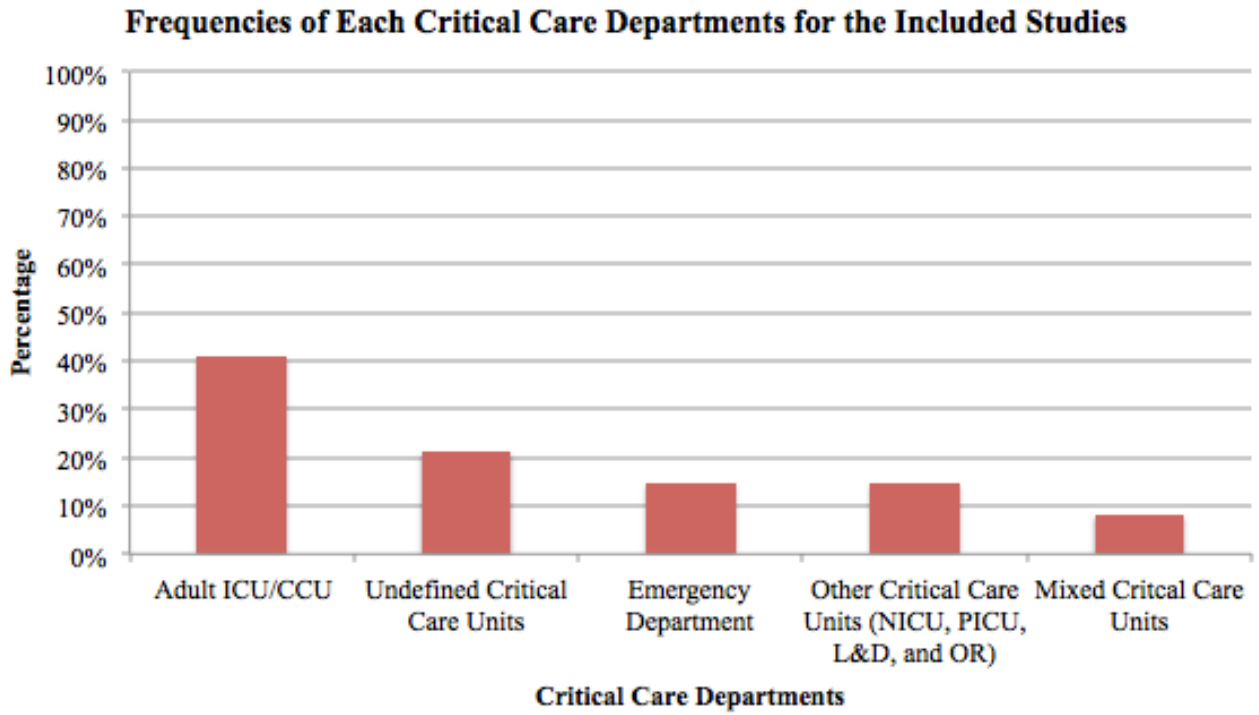
Additional Figure 5.0− Pie chart graph for country/countries of origin for each included study (η=61)



Additional Table 6.0− Frequency table for critical care departments in included studies (η=61)

Critical Care Department	Critical Care Mixed	Critical Care Undefined	Adult ICU/CCU	ED/ER	Others (NICU, PICU, OR, and L&D)
Frequency (%)	5 (8)	13 (21)	25 (41)	9 (15)	9 (15)

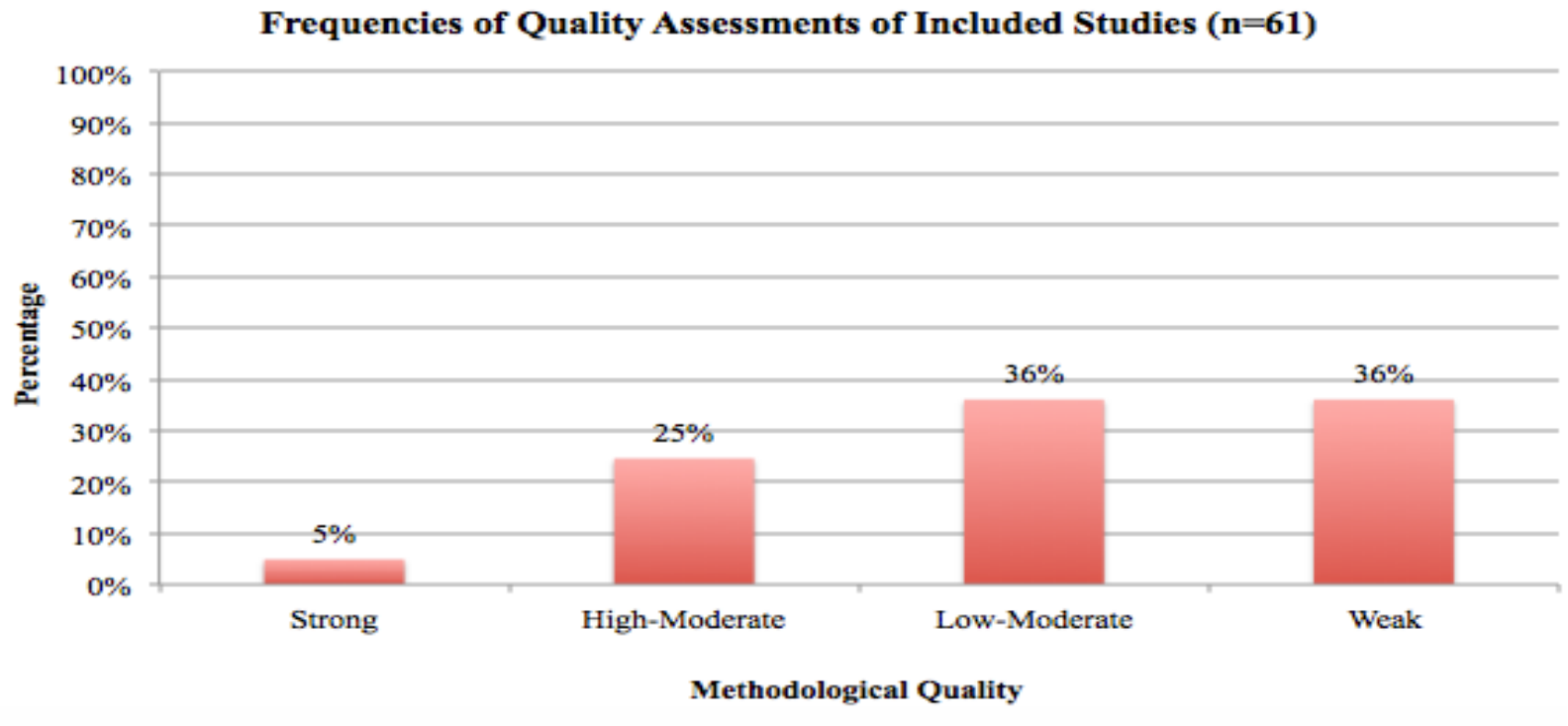
Additional Figure 6.0− Frequency graph for critical care departments in included studies (η=61)



Additional Table 7.0− Frequency table for quality assessments of included studies (η=61)

Methodological Quality	Strong	High-Moderate	Low-Moderate	Weak	Total
Frequency (%)	2 (3)	15 (25)	22 (36)	22 (36)	61
Cross-sectional/ Longitudinal (η)	2	15	20	17	54
Pre-&Post-Test (η)	0	0	2	5	7

Additional Figure 7.0− Frequency graph for quality assessments of included studies (η=61)



Additional Table 8.0− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
Job Satisfaction (single-item measure)	–	1 (Gauthier, 2015)	1	"Considering all aspects of my job, I would say that I am very satisfied with my job"	7-point Likert scale: 1 (strongly agree) to 7 (strongly disagree).	–	–
Overall Job Satisfaction (single-item measure)	–	1 (Kuokkanen, 2003)	1	Satisfied, job/work or dissatisfied, job/work	Satisfied, job/work or Dissatisfied, job/work	–	–
ED Employee Satisfaction Questionnaire (single-item measure)	–	1 (Lin, 2011)	1	One's overall satisfaction in the ED setting	Scored 0−100	–	–
No Name (Overall Job Satisfaction, single-item)	–	1 (Panunto, 2013)	1	–	Very satisfied, Satisfied, Dissatisfied, Very Dissatisfied	–	–

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
No Name (single-item measure)	−	1 (Rochefort, 2010)	1	Overall level of job satisfaction	4-point Likert scale: very satisfied to very dissatisfied	Previous research has demonstrated the validity and reliability of single-item measures designed to capture global perceptions about constructs such as job satisfaction (Wanous et al. 1997, Patrician 2004)	
No Name (single-item measure)	−	1 (Sawatzky, 2012)	1	−	5-point Likert scale: 1 (not at all satisfied) to 5 (very satisfied)	−	−
No Name (Job Dissatisfaction-single item)	−	1 (Cho, 2009)	1	−	4-point Liker scale: very dissatisfied to very satisfied. Dissatisfaction was defined as responses of “very dissatisfied” or “dissatisfied.”	−	−

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
RN4CAST (single-item measure JS)	Sermeus et al. (2011)	1 (Klopper, 2012)	1	Section A 1) Practice Environment Scale of the Nurse Work Index (PEW-NWI) 2) Job Satisfaction 3) Intent to leave 4) The Maslach Burnout Inventory (MBI). Section B 1) Quality of care 2) Patient safety issues 3) Occurrence of adverse events. Section C 1) Most recent shifts of nurses 2) Work schedules 3) Nursing tasks 4) Nurse-to-patient ratios Section D 1) Demographics	Very dissatisfied, A little dissatisfied, Moderately Satisfied, and Very satisfied.	Cronbach's α 0.82	–

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
NICU Nurses Satisfaction Survey	−	1 (McDonald, 2012)	−	1) Monetary compensation (pay) 2) Job stress 3) Caring for patients in stressful situations 4) Level of autonomy 5) Organizational support 6) Level of knowledge of the specialty 7) Work environment 8) Staffing levels 9) Communication with physicians 10) Communication with NNPs 11) Team spirit 12) The amount of required “floating” to other nursing units. 13) Overall job satisfaction (single-item)	5-point Likert scale: 1 (strongly disagree) to 5 (strongly agree)	Cronbach’s α 0.89	−

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
Satisfaction Instrument	Price & Mueller (1986)	1 (Boyle, 1996)	6	General measure of JS.	6-point Likert type scale. Table 1, p.144. Possible range 6−36 with midpoint of 21.	Previous Cronbach's α 0.88 3-mth & 6-mth Cronbach's α 0.87 Exp RN Cronbach's α 0.88	Construct validity has been assessed.
Job Satisfaction Questionnaire	Price & Mueller (1986)	1 (Freeman, 1998)	46	1) Opportunity 2) Routinization 3) Autonomy 4) Communication 5) Social integration 6) Distributive justice 7) Promotional opportunity 8) Motivation 9) Pay 10) Workload 11) General training 12) Kinship responsibility 13) Unit size 14) Job satisfaction.	–	Cronbach's α 0.43−0.93	Average loading factors 0.495−0.825

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
The Mueller-McCloskey Satisfaction Scale (MMSS)	Mueller & McCloskey (1990)	1 (Mryyan, 2006)	31	–	5-point Likert scale	Cronbach's α 0.52−0.84	Construct validity: Cutoff for item loading on factor was 0.40. Correlations on subscales ranged from 0.53 to 0.75 for similar dimensions, which demonstrated Criterion-related Validity.
The Job Satisfaction Scale (JSS)	–	1 (Chen, 2009)	27	1) Work rewards 2) OR environment 3) Self-esteem 4) Administrative management 5) Job ability	5-point Likert scale: 1 (strongle disagree) to 5 (strongly agree).	Cronbach's α 0.62−0.88	–

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
Job Satisfaction Scale (JSS)	Maastricht (−)	1 (Tummers, 2006)	21	1) Supervision 2) Career opportunity 3) Quality patient care 4) Growth opportunities 5) Social contact with colleagues 6) Social contact with patients 7) Satisfaction with job clarity	5-point scale.	−	−
Chinese Nurses Job Satisfaction Scale (CNJSS)	Tao et al. (2009)	1 (Zhang, 2013)	38	1) Administration 2) Workloads 3) Co-workers 4) Work itself 5) Pay 6) Professional opportunities 7) Praise/recognition 8) Family/work balance	5-point Likert scale: 1: strongly disagree 2: disagree 3: neither agree nor disagree 4: agree 5: strongly agree.	Cronbach's α Overall 0.85 Subscales 0.62−0.82	The validity of the CNJSS has been well established
Job Satisfaction Survey (JSS)	Researcher developed (−)	1 (Bailey, 2005)	16	−	Likert scale	−	Validated by the East Carolina University Department of Sociology

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
The Job Satisfaction Survey (JSS)	Spector (1997)	1 (Li, 2008)	36	1) Pay 2) Promotion 3) Supervision 4) Fringe benefits 5) Contingent rewards 6) Operating procedures 7) Coworkers 8) Nature of work 9) Communication	A high total score represents a high level of JS	Cronbach's α 0.879	–
Work Satisfaction Survey	Hoppock (1953)	1 (Medcof, 1992)	4	–	–	Cronbach's α 0.79	–
Job Satisfaction	–	1 (Ehrenfeld, 1990)	8	–	5-point Likert scale: 1 (strongly satisfied) to 5 (very dissatisfied).	NR	–
Job Satisfaction	Leatt & Schneck (1981)	1 (Ehrenfeld, 1991)	–	1) Challenge 2) Comfort 3) Rewards	5-point Likert scale: 1 (minimum agreement) to 5 (maximum agreement)	Cronbach's α 0.81	–
The Job Descriptive Index (JDI)	Smith, Kendall, & Hulin (1969)	1 (Dear, 1982)	72	1) Work content 2) Adequacy of supervision 3) Relations with co-workers 4) Level of pay 5) Promotion	The JS score is a weighted sum of the 5 subscales scores of the JDI. The measurement procedure is discussed in detail by Weisman et al.	Used in earlier studies with nurses. Reliability has been estimated	Used in earlier studies with nurses. Validity has been estimated.

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
General Job Satisfaction	–	1 (Boumans, 1994)	42	1) Quality of care 2) Clarity 3) Head nurse 4) Contacts with colleagues 5) Promotion opportunities 6) Growth opportunities 7) Contacts with patients	–	Cronbach's α 0.80	–
The Standard Shiftwork Index (SSI)	Barton et al. (1990)	1 (Iskra-Golec, 1996)	–	1) GI and CV symptoms 2) Chronic fatigue 3) Cog and somatic anxiety 4) Psychological health 5) Sleep 6) Job satisfaction 7) Social and domestic disrupt	Scores range 5−35	–	–
Mumford's Questionnaire	Mumford (1986)	1 (Manley, 1996)	31	Focuses on aspects of the job itself rather than identifying personal factors which may have influence on JS	–	–	–

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
ED Employee Satisfaction Questionnaire (Nurses)	Based on literature on emergency management and input from 2 academic professors and 3 emergency practicing nurses. (NR)	1 (Lin, 2012)	60	1) Autonomy 2) Professional growth and accomplishment 3) Nursing leadership, communication within ED 4) Communication with other hospital departments 5) ED management 6) Hospital policies and regulations 7) External health policy environments relevant to emergency medicine in Taiwan	5-point Likert scale	Cronbach's α 0.950−0.708	Content validity and construct validity by factor analysis.
No Name	−	1 (Forsgren, 2009)	37	−	5-point Likert scale	Cronbach's α 0.68−0.84	Validated in a pilot study of 5 nurses (Trost, 2001)
Staff Satisfaction Questionnaire	QIP lead nurse & research nurse scientist (NR)	1 (Bornemann-Shepherd, 2015)	10	−	4-point Likert scale. Neutral score was eliminated to force an opinion	−	Reviewed and approved by the inter-professional task force.

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
Index of Organizational Reaction (IOR)	Smith (1976)	1 (Al'Ma'aitah, 1996)	41	1) Supervision 2) Hospital identification 3) Kind of work 4) Amount of work 5) Co-workers 6) Physical work conditions 7) Financial rewards 8) Career future	–	Cronbach's α 0.85−0.91	–
Work Satisfaction Scale	Hinshaw & Atwood (1985)	1 (Bratt, 2000)	32	1) Administration 2) Interaction 3) Pay 4) Professional status 5) Task requirements	5-point Likert scale	Cronbach's α Overall 0.83 Subscales 0.60−0.84	–
The Alegra Questionnaire	Alegra (1980,1986)	1 (Landeweerd, 1988)	53	1) Experienced meaningfulness 2) Experienced responsibility 3) Knowledge of results 4) Internal work motivation 5) Job involvement 6) Growth satisfaction 7) Clarify satisfaction 8) Social satisfaction 9) Supervisory satisfaction 10) General work satisfaction	–	Cronbach's α 0.50−0.92	–

Additional Table 8.0 (Continued.)− Quantitative measures of job satisfaction among critical care nurses used in only one study

Instrument	Developer(s) (Year)	Frequency (Citation)	Number of Items	Subscale(s)/ Domain(s)	Scoring	Reliability	Validity
No Name	Members of the Taiwan Society of Anesthesiologists and the Taiwan Association of Nurse Anesthetist (−)	1 (Dai, 2009)	–	–	5-point Likert scales (very satisfied, satisfied, acceptable, dissatisfied and very dissatisfied). The satisfaction rate was defined as the percentages of NAs reporting they were satisfied or very satisfied.	Cronbach's α 0.7	0.8
No Name	–	1 (Pike, 1993)	–	Listing of emotional experiences and rating of how frequently they experienced these emotions at the end of the shift.	5-point rating: 1 (never) to 5 (always).	–	–

Additional Table 9.0− Bivariate analysis results of the factors, individual and organizational, related to critical care nurses' job satisfaction

Author (year)	Factors									
	Age	**Sex**	**Education**	**Autonomy**	**Job Stress**	**Burnout Emotional Exhaustion**	**Shift Worked**	**Staffing Personnel Resources**	**Teamwork**	**Career Experience**
Dear (1982)	-0.02		-0.06*	0.45*						
Norbeck (1985a)					-24***					23***
Norbeck (1985b)										-26***
Ehrenfeld (1991)					0.16***					
Boumans (1994)				0.14*						
Bratt (2000)					-0.56*** -0.52***				0.52*** 0.29***	
Loke (2001)	0.292*									
Forsgren (2009)									0.24*	
Adriaenssens (2011)	0.75							0.16**		-0.7

*p<0.05, **p<0.01, ***p<0.001

Additional Table 9.0 (Continued.)− Bivariate analysis results of the factors, individual and organizational, related to critical care nurses' job satisfaction

Author (year)	Factors									
	Age	**Sex**	**Education**	**Autonomy**	**Job Stress**	**Burnout Emotional Exhaustion**	**Shift Worked**	**Staffing Personnel Resources**	**Teamwork**	**Career Experience**
Klopper (2012)						-0.455*** -0.325***		0.428*** 0.328***		
McDonald (2012)				0.44**	0.39**			0.46**	0.53**	
Bai (2013, 2015)				0.34**				0.47**		
Block (2013)						-0.452***		0.307*	0.61***	
Iglasias (2013)					-0.372**	-0.04				
Ozden (2013)						-0.416***				
Adriaenssens (2015)	0.02					-0.3***		0.24***		

*p<0.05, **p<0.01, ***p<0.001

Additional Table 9.1− Multivariate analysis results of the factors, individual and organizational, related to critical care nurses' job satisfaction

Author (year)	Factors									
	Age	**Sex**	**Education**	**Autonomy**	**Job Stress**	**Emotional Exhaustion**	**Shift Worked**	**Staffing Personnel Resources**	**Teamwork**	**Career Experience**
Norbeck (1985a)					0.057***		0.05**			0.055**
Norbeck (1985b)					0.046**		0.049**			0.068***
Stechmiller (1993)					-0.106*	-0.334*				
Freeman (1998)				0.331***						
Loke (2001)	0.085**	0.013	0.021							0.116***
Tummers (2006)	-0.01	-0.05								
Adriaenssens (2011)	-0.02	0.09	0.06				0.12*	0.08		
Sawatzky (2012)								1.110*		
Adriaenssens (2015)	0.05	0.09								
Bai (2015)										88.7***

*p<0.05, **p<0.01, ***p<0.001

Additional Table 10.0− Individual factors and their relationship to nurses' job satisfaction, examined in <4 of the included studies (η=61)

Individual Factor	No. of Included Studies Examining Factor	Bivariate Statistic	Value (r)	Multivariate Statistic	Value
Burnout	3	Correlation Intercorrelation Correlation	NR -0.41*** NR		
Burnout: Depersonalization	3	Pearson correlation Spearman rank correlation	0.291* -0.324*** -0.236***		
Burnout: Accomplishment	3	Pearson correlation Spearman rank correlation	0.224 0.336*** 0.189***		
Certification	2	ANOVA	NR	Hierarchal regression	-0.10
Professional Title	2	ANOVA	NR	MANCOVA	F=5.41*
No. professional activities nurse is involved in	2	Pearson correlation	0.29* -0.2***	Stepwise multiple regression	β=0.31**
Preference to be involved	2	Pearson correlation	0.28* -0.2***	Stepwise multiple regression	β=0.29**
Willingness to adopt new methods and procedures	2	Pearson correlation	0.18* 0.11*	Stepwise multiple regression	β=0.21**
No. Books/Journals	2	Pearson Correlation	0.17* -0.13**		
Readiness to invest time	2	Pearson correlation	0.26** 0.22***	Stepwise multiple regression	β=0.26*

*p<0.05, **p<0.01, ***p<0.001

Additional Table 10.0 (Continued.)− Individual factors and their relationship to nurses' job satisfaction, examined in <4 of the included studies (η=61)

Individual Factor	No. of Included Studies Examining Factor	Bivariate Statistic	Value (r)	Multivariate Statistic	Value
Psychosomatic distress	2	Correlation	-0.31*** -0.23**		
Psychological symptoms	2 (Same results)	Pearson correlation	-40***		
Educational need **Adequacy of education**	2	Pearson correlation	0.16*** 0.14**		
No. of children	1	Pearson correlation	-0.11*		
General training	1	ANOVA	4.95**		
Knowledge of specialty	1	Kendall's Tau-b	0.32* RN 0.17 NNP		
Ethnicity	1	ANOVA	NR		
Position held	1	NR	NR	Regression	F=1.252
First position	1	Pearson correlation	-0.11		
Years in critical care	1	Correlation	-0.21*		
Years hospital experience	1	Correlation	NR	Regression	F=5.344*
Years with current employer	1			Regression	NR
Amount of floating	1	Kendall's Tau-b	0.17*		
Nurse involvement in hospital affairs	1	Spearman rank correlation	0.384***		

*p<0.05, **p<0.01, ***p<0.001

Additional Table 10.0 (Continued.)− Individual factors and their relationship to nurses' job satisfaction, examined in <4 of the included studies (η=61)

Individual Factor	No. of Included Studies Examining Factor	Bivariate Statistic	Value (r)	Multivariate Statistic	Value
Work regime (FT/PT)	1			Hierarchal regression	β =−0.04
Employment status	1	ANOVA	NR		
Work overtime	1			Ordinal logistic regression	2.147*
Fatigue	1	Pearson correlation	-0.3**		

*p<0.05, **p<0.01, ***p<0.001

Additional Table 10.1− Organizational factors and their relationship to nurses' job satisfaction, examined in <4 of the included studies (η=61)

Organizational Factor	No. of Included Studies Examining Factor	Bivariate Statistic	Value (r)	Multivariate Statistic	Value
Nurse-Physician collaboration	3	Correlation	0.03 0.275 0.378		
Job control	3	Correlation	0.33 0.38 -0.25		
Work engagement	3	Correlation	0.43*** 0.20**	Ordinal logistic regression	1.593***
Quality of care	2	Correlation Spearman rank correlation	0.52** 0.543***		
Job demands **Work/Time demands** **Physical demands**	2	Correlation Pearson correlation	0.21** -0.08 0.29**		
Leadership behaviors: Inspiring shared vision	2	Correlation	0.43** 0.24**	Regression	β = 0.300*
Leadership behaviors: Enabling others to act	2	Correlation	0.42** 0.21*	Regression	β = 0.307*
Leadership behaviors: Modeling the way	2	Correlation	0.43** 0.23*	Regression	β = 0.143
Leadership behaviors: Encouraging the heart	2	Correlation	0.29**	Regression	β = -0.239
Social Support	2	Correlation	0.16 -18* JD	Hierarchal regression	3.78

*p<0.05, **p<0.01, ***p<0.001

Additional Table 10.1 (Continued.)− Organizational factors and their relationship to nurses' job satisfaction, examined in <4 of the included studies (η=61)

Organizational Factor	No. of Included Studies Examining Factor	Bivariate Statistic	Value (r)	Multivariate Statistic	Value
Material resources	2	Correlation	0.35*** 0.34**	Hierarchal regression	β = −0.04
Reward	2	Correlation	0.34*** 0.20**	Hierarchal regression	β=0.25***
Promotional/Growth opportunity	2	Correlation ANOVA	NR		
Decision authority	2	Pearson correlation Correlation	NR	Hierarchal regression	β=0.13* β=0.23**
Organizational commitment	2	Correlation	NR	Regression	B=0.353***
ICU type	2	Pearson correlation	0.05	MANCOVA Regression	NR β = 0.06*
Nurse manager support	1	Correlation	0.47**		
Support for education	1	Correlation	0.42**		
Clinically competent peers	1	Correlation	0.40**		
Patient-centered values	1	Correlation	0.51**		
Workload	1	ANOVA	9.66***		
Work agreements	1	Correlation	0.36***		
Work procedures	1	Pearson correlation	0.27**	Hierarchal regression	β = 0.08
Structure of overall work	1	Pearson correlation	0.35***		
Freedom of taking initiative in triage	1	Pearson correlation	0.43***	Multiple regression	β = 0.73*

*p<0.05, **p<0.01, ***p<0.001

Additional Table 10.1 (Continued.)− Organizational factors and their relationship to nurses' job satisfaction, examined in <4 of the included studies (η=61)

Organizational Factor	No. of Included Studies Examining Factor	Bivariate Statistic	Value (r)	Multivariate Statistic	Value
Freedom of decision-making in triage	1	Pearson correlation	0.29**	Multiple regression	β=0.70
Skill discretion	1	Pearson correlation	0.29**	Hierarchal regression	β=0.17**
Technology uncertainty	1	ANOVA	3.45*		
Technology instability	1	ANOVA	32.45***		
Technology variability	1	ANOVA	2.72		
Complexity/Difficulty	1	Correlation	-0.02		
Work pressure	1	Correlation	-0.22***		
Years under manager	1			Regression	1.953
Leadership	1	Correlation	0.44**		
Nursing leadership behaviors	1	Correlation	0.42**		
Composite leadership behaviors	1	Correlation	0.44**		
Leadership behaviors: Challenging the process	1	Correlation	0.23*		
Task-oriented leadership behaviors	1	Correlation	0.27*		
Employee-oriented leadership behaviors	1	Correlation	0.30*		
Social-Emotional leadership	1	Correlation	0.54***		
Instrumental leadership	1	Correlation	0.10		
Task vs. Patient allocation	1	Correlation	-0.07		
Head nurse consideration	1	Intercorrelation	-0.55***		

*p<0.05, **p<0.01, ***p<0.001

Additional Table 10.1 (Continued.)− Organizational factors and their relationship to nurses' job satisfaction, examined in <4 of the included studies (η=61)

Organizational Factor	No. of Included Studies Examining Factor	Bivariate Statistic	Value (r)	Multivariate Statistic	Value
Head nurse structure	1	Intercorrelation	-0.01		
Social support: Supervisor	1	Pearson correlation	0.41**	Hierarchal regression	β=0.11
Leadership & Support	1	Spearman rank correlation			
Social Support colleagues	1	Pearson correlation	0.36**	Hierarchal regression	β=0.16**
Collegial support	1	Pearson correlation	0.32***		
Emotional support	1	Pearson correlation	-22**(JD)		
Tangible support	1	Pearson correlation	-12 (JD)		
Work support	1	Pearson correlation	-13 (JD)		
Organizational support	1	Kendall's Tau-b	0.53**		
Social harassment	1	Correlation	0.04		
Social integration	1	ANOVA	1.11		
Information available for decision-making	1	Pearson correlation	0.439***		
Competence	1			Ordinal logistic regression	-0.885**
Job communication	1	ANOVA	0.68		
Interdisciplinary communication	1	Kendall's Tau-b	0.42**		
Communication with MD	1	Kendall's Tau-b	0.36**		
Communication with NNP/RN	1	Kendall's Tau-b	0.25**		

*p<0.05, **p<0.01, ***p<0.001

Additional Table 10.1 (Continued.)− Organizational factors and their relationship to nurses' job satisfaction, examined in <4 of the included studies (η=61)

Organizational Factor	No. of Included Studies Examining Factor	Bivariate Statistic	Value (r)	Multivariate Statistic	Value
Feedback/Clarity	1	Correlation	0.61***		
Opportunity	1	ANOVA	2.60		
Interaction uncertainty x Decision authority	1			Hierarchal regression	β=0.11
Difficulty speaking up if there's a problem with quality	1	Pearson correlation	-0.074		
Knowing names or personnel	1	Pearson correlation	-0.20		
Important issues well communicated	1	Pearson correlation	0.252		
Safety suggestions acted upon by management	1	Pearson correlation	0.547***		
Emotionally unhealthy life effects	1	Pearson correlation	-0.008		
Input well received	1	Pearson correlation	0.481***		
Communication breakdowns are common and delay care	1	Pearson correlation	0.036		
Shift change infoqual	1	Pearson correlation	NR		
Shift change processqual	1	Pearson correlation	0.228*		
Triage work is interesting	1	Pearson correlation	NR	Multiple regression	β=0.19***
Others understanding of triage RNs work	1	Pearson correlation	0.342*	Multiple regression	β=0.05
MTS method	1	Pearson correlation	0.48***	Multiple regression	β=0.03*
Sufficient time in triage	1	Pearson correlation	0.33**		

*p<0.05, **p<0.01, ***p<0.001

Additional Table 10.1 (Continued.)− Organizational factors and their relationship to nurses' job satisfaction, examined in <4 of the included studies (η=61)

Organizational Factor	No. of Included Studies Examining Factor	Bivariate Statistic	Value (r)	Multivariate Statistic	Value
Sufficient time for analysis in triage	1	Pearson correlation	0.32**		
Routinization	1	ANOVA	1.88		
Distributive Justice	1	ANOVA	0.79		
Motivation	1	ANOVA	0.19		
Productivity	1	Pearson Correlation	0.1999		
Environmental uncertainty	1			Hierarchal regression	β=-0.09
Work environment	1	Kendall's Tau-b	0.50**		
ED characteristics	1	Correlation	NR		
Hospital type	1			MANCOVA	7.32
Specialty area	1	ANOVA	NR		
Unit Size	1	ANOVA	5.59**		

*p<0.05, **p<0.01, ***p<0.001

Additional Table 11.0− Assessing the methodological quality of this systematic review (AMSTAR checklist and score)

AMSTAR Checklist	
Article Name: Job Satisfaction among Critical Care Nurses: A systematic review of contributing factors, individual and organizational	
1. Was an 'a priori' design provided? The research question and inclusion criteria should be established before the conduct of the review. *Note: Need to refer to a protocol, ethics approval, or predetermined/a priori published research objectives to score a "yes."*	☑ Yes ☐ No ☐ Can't Answer ☐ Not Applicable
2. Was there duplicate study selection and data extraction? There should be at least two independent data extractors and a consensus procedure for disagreements should be in place. *Note: 2 people do study selection, 2 people do data extraction, consensus process or one person checks the other's work.*	☑ Yes ☐ No ☐ Can't Answer ☐ Not Applicable
3. Was a comprehensive literature search performed? At least two electronic sources should be searched. The report must include years and databases used (e.g., Central, EMBASE, and MEDLINE). Key words and/or MESH terms must be stated and where feasible the search strategy should be provided. All searches should be supplemented by consulting current contents, reviews, textbooks, specialized registers, or experts in the particular field of study, and by reviewing the references in the studies found. *Note: If at least 2 sources + one supplementary strategy used, select "yes" (Cochrane register/Central counts as 2 sources; a grey literature search counts as supplementary).*	☑ Yes ☐ No ☐ Can't Answer ☐ Not Applicable
4. Was the status of publication (i.e. grey literature) used as an inclusion criterion? The authors should state that they searched for reports regardless of their publication type. The authors should state whether or not they excluded any reports (from the systematic review), based on their publication status, language etc. *Note: If review indicates that there was a search for "grey literature" or "unpublished literature," indicate "yes." SINGLE database, dissertations, conference proceedings, and trial registries are all considered grey for this purpose. If searching a source that contains both grey and non-grey, must specify that they were searching for grey/unpublished lit.*	☐ Yes ☑ No ☐ Can't Answer ☐ Not Applicable

Additional Table 11.0 (Continued.)− Assessing the methodological quality of this systematic review (AMSTAR checklist and score)

AMSTAR Checklist	
Article Name: Job Satisfaction among Critical Care Nurses: A systematic review of contributing factors, individual and organizational	
5. Was a list of studies (included and excluded) provided? A list of included and excluded studies should be provided. *Note: Acceptable if the excluded studies are referenced. If there is an electronic link to the list but the link is dead, select "no."*	☑ Yes ☐ No ☐ Can't Answer ☐ Not Applicable
6. Were the characteristics of the included studies provided? In an aggregated form such as a table, data from the original studies should be provided on the participants, interventions and outcomes. The ranges of characteristics in all the studies analyzed e.g., age, race, sex, relevant socioeconomic data, disease status, duration, severity, or other diseases should be reported. *Note: Acceptable if not in table format as long as they are described as above.*	☑ Yes ☐ No ☐ Can't Answer ☐ Not Applicable
7. Was the scientific quality of the included studies assessed and documented? 'A priori' methods of assessment should be provided (e.g., for effectiveness studies if the author(s) chose to include only randomized, doubleblind, placebo controlled studies, or allocation concealment as inclusion criteria); for other types of studies alternative items will be relevant. *Note: Can include use of a quality scoring tool or checklist, e.g., Jadad scale, risk of bias, sensitivity analysis, etc., or a description of quality items, with some kind of result for EACH study ("low" or "high" is fine, as long as it is clear which studies scored "low" and which scored "high"; a summary score/range for all studies is not acceptable).*	☑ Yes ☐ No ☐ Can't Answer ☐ Not Applicable
8. Was the scientific quality of the included studies used appropriately in formulating conclusions? The results of the methodological rigor and scientific quality should be considered in the analysis and the conclusions of the review, and explicitly stated in formulating recommendations. *Note: Might say something such as "the results should be interpreted with caution due to poor quality of included studies." Cannot score "yes" for this question if scored "no" for question 7.*	☑ Yes ☐ No ☐ Can't Answer ☐ Not Applicable

Additional Table 11.0 (Continued.)− Assessing the methodological quality of this systematic review (AMSTAR checklist and score)

AMSTAR Checklist	
Article Name: Job Satisfaction among Critical Care Nurses: A systematic review of contributing factors, individual and organizational	
9. Were the methods used to combine the findings of studies appropriate? For the pooled results, a test should be done to ensure the studies were combinable, to assess their homogeneity (i.e., Chisquared test for homogeneity, I2). If heterogeneity exists a random effects model should be used and/or the clinical appropriateness of combining should be taken into consideration (i.e., is it sensible to combine?). *Note: Indicate "yes" if they mention or describe heterogeneity, i.e., if they explain that they cannot pool because of heterogeneity/variability between interventions.*	□ Yes ☑ No ☐Can't Answer ☐Not Applicable
10. Was the likelihood of publication bias assessed? An assessment of publication bias should include a combination of graphical aids (e.g., funnel plot, other available tests) and/or statistical tests (e.g., Egger regression test, HedgesOlken). Note: If no test values or funnel plot included, score "no". Score "yes" if mentions that publication bias could not be assessed because there were fewer than 10 included studies.	☑ Yes ☐No ☐Can't Answer ☐Not Applicable
11. Was the conflict of interest included? Potential sources of support should be clearly acknowledged in both the systematic review and the included studies. Note: To get a "yes," must indicate source of funding or support for the systematic review AND for each of the included studies.	☑ Yes ☐No ☐Can't Answer ☐Not Applicable
Total Score	9/11
High Quality	8 to 11
Medium Quality	4 to 7
Low Quality	0 to 3