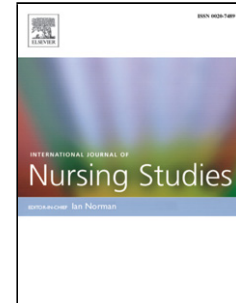


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Job Satisfaction among Critical Care Nurses: A Systematic Review

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Abstract

Background: Nursing shortages, particularly in critical care units, are a major concern worldwide. Job satisfaction is a key factor associated with the high turnover of critical care nurses.

Objectives: The purpose of this systematic review was to synthesize the evidence on critical care nurses' job satisfaction. Specific research questions were: 1. How is job satisfaction defined and measured in studies of critical care nurses? 2a. What is the level of job satisfaction among critical care nurses? 2b. How has it changed over time? 2c. Do nurses' levels of job satisfaction differ by type of critical care unit? 3. What factors are associated with critical care nurses' job satisfaction?

Design: Systematic review

Data sources: We searched five electronic databases from January 1980 to May 2015: MEDLINE, CINAHL, PsychINFO, EMBASE, and Proquest Nursing & Allied Health Source.

Review methods: Two team members independently screened all titles and abstracts and extracted data and assessed methodological quality on all included papers. A narrative synthesis with vote counting was undertaken.

Results: A total of 1,995 titles were identified, of which 61 satisfied our inclusion criteria. Only 24 (39%) of the included studies reported a conceptual definition of job satisfaction. Forty-two different quantitative measures of job satisfaction were identified, of which only 10 (24%) were used in multiple studies. The weighted mean job satisfaction score for critical care nurses across all studies was 56% satisfied and demonstrated fluctuations over time. Four factors showed significant positive relationships to job satisfaction: 1. shift worked - rotating 8- to 12-hours and rotating days, evenings or nights; 2. Autonomy; 3. personnel resources and staffing; and 4.

teamwork and cohesion; while two factors showed significant negative relationships to job satisfaction: 1. job stress; and 2. burnout-emotional exhaustion.

Conclusion: From this review, we did not find any evidence to support relationships between individual (socio-demographic) factors and critical care nurses' job satisfaction. We did however find evidence to support relationships between several employment and organizational factors and job satisfaction. Several of these factors are different from those reported among general hospital nurses and long-term care nursing staff, supporting the need for differential strategies to improve critical care nurses' job satisfaction. While the findings from this review hold promise as potential targets of future job satisfaction interventions, there were several methodological problems inherent in many of the studies.

Key words: critical care; job satisfaction; nurse; systematic review

What is already known about this topic?

- Nursing shortages are currently a major worldwide concern.
- Critical care nurses have higher turnover rates compared to nurses working in any other area.
- Low levels of job satisfaction are a key factor associated with high nurse turnover in critical care units, but a comprehensive understanding of critical care nurses' job satisfaction and its associated factors remains elusive.

What this paper adds?

- Critical care nurses are moderately satisfied with their jobs; levels of job satisfaction varied over time and by the type of critical unit where the nurse was employed
- Empirical evidence relating to the factors that contribute to critical care nurses' job satisfaction indicates the need for continued improvement in their working lives. While several of the factors associated with their job satisfaction are similar to those reported by general hospital nurses, other factors (e.g., burnout-emotional exhaustion and rotating shiftwork) reported by critical nurses were unique to them, supporting the need for differential strategies to improve their job satisfaction.
- The limited methodological quality and use of multivariate statistics, and inconsistency in conceptualizing and measuring critical care nurses' job satisfaction, are major shortcomings of the current body of evidence.

1. Introduction

Adequate staffing of nurses is fundamental to the provision of high quality patient care and to the improvement of patient outcomes (Cho et al., 2009). Today, nursing shortages, particularly in critical care units, are a major worldwide concern. Critical care nurses are experts in their field and possess specialized training, experience, knowledge, and skills, which take time to acquire (Choi et al., 2004, Heinrich, 2001, Kramer and Schmalenberg, 1991). Unfortunately, these highly trained and specialized nurses 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 et al., 2012). Low levels of job satisfaction are a key factor associated with high nurse turnover in critical care units (Bai et al., 2015, McDonald et al., 2012). Therefore, it is

essential to better understand critical care nurses' job satisfaction and its associated factors. This will allow for the design of future interventions that are more likely to be successful at improving critical nurses' job satisfaction, and consequently, improving retention of highly specialized critical care nurses.

2. Literature Review

2.1 Nursing shortages and turnover

There is currently a shortage of nurses available to work clinically, which is expected to continue to rise over the next decade (Aiken and Cheung, 2008, Buchan and Calman, 2004, Nursing, 2014, Rochefort and Clarke, 2010). Critical care nurses have higher turnover rates compared to nurses working in any other departments. For example, in a large pan-Canadian study of 182 units in 41 hospitals, O'Brien-Pallas and colleagues (2010) found the mean annual nursing turnover rate (calculated as the number of nurse voluntary terminations per year divided by the number of actual nurse full time equivalents per year, multiplied by 100) of 19.9%, but with the intensive care units having the highest turnover of any unit at 26.7%. High turnover is associated with negative nursing and patient outcomes, such as high workloads, burnout, and poor quality of patient care (Advisory Committee Health Delivery and Human Resources, 2002, Aiken et al., 2002, Aiken et al., 2002, Browning et al., 2007, De Gieter et al., 2011, Holtom and O'Neill, 2004, Moneke and Umeh, 2013). Nurse turnover is also associated with lost productivity and decreased unit morale in specialty units like intensive care (O'Brien-Pallas et al., 2010, O'Brien-Pallas et al., 2006). In addition to negative nurse and patient outcomes, there are also significant costs associated with nurse turnover. For example, in a cross-country comparative review of 65 hospitals across four countries, cost (standardized to United States Dollars)

associated with nurse turnover (for each RN replaced) ranged from \$20,561 (United States) to \$48,790 (Australia) (Duffield et al., 2014).

2.2 Job satisfaction

2.2.1 Job Satisfaction Theories. There are inconsistencies in the literature with respect to job satisfaction theories and definitions. There are two theoretical approaches used to conceptualize job satisfaction: 1. content theories (Herzberg, 1959, Herzberg, 1966, Maslow, 1943, McClelland, 1961, McGregor, 1960, Saif et al., 2012) and 2. process theories (Adams, 1963, Durant et al., 2006, Hackman and Oldham, 1975, Hackman and Oldham, 1976, Locke, 1969, Porter and Lawler, 1968, Vroom, 1964). Content theories focus on identifying and prioritizing individuals' needs, motives, and goals. When these needs are met, individuals experience satisfaction (Saif et al., 2012). Job satisfaction process theories on the other hand focus on how motivation, needs, and goals are fulfilled (Durant et al., 2006).

2.2.2 Job Satisfaction Definitions. With respect to definitions of job satisfaction, some focus on the global affective response or attitude an individual has toward the job (Locke, 1969, Price, 2002) while others encompass both the overall nature as well as different facets of a job in relation to a person's expectations and perceptions of the components of the work environment (Spector, 1997). These later definitions consider which factors make a job satisfying or not and examine different aspects of the job that can produce satisfaction or dissatisfaction (Lu et al., 2012, Lu et al., 2005).

2.3 Previous systematic reviews on job satisfaction

We identified two systematic reviews regarding job satisfaction among nursing care providers. Lu and colleagues conducted the first systematic review in (2005), and updated it in 2012 (Lu et al., 2012). In their systematic review, they narratively synthesized data on job

satisfaction among general hospital nurses (excluding critical care nurses) from 100 studies. They presented their results as two lists: 1. 35 related factors to job satisfaction of nurses, and 2. 58 predictors of job satisfaction (Lu et al., 2012). Overall, the factors important to nurse job satisfaction from this review could be grouped into three broad categories: 1) individual factors (e.g. age, year of experience, educational level, depression), 2) employment factors (e.g. job stress, autonomy) and 3) organizational factors (e.g. cohesion of the ward nursing team, nurse staffing).

Squires and colleagues conducted a second systematic review in 2015 (Squires et al., 2015). They narratively synthesized 42 studies on job satisfaction among nursing care aids, nursing assistants, and licensed practical nurses in residential long-term care facilities. They drew conclusions on seven individual and four organizational factors in relation to job satisfaction. Of the seven individual factors, two (empowerment, autonomy) had significant positive relationships with job satisfaction, while five (age, gender, educational level, special training, years of experience) were not related to job satisfaction. Of the four organizational factors, two (resources, workload) had significant relationships with job satisfaction; resources had a significant positive relationship with job satisfaction, while workload had a significant negative relationship. The remaining two organizational factors (satisfaction with salary and benefits, job performance) were not related to job satisfaction.

While there are multiple individual study reports on critical care nurses' job satisfaction, this evidence had not yet been synthesized. Therefore, the purpose of this systematic review was to synthesize the evidence on critical care nurses' job satisfaction. The following research questions were addressed: 1. How is job satisfaction defined and measured in studies of critical care nurses? 2a. What is the level of job satisfaction among critical care nurses? 2b. How has it

changed over time? 2c. Do nurses' levels of job satisfaction differ by type of critical care unit? 3. What factors are associated with critical care nurses' job satisfaction?

3. Methods

3.1 Search strategy

We developed the search strategy in consultation with a health sciences librarian. We searched the following electronic databases from January 1980 to May 2015: MEDLINE, CINAHL, PsychINFO, EMBASE, and Proquest Nursing & Allied Health Source. A systematic search conducted as part of our background revealed that the earliest articles published on critical care nurses' job satisfaction were in 1982 (Blair et al., 1982, Dear et al., 1982). Therefore, our search for this review was limited to 1980 onwards. We used key words and MeSH headings/index terms related to critical care nurses' job satisfaction. Our full search strategy is in the *Supplementary Data File - Table 1*.

3.2 Selection criteria

We included studies published in English and French as they were the languages of the research team. Articles needed to be a report of a primary research study that quantitatively measured job satisfaction in registered nurses who provide direct patient care in a critical care unit. We restricted our sample to quantitative measures as we were interested in examining self-reported levels of job satisfaction. We included studies of job satisfaction in other (non registered nurse) care providers only if a separate analysis of registered nurses job satisfaction was provided or could be extracted. There is great variation in what is considered a critical care unit but according to the World Federation of Societies of Intensive and Critical Care Medicine task force, any global definition of critical care unit must acknowledge the variability that exists in the capacity of health care systems to care for the sickest patients (Marshall et al., 2017).

Therefore, for this review we used the following definition of critical care unit: a setting where nursing care is provided to individuals who require high levels of assessment and intervention (Robinson, 2001). For this review, we operationized this definition as including: emergency departments, intensive care units (adults, pediatric and neonatal), coronary care units, operating rooms, post-anesthesia, and labor and delivery rooms. Full inclusion and exclusion criteria are listed in the *Supplementary Data File - Table 2*.

3.3 Screening process

Two team members independently screened the titles and abstracts of all articles identified by the search strategy. Articles that potentially met our inclusion criteria, or where there was insufficient information to make a decision regarding inclusion, were also retrieved and assessed for relevance independently by two team members. Disagreements throughout the study selection process were resolved by consensus and consultation with a third senior team member where necessary.

3.4 Methodological quality assessment

To assess methodological quality of the final set of articles, we used two existing tools: 1. Quality Assessment and Validity Tool for Cross-Sectional Studies (Squires et al., 2011) and 2. Quality Assessment and Validity Tool for Before/After-Cohort Studies (Estabrooks et al., 2009). Each article had a quality appraisal performed by two team members independently. All discrepancies in quality assessment were resolved through consensus.

The Quality Assessment and Validity Tool for Cross-Sectional Studies has a maximum score of 16 points possible 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 possible 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). For purposes of this review, we made the item “Dependent Variable Directly Measured” on both tools not applicable, as an objective measure of job satisfaction does not exist. We obtained a quality score for each article by dividing the total points scored by the total points possible (16 or 18) minus the number of inapplicable points. We then classified the quotient score obtained for each study in one of four categories of methodological quality based on a scoring system developed by de Vet and colleagues (1997): 1. “weak” (≤ 0.50), 2. “low-moderate” (0.51 to 0.65), 3. “high-moderate” (0.66 to 0.79), or 4. “strong” (≥ 0.80). Multiple systematic reviews have utilized both of these quality assessment tools as well as the scoring system described above (Estabrooks et al., 2009, Estabrooks et al., 2003, Squires et al., 2015).

3.5 Data extraction

Two team members independently extracted data from all included papers into Excel spreadsheets. Discrepancies in data extraction were resolved through consensus. We extracted data into five main categories:

1. study information (author(s), year of publication, journal of publication, study’s country or countries of origin, study design, critical care department studied, data collection year, data collection method, sample size, response rate, and statistical analyses conducted);
2. participants’ socio-demographic characteristics (age, gender/sex (as labeled by the authors of each included study), 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);

3. conceptual definitions of job satisfaction and theoretical frameworks used;
4. quantitative job satisfaction measure used (developer(s), development year, number of items, domains and subscales, scoring, reliability, and validity);
5. 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).

3.6 Data synthesis

Research Question 1: How is job satisfaction defined and measured in studies of critical care nurses?

To summarize data on conceptual definitions of job satisfaction, we used a directed content analysis approach (Hsieh and Shannon, 2005). First, we read each definition and categorized the definitions as either global affective approach or facet approach (being the a priori identified approaches to defining job satisfaction), where possible. (Locke, 1969, Price, 2002). Where definitions could not be grouped into one of these two categories, an inductive thematic analysis of the definition(s) for common themes was performed to create new approach categories.

To assess which and how theories and/or conceptual frameworks were used in the included studies, we listed and grouped all theories as: 1. "job satisfaction" related theories with subcategories for content and process theory, or 2. "other" theories. We calculated frequencies (number of included studies) for each theory. To examine how the theory was used in the study, we used Field and colleagues' (2014) five categories for assessing the degree of usage of the

theory in a study as follows:

1. integrated (the theory is integral to the design, delivery, and evaluation of the implementation activities);
2. directed (the theory has influenced project design, but no examples are provided);
3. adapted/combined (the theory is modified or combined with another theory);
4. informed (the theory influences the study in a non-specified general way);
5. referenced (the theory is cited with little or no further explanation).

To assess job satisfaction measures, we calculated frequencies (number of included studies) for each unique measure of job satisfaction identified.

Research Question 2: 2a. What is the level of job satisfaction among critical care nurses? 2b.

How has it changed over time? 2c. Do nurses' levels of job satisfaction differ by type of critical care unit?

To facilitate comparison of job satisfaction scores across the included studies, scores were standardized on a scale from 0 to 100, allowing for a common metric (Clarke, 2007) where sufficient data (i.e., a reported job satisfaction score and the maximum score possible for the measure) was provided in the article to allow for this calculation. 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 and colleagues (2007) used the Minnesota Work Satisfaction Questionnaire that measures 20 job satisfaction items on a 5-point Likert scale. They reported an overall standard mean job satisfaction across the 20 items of 2.26. The result of this standardization calculation ($2.26 / 5 \times 100$) yields a job satisfaction score of 45% (on a scale of 0–100%). This standardization allowed for more accurate comparisons and examinations of

trends in critical care nurses' job satisfaction scores across the included studies. Using these standardized scores, we assessed for changes in job satisfaction scores chronologically and by type of critical care unit.

Research Question 3: What factors are associated with critical care nurses' job satisfaction?

To identify which factors were associated with job satisfaction, we first categorized all factors into one of three categories: 1. individual (personal) factors, 2. employment factors and 3. organizational (facility) factors. These categories emerged from the data and were not decided a priori. Due to substantial heterogeneity in how job satisfaction was measured across the studies, a meta-analysis was not possible. We therefore performed a narrative synthesis with vote counting. That is, the overall assessment of evidence for the association between a factor (individual, employment, or organizational) and job satisfaction was based on the relative number of studies demonstrating, and failing to demonstrate, statistically significant associations. We supplemented this approach by also extracting all associations showing a positive direction of effect and the magnitude of effect for statistically significant effects when it was provided in the article (Grimshaw et al., 2003, Squires et al., 2011). An overall determination of the relationship of the factor to job satisfaction was therefore based on the percentage of studies demonstrating, or failing to demonstrate, statistically significant associations. The following previously established a priori rules were then applied to guide our synthesis (Squires et al., 2015).

1. To conclude whether or not a factor was associated with job satisfaction, the factor had to be assessed in four or more studies. If a factor was assessed in fewer than four studies, it was coded as inconsistent (i.e., insufficient evidence to reach a conclusion).
2. Factors assessed in four or more studies were coded as

- a. significant to critical care nurses' job satisfaction if more than 60% of the statistical or quantitative tests showed 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 tests showed an insignificant relationship between the factor and job satisfaction;
- c. equivocal or mixed, significance to critical care nurses' job satisfaction if fewer than 60% of the statistical or quantitative tests showed a significant or nonsignificant relationship between the factor and job satisfaction.

4. Results

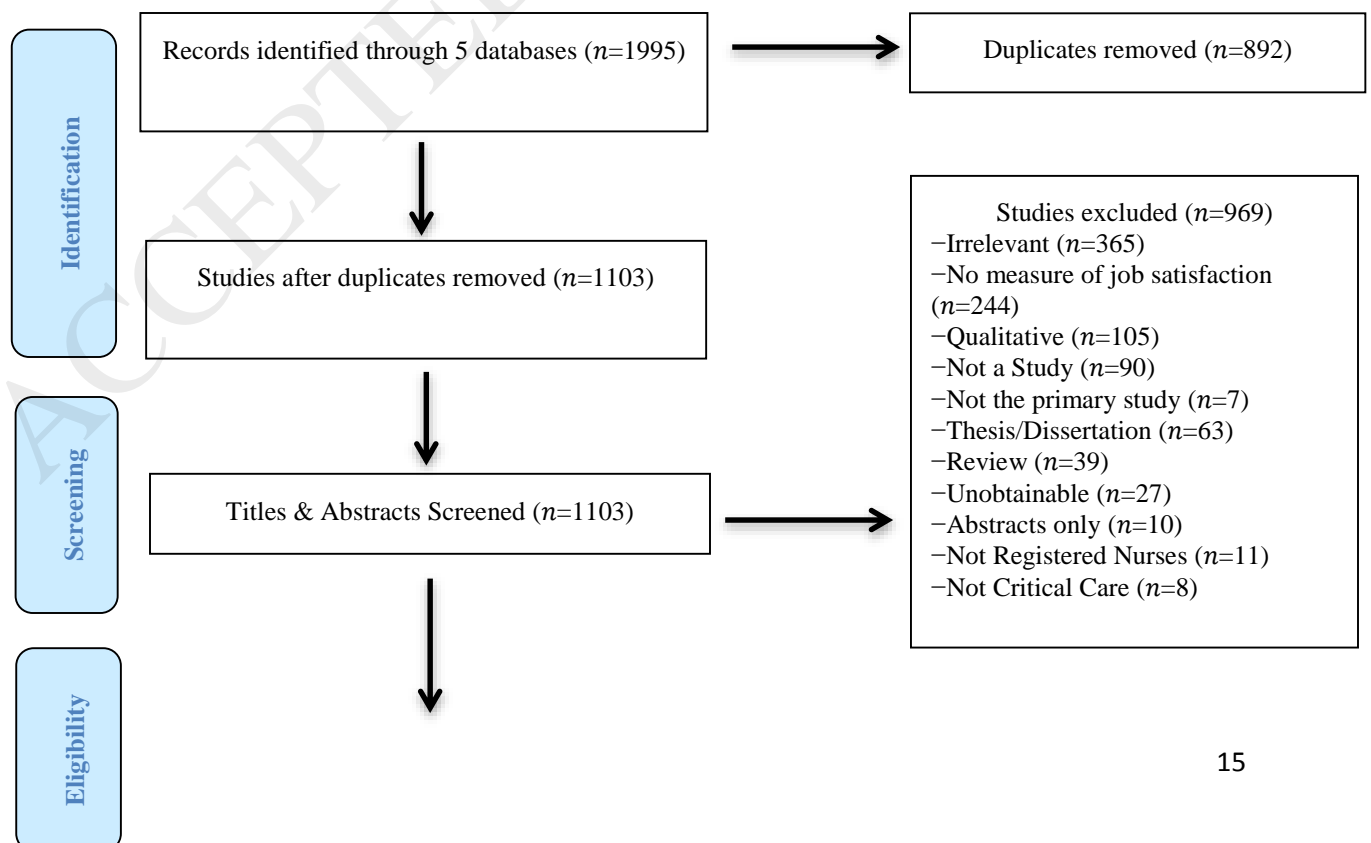
4.1 Description of studies

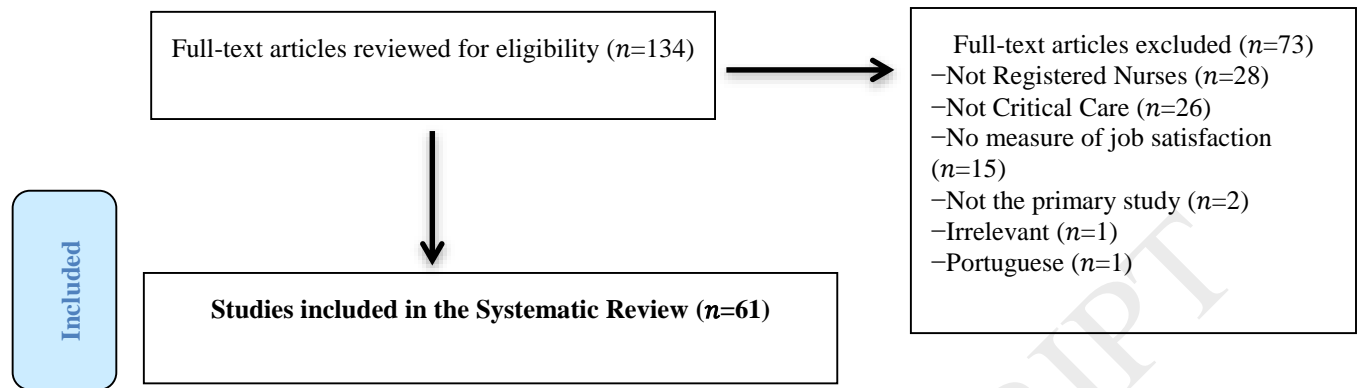
Figure 1 summarizes article selection for this review. The search yielded 1,995 titles and abstracts. Of these, 134 were identified as being potentially relevant after a title and abstract review. A total of 73 articles were excluded for not meeting our inclusion criteria, leaving 61 articles for inclusion in this review.

Of the 61 included studies, the majority of researchers reported using a survey (cross-sectional) study design (n=51, 84%). The remaining researchers used longitudinal study designs (n=3, 5%) or pre- and post-intervention (n=7, 11%) designs. Most studies were conducted in the United States (n=24, 39%) and in adult intensive care units or cardiac/coronary care units (n=25, 41%). Blair & colleagues (1982) and Dear, Weisman, Alexander, & Chase (1982) published the earliest studies, both in 1982. Since this time, 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%).

The sample for our systematic review was comprised of approximately 22,618 critical care nurses. The sample size is approximate because the exact number of critical care nurses was not provided in three studies: Boyle et al. (2006), Loke (2001), and Medcof and Wegener (1992). Demographic variables were inconsistently reported across the studies. Authors most frequently reported on gender or sex; (n=4 studies on sex, n=19 studies on gender (both reporting as male/female) and n=13 studies used “male” or “female” with no labeling as gender or sex). For our purposes, we grouped all “male” together and all “female” together. Females comprised 89.5% (n=14,466) and males 10.5% (n=1,695) of the total sample. The next most frequently reported demographic variable was mean age (n=28 studies, mean = 33 years). All other demographic variables were examined in fewer than 40% of the included studies, making it difficult to summarize them for the overall sample. All demographic details for each individual study are in the *Supplementary Data file – Table 3*.

Figure 1 – PRISMA Flow Diagram





4.2 Methodological quality of included studies

Details of the methodological quality of included studies are reported in the *Supplementary Data File – Tables 4 and 5*. In all studies, an observational design was used: cross-sectional/survey (n=54, 89%) or pre/post (n=7, 11%). Of the 61 included studies, five (8%) were rated as methodologically strong, 21 (34%) as high-moderate, 15 (25%) as low-moderate, and 20 (33%) as weak. Discrepancies in quality assessment related mainly to sample representativeness, treatment of missing data, and appropriateness of the statistical test(s) used.

4.3 Research Question 1: How is job satisfaction defined and measured in studies of critical care nurses?

4.3.1 Definitions of job satisfaction

Less than half (n=24, 39%) of the studies contained a conceptual definition of job satisfaction. Further, there were 24 different definitions across these 24 studies with some studies citing multiple definitions (see *Table 1*). Only three of the definitions were cited in more than one study: 1) “positivity about the work experience” (Sexton et al., 2006) cited in Abdi and colleagues (2015) and Huang and colleagues (2007); 2) “the extent to which nurses are satisfied with their job” (van der Doef and Maes, 1999) cited in Adriaenssens (2015, 2011); and 3) “the

degree to which nurses like their job” (Price and Mueller, 1986) cited in Boyle and colleagues (1996) and Mrayyan (2006).

Using directed content analysis, we coded the 24 definitions into four job satisfaction approaches: 1. global affective approach (overall feeling of job satisfaction), 2. facet approach (outlines different facets of the work environment that affects overall job satisfaction), 3. expectations and needs approach (overall job satisfaction is based on the fulfillment of an individual’s needs and expectations), and 4. well-being approach (job satisfaction is based on the individual’s well-being) (Table 1). Most definitions (n=11, 46%) fell under the global affective approach, followed by the facet approach (n=9, 38%), expectations and needs approach (n=3, 12%), and lastly, well-being approach (n=1, 4%).

Table 1 - Conceptual definitions of job satisfaction (N=24 Studies)

Approach to Defining Job Satisfaction	Definition of Job Satisfaction	Frequency	Citation
Global Affective Approach (n=11)	The extent to which nurses are satisfied with their job (van der Doef and Maes, 1999)	2	Adriaenssens et al. (2011) Adriaenssens et al. (2015)
	Positivity about the work experience (Sexton et al., 2006)	2	Abdi et al. (2015) Huang et al. (2007)
	The degree to which nurses like their job (Price and Mueller, 1986)	2	Boyle et al. (1996) Mrayyan (2006)
	Overall measure of the degree to which employees are satisfied and happy with their job (Boumans and Landeweerd, 1994)	1	Boumans and Landeweerd (1994)
	The extent to which people like their jobs (Stamps, 1997, p.13)	1	Boyle et al. (2006)
	The feeling employees have about their jobs in general (Smith et al., 1975)	1	Loke (2001)
	Nurses' affective response to the job (Smith et al., 1975)	1	Dear et al. (1982)
	The affective orientation that employees have towards their work (Lu et al., 2005)	1	Sawatzky and Enns (2012)

Approach to Defining Job Satisfaction	Definition of Job Satisfaction	Frequency	Citation
	An emotional response and behavioural expression that reflects an individual's evaluation of his or her work, working life, and working environment (Çam et al., 2005, Golbasi et al., 2008, Kahraman et al., 2011)	1	Özden et al. (2013)
	Liking or enjoying one's job (McDonald et al., 2012)	1	McDonald et al. (2012)
	One's overall satisfaction in the emergency department setting (Lin et al., 2011)	1	Lin et al. (2011)
Facet Approach (n=9)	Consists of feelings the worker has towards various aspects of the job (Herzberg, 1966, Walrath et al., 1979)	1	Blair et al. (1982)
	The degree of positive affect towards a job or its components (Adams and Bond, 2000)	1	Zhang et al. (2013)
	Individual employee's evaluation of the work environment (Smith, 1963)	1	Duxbury et al. (1984)
	A multidimensional construct made up of elements essential to enjoyment and fulfillment in a person's job. Professional job satisfaction 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 et al., 1985)	1	Bratt et al. (2000)
	Satisfaction with extrinsic rewards, scheduling, family/work balance, co-workers, interaction, professional opportunities, praise/recognition, and control/responsibility (Mueller and 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 et al. (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)

Approach to Defining Job Satisfaction	Definition of Job Satisfaction	Frequency	Citation
	A complex, multidimensional construct that captures reactions to specific components of work and the work environment (Stamps, 1997, p.13)	1	Boyle et al. (2006)
	Where a task is experienced as stimulating. Job satisfaction is a multi-faceted term and its meaning can vary from individual to individual (Antonovsky, 1987, Mullins, 2002)	1	Forsgren et al. (2009)
Expectations & Needs Approach (n=3)	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, Musal et al., 1995)	1	Arikan et al. (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 and Martin, 2000, Lu et al., 2012, Sahin and Yilmaz, 2007)	1	Cilingir et al. (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 et al. (1996)
Well-being Approach (n=1)	Key indicator of well-being for employees (Lin et al., 2012)	1	Lin et al. (2012)

4.3.2 Job satisfaction theories

Of the 61 included studies in our review, only 23 (38%) included mention of a theoretical framework. Of these, seven used a job satisfaction theory. There were four different job satisfaction theories used in these seven studies.

We applied Field and colleagues' (2014) five categories of theory application to the seven studies that reported a job satisfaction theory. As can be seen in *Table 2*, the various

researchers who used these theories applied them in different ways, ranging from little use (i. e., referenced) to the highest level of use (i.e., Integrated).

Table 2 - Use of job satisfaction theories (N=4 theories)

Theory Type	Theory Name (Developer)	Frequency of Use	Citation	Field's Category of Use
Process Job Satisfaction Theories	The Causal Model of Job Satisfaction for Nurses (Blegen & Mueller, 1987)	1	Freeman and O'Brien-Pallas (1998)	Integrated
Content Job Satisfaction Theories	Hierarchy of Needs (Maslow, 1970)	2	Manley et al. (1996) Moneke and Umeh (2013)	Adapted/Combined Adapted/Combined
	Theory of Motivation Dual Factor Theory of Job Satisfaction Motivation-Hygiene Theory (Herzberg, 1959, 1966)	5	Blair et al. (1982) Duxbury et al. (1984) Manley et al. (1996) McGregor (1960) Williams (1990)	Integrated Referenced Informed Adapted/Combined Adapted/Combined
Un-categorized Job Satisfaction Theory	The conceptual model of job satisfaction and turnover (Bratt et al., 2000)	1	Bratt et al. (2000)	Referenced

4.3.2 Job satisfaction measures

Forty-two different measures of job satisfaction were reported in the 61 studies. Of the 42 measures, 10 (9 multi-item and one single item) were reported in more than one study (See

Supplementary Data File, Table 6). All remaining measures (n=32, 76%) were only used in a single study. The nine multi-item measures were: 1) the Index Work Satisfaction (n=5 studies); 2) the Minnesota Satisfaction Questionnaire (n=5 studies); 3) the Nursing Job Satisfaction Scale (n=4 studies); 4) the Safety Attitudes Questionnaire (n=3 studies); 5) the Job Diagnostic Survey (n=3 studies); 6) the Leiden Quality of Work Questionnaire for Nurses (n=2 studies); 7) the Job in General Scale (n=2 studies); 8) The National Database of Nursing Quality Indicators RN Satisfaction Survey (n=2 studies); and 9) the Job Satisfaction Survey (n=2 studies). The one single-item measure that was used in more than one study, Overall Job Satisfaction, was reported in two different studies conducted by the same author (Bai et al., 2013, Bai et al., 2015). Both studies (2013, 2015) included the same sample of critical care nurses, and reported the same overall job satisfaction score. Further details of these 10 instruments used in multiple studies can be found in the *Supplementary Data File – Table 6*.

4.4 Research Question 2: 2a. What is the level of job satisfaction among critical care nurses? 2b. How has it changed over time? 2c. Do nurses' level of job satisfaction differ by type of critical care unit?

4.4.1 Level of job satisfaction

We identified 46 studies (75% of included studies) that reported a job satisfaction score for critical care nurses. In the majority (n=42, 91%) of these studies, researchers reported sufficient information (job satisfaction score plus maximum possible score for the measure) to allow us to standardize the job satisfaction score. The average standardized overall job satisfaction score was 66% satisfied within a range of 43% (Dai et al., 2009) to 88% (Forsgren et al., 2009, Moneke and Umeh, 2013). The average (weighted for sample size) standardized job

satisfaction score across all studies was slightly lower at 56% satisfied. Standardized scores for each individual study can be found in the *Supplementary Data File – Table 7*.

4.4.2 Job satisfaction over time

Fluctuations in critical care nurses' job satisfaction scores was evident when we arranged them chronologically, grouped into five-year ranges (see *Table 3*). The lowest job satisfaction scores were in studies published between 2006-2010 (mean weighted standardized job satisfaction score of 50% satisfied) while the highest scores were seen between 1991-1995 (mean weighted standardized job satisfaction score of 79% satisfied). These results however must be interpreted cautiously as there is the possibility of confounding due to geography and type of critical care unit. There was considerable variation in standardized job satisfaction scores between individual studies. Forsgren & colleagues in 2009, and Moneke & Umeh in 2013 reported the highest job satisfaction scores (88% satisfied) with emergency nurses in Sweden and mixed critical care nurses in the United States respectively (Forsgren et al., 2009, Moneke and Umeh, 2013). Dai & colleagues (2009), on the other hand, reported the lowest job satisfaction score (43%) which was among nurse anesthetists in Taiwan.

Table 3 – Mean Weighted Standardized Job Satisfaction Scores by Five Year Ranges

Year Range	Number of Studies	Total Sample Size	Mean Weighted Standardized Job Satisfaction Score	Citations
1981-1985	3	578	75%	Dear et al. (1982) Norbeck (1985) Norbeck (1985)
1986-1990	2	42	61%	Carnevale et al. (1987) Williams (1990)
1991-1995	2	107	79%	Pike (1993) Oermann (1995)
1996-2000	6	2,483	63%	Al-Ma'aitah et al. (1996) Boyle et al. (1996) Iskera-golec et al. (1996)

Year Range	Number of Studies	Total Sample Size	Mean Weighted Standardized Job Satisfaction Score	Citations
				Song et al. (1997) Freeman and O'Brien-Pallas (1998) Bratt et al. (2000)
2001-2005	3	237	75%	Loke (2001) Kuokkanen and Katajisto (2003) Dodd-McCue et al. (2004)
2006-2010	10	11,515	50%	Boyle et al. (2006) Mrayyan (2006) Tummers et al. (2006) Arikan et al. (2007) Huang et al. (2007) Chen et al. (2009) Cho et al. (2009) Dai et al. (2009) Forsgren et al. (2009) Rocheffort and Clarke (2010)
2011-2015	16	4,866	64%	Lin et al. (2011) Cilingir et al. (2012) Klopper et al. (2012) Lin et al. (2012) McDonald et al. (2012) Bai et al. (2013) Block et al. (2013) Choi et al. (2013) Iglesias and de Bengoa Vallejo (2013) Moneke and Umeh (2013) Myhren et al. (2013) Özden et al. (2013) Panunto and Guirardello (2013) Zhang et al. (2013) Abdi et al. (2015) Bai et al. (2015)

4.4.3 Job satisfaction by type of unit

Nurses in mixed critical care settings (n=4 studies, 371 nurses) and emergency departments (n=3 studies, 532 nurses) reported the highest levels of job satisfaction at 73% and 72% satisfied respectively. This was followed by nurses working in the adult intensive and coronary care units (n=18 studies, 4,389 nurses) at 60% satisfied, and undefined critical care units (n=10 studies, 10,471 nurses) and 'other' critical care units (neonatal intensive care unit,

pediatric intensive care unit, operating room, labor and delivery) (n=7 studies, 4,065 nurses) at 53% and 57% satisfied respectively.

4.4 Research Question 3: What factors are associated with critical care nurses' job satisfaction?

In 24 (39%) of the included studies, our inclusion criteria of reporting on statistical associations between critical care nurses' job satisfaction and individual, employment and/or organizational factors in four or more studies, was met. Within these 24 studies, 10 factors were assessed: 4 individual (personal) factors, 4 employment factors, and 2 organizational (facility) factors. In Table 4 we identify and define these 10 factors, provide details of their statistical effects on job satisfaction, including direction of effect and significance, as well as provide our overall conclusion of its relationship job satisfaction. A listing of factors, and their associations (including direction of effect and significance) with job satisfaction, of factors not meeting our four study a priori set rule for synthesis, are summarized *Supplementary Data File – Table 8*.

As illustrated in Table 4, we were able to draw conclusions on 9 of the 10 factors assessed in four or more studies. Of the individual four individual factors included in Table 4, three (age, gender/sex, education) were not significantly associated with job satisfaction overall. The one remaining individual factor (career experience) displayed mixed results in relation to job satisfaction precluding us from being able to make a conclusion on the factor; significant positive associations were reported in four studies, a significant negative relationship in one study, and no relationship in three studies. Of the four employment factors, we found two factors (job stress, burnout-emotional exhaustion) to have a significant negative relationship with job satisfaction and two factors (shift worked (flexibility in shifts) and autonomy) to have a significant positive relationship with job satisfaction. The two organizational factors (personnel resources and

staffing, teamwork and group cohesion) assessed in 4 or more studies both had significant positive relationships with critical care nurses' job satisfaction.

Table 4 – Associations between individual, employment, and organizational factors and critical care nurses' job satisfaction (N=24 studies)

Category	Citation	Significance	Sample Size	Conclusion
Individual (Personal) Factors				
Age <i>An individual's age in years.</i> (n=8 studies)	Baggs and Ryan (1990)	NS	68	1/8 studies found a positive significant relationship between age and job satisfaction
	Ehrenfeld (1990)	NS	167	
	Bratt et al. (2000)	NS	1,973	7/8 studies found a nonsignificant relationship between age and job satisfaction Overall: NS (no relationship between age and critical care nurses' job satisfaction)
	Loke (2001)	S (+t=2.973)	97	
	Tummers et al. (2006)	NS	184	
	Adriaenssens et al. (2011)	NS	254	
	Moneke and Umeh (2013)	NS	137	
	Adriaenssens et al. (2015)	NS	170	
Gender/Sex <i>An individual's gender or sex (term used as per study, but always a dichotomous choice of male or female.)</i> (n=7 studies)	Ehrenfeld (1990) – sex or gender not specified	NS	167	All 7 studies found a nonsignificant relationship between gender/sex and job satisfaction
	Loke (2001) - Gender	NS	97	
	Tummers et al. (2006) - Gender	NS	184	Overall: NS (no relationship between gender/sex and critical care nurses' job satisfaction)
	Adriaenssens et al. (2011) - sex or gender not specified	NS	254	
	Moneke and Umeh (2013) - sex or gender not specified	NS	137	
	Adriaenssens et al. (2015) - sex or gender not specified	NS	170	
Bai et al. (2015) - Sex	NS	706		

Category	Citation	Significance	Sample Size	Conclusion
Career Experience <i>Number of years worked as a nurse.</i> (n= 8 studies)	Norbeck (1985)	S (+ r=.23, F=10.3)	180	4/8 studies found a significant relationship between career experience and job satisfaction- 3 found a positive relationship while 1 found a negative relationship. 3/8 studies found found a nonsignificant relationship between career experience and job satisfaction Overall: Equivocal (mixed results with respect to whether or not there is a relationship between career experience and critical care nurses' job satisfaction)
	Norbeck (1985)	S (- r= .26, F= 11.85)	164	
	Oermann (1995)	NS	59	
	Loke (2001)	S (+F=12.438)	97	
	Adriaenssens et al. (2011)	NS	254	
	Moneke and Umeh (2013)	NS	137	
	Bai et al. (2015)	S (+ F=20.77)	706	
Education <i>Level of education obtained e.g. diploma, bachelor's degree, graduate degree.</i> (n=7 studies)	Baggs and Ryan (1990)	NS	68	All 7 studies found a nonsignificant relationship between education and job satisfaction Overall: NS (no relationship between education and critical care nurses' job satisfaction)
	Bratt et al. (2000)	NS	1,973	
	Loke (2001)	NS	97	
	Adriaenssens et al. (2011)	NS	254	
	Moneke and Umeh (2013)	NS	137	
	Adriaenssens et al. (2015)	NS	170	
	Bai et al. (2015)	NS	706	
Employment Factors				
Burnout-Emotional Exhaustion <i>Debilitating emotional fatigue brought about by unrelieved work stress.</i> (n=5 studies)	Tummers et al. (2006)	S (- r=0.420)	184	4/5 studies showed a significant negative relationship between burnout: emotional exhaustion and job satisfaction Overall: Significant negative relationship between burnout-emotional exhaustion and critical care nurses' job satisfaction – as
	Block et al. (2013)	S (- r=0.452)	55	
	Iglesias and de Bengoa Vallejo (2013)	NS	74	
	Özden et al. (2013)	S (- r=0.416)	138	
	Adriaenssens et al. (2015)	S (- r=0.30)	170	

Category	Citation	Significance	Sample Size	Conclusion
				burnout- emotional exhaustion increases, job satisfaction decreases
Shift Worked <i>Flexibility in shifts</i> (n= 5 studies)	Norbeck (1985) Norbeck (1985) Adriaenssens et al. (2011) Moneke and Umeh (2013) Adriaenssens et al. (2015)	S (+ r=0.27, F=9.8) S (+ r=0.28, F=8.99) S (+ β = 0.12) NS NS	180 164 254 137 170	3/5 studies found a significant positive relationship between shift worked and job satisfaction Overall: Significant positive relationship between shift worked and critical care nurses' job satisfaction – with an increase in rotating shifts, job satisfaction increases
Job Stress <i>The amount of stress that nurses perceive as they perform their duties at work.</i> (n= 7 studies)	Norbeck (1985) Norbeck (1985) Ehrenfeld (1991) Bratt et al. (2000) McDonald et al. (2012) Iglesias and de Bengoa Vallejo (2013) Gauthier et al. (2015)	S (– r=0.24, F=12) S (+ r=0.24, F=8.96) NS S (– r=0.16) S (– r=0.56) S (+ Tb (Kendall's tau – b) =0.39) S (– r=0.47)	180 164 248 1973 109 74 45	6/7 studies found a significant relationship. 4 found negative relationships and 2 found positive relationship to job satisfaction Overall: Significant negative relationship between job stress and critical care nurses' job satisfaction – as job stress increases, job satisfaction decreases
Autonomy <i>Having the authority to make clinical decisions and the freedom to act on them.</i> (n=4 studies)	Boumans and Landeweerd (1994) Freeman and O'Brien-Pallas (1998) McDonald et al. (2012) Bai et al. (2013) and Bai et	S (+ r=0.14) S (+ β =0.331, B=0.62) S (+ Tb (Kendall's tau – b) = 0.44) S (+ r=0.34)	305 38 109 706	All 4 studies found a significant positive relationship between autonomy and job satisfaction Overall: Significant positive relationship between autonomy and critical care nurses' job satisfaction – with an increase in autonomy, job

Category	Citation	Significance	Sample Size	Conclusion
	al. (2015) (two different studies but reported the same sample and same analysis for autonomy and job satisfaction)			satisfaction increases
Organizational (Facility) Factors				
Personnel Resources and Staffing <i>Having an adequate number and mix of staff.</i> (n= 6 studies)	Rochefort and Clarke (2010)	S (+B=0.22)	329	5/6 studies found significant positive relationships between staffing/personnel resources and job satisfaction Overall: Significant positive relationship between personnel resources and staffing and critical care nurses' job satisfaction – with an increase in personnel resources/staffing, job satisfaction increases
	Adriaenssens et al. (2011)	NS	254	
	McDonald et al. (2012)	S (+ Tb (Kendall's tau – b) = 0.46)	190	
	Sawatzky and Enns (2012)	S (+ Est=1.11)	261	
	Bai et al. (2013) and Bai et al. (2015) (two different studies but reported the same sample and same analysis for resources and staffing and job satisfaction)	S (+ r= 0.47)	705	
	Block et al. (2013)	S (+ r= 0.307)	55	
Teamwork and Group Cohesion <i>The general sense of individuals wanting to stay in a particular group.</i> (n = 4 studies)	Adriaenssens et al. (2015)	S (+ r=0.24)	170	All 4 studies found significant positive relationships between teamwork and group cohesion and job satisfaction Overall: Significant positive relationship between teamwork and group cohesion and critical care nurses' job satisfaction – with an increase in teamwork/group cohesion, job satisfaction increases
	Bratt et al. (2000)	S (+ r=0.52)	1973	
	Forsgren et al. (2009)	S (+ r=0.24)	74	
	McDonald et al. (2012)	S (+ Tb (Kendall's tau – b) =0.53)	109	
	Block et al. (2013)	S (+ r=0.610)	55	

+ = positive relationship, - = negative relationship, NS = not significant, S = significant (p<.05)

5. Discussion

5.1 *Summary of findings*

We conducted a systematic review to examine the available evidence on critical care nurses' levels of job satisfaction and the factors, individual, employment, and organizational, associated with their job satisfaction. The accumulated body of evidence showed little consistency with respect to the use of definitions, theories and measures of job satisfaction, as well as with the investigation of common factors that may be related to job satisfaction. We found that critical care nurses, overall, were not very satisfied with their jobs (56% satisfied). Despite lack of consistency in the measurement of factors related to job satisfaction, we were able to draw conclusions on nine factors that were assessed in multiple studies. We concluded that four factors were positively associated with critical care nurses' job satisfaction: 1. shift worked (rotating, 8 to 12-hours (days, evenings or nights); 2. autonomy; 3. personnel resources and staffing; and 4. teamwork and group cohesion. Two factors were negatively associated with job satisfaction: 1. job stress and 2. burnout-emotional exhaustion. Finally, three factors were found to not have an association with critical care nurses' job satisfaction overall: 1. gender/ sex, 2. age, and 3. level of education.

5.2 *Comparison with previous systematic reviews*

Two previous systematic reviews on job satisfaction exist: 1. registered nurses in general hospital settings, which does not include critical care units (Lu et al., 2012, Lu et al., 2005) and 2) care aids, nursing assistants, and licensed practical nurses in long-term care residences (Squires et al., 2015). Neither of these previous reviews assessed levels of job satisfaction. Therefore, we cannot say with certainty if our average job satisfaction score of 56% satisfied for critical care nurses is in line with nurses in other sectors or clinical areas. Most studies on nurse

job satisfaction assume low levels and focus on factors related to nurse job satisfaction and/or the consequences of job satisfaction, rather than on exact levels of job satisfaction. A search of primary studies on nurse job satisfaction levels however revealed similar levels in other sectors to what we obtained for critical care nurses. For example, McGlynn and colleagues (2012), in a study of 182 registered nurses in general units of four US acute care hospitals, also found that nurses were moderately (47th percentile) satisfied. Similarly, Hayes and colleagues (2015), in a study of 417 nurses employed in hospital and satellite haemodialysis units in Australia and New Zealand, found nurses were moderately satisfied (62%, mean of 191/308 x 100). While Choi and colleagues (2011), in a study of 863 registered nurses from 282 long-term care facilities, found nurses in long-term care were marginally more satisfied (72% (mean of 2.91/4 x100)).

In the two previous systematic reviews of nurse job satisfaction, as well as in the review presented here, researchers explored factors associated with job satisfaction. This allowed us to compare the factors associated with critical care nurses' job satisfaction identified from this review with nursing care providers in other settings and nursing roles. Supplementary Data File – Table 9 provides a summary of this review to the previous reviews. Only in our review, however, were conceptual definitions, theories, and measures of job satisfaction identified, and overall levels of job satisfaction reported. The inclusion of this information significantly extends our understanding of nurse job satisfaction.

Autonomy was the only factor that was assessed in all three reviews with the same results in each review; all reported a significant positive relationship between autonomy and job satisfaction. Burnout-emotional exhaustion and shift worked were also assessed in all three reviews but only found to have significant relationships with job satisfaction in our systematic review in critical care nurses. While this may be due to differences in role (registered nurse

versus nursing care aid) and setting (critical care, general hospital, and long-term care), it may also be due to differences in the methodological approaches taken. For example, Lu and colleagues (2012) reported on all the factors examined in any one of the 100 included studies, whereas in this review and in the Squires and colleagues' (2015) review, more stringent synthesis criteria was enforced requiring a factor to be examined in four or more included studies before drawing a conclusion.

5.3 Limitations of job satisfaction literature in critical care nursing

5.3.1 Methodological quality of included studies

In this systematic review, we found that the majority of studies (n=56, 92%) were of weak or moderate methodological quality, demonstrating a need for well-designed and robust studies in the field of critical care nurses' job satisfaction research. Our findings were similar to those of Squires and colleagues (2015), who found in their systematic review of job satisfaction with nurse aides, nursing assistants, and licensed practical nurses, that 89% of studies were of only weak or moderate methodological quality. Lu (2012, 2005) did not assess methodological quality. Strong methodology is necessary to reduce bias and increase confidence in the research, its results, and in the critical care nursing job satisfaction field as a whole. The findings from well-designed studies should lead to better-informed interventions and strategies that could improve job satisfaction, quality of care, and recruitment and retention of critical care nurses.

5.3.2 Statistical rigor of included studies

Few researchers (n=13, 21.3%) of the studies in our review used multivariate analyses to assess the relationships between factors (individual, employment, organizational) and critical care nurses' job satisfaction despite having the data to do so. 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 the critical care nursing field is dominantly based on simple bivariate analysis examining the association between a single factor and job satisfaction. We need to move beyond these simple bivariate statistical analyses; future researchers should 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.

5.3.3 Conceptual clarity and quantitative measures

Few researchers (n=24, 39%) defined or used theories of any kind (n=23, 38%) to conceptualize job satisfaction. Additionally, measures of job satisfaction varied widely across the studies included in this systematic review. To compare job satisfaction levels across studies and be confident in the reliability and validity of the results of studies, conceptual clarity and consistent measurement is required. Researchers for the included studies also did not consistently report independent variables (i.e., the individual and organizational factors) making these variables difficult to compare across studies. For instance, researchers did not use a single common demographic variable and some research teams (n=16) failed to report on any demographic variables. To build the science behind critical care nurses’ job satisfaction and the factors associated with it, future researchers should utilize consistent measurements of both the independent and dependent variables.

5.4 Implications for Nursing Through conducting this systematic review we found that critical care nurses are not very satisfied with their jobs (56% satisfied overall), and that their satisfaction varies over time. Given current nursing shortages, there is a need to increase critical

care nurses' job satisfaction to ensure their retention and prevent further turnover of these highly specialized nurses. When compared to the review of general hospital nurses' job satisfaction (Lu et al., 2012, Squires et al., 2015), there were three factors that were assessed in both samples and found to be important to job satisfaction in both samples: 1. job stress (negatively associated with job satisfaction) and 2. autonomy and 3. cohesion/teamwork (both positively associated with job satisfaction). Future job satisfaction interventions that work to reduce job stress and increase nurse autonomy and teamwork, could be implemented hospital-wide to improve job satisfaction of all nurses, irrespective of the department or unit where they are employed.

In our review, closely related to job stress, we also found burnout-emotional exhaustion, to also be negatively associated with critical care nurses' job satisfaction. Burnout was not assessed as a separate factor in the review of general hospital nurses. With job stress and burnout-emotional exhaustion being two factors that were consistently negatively associated with critical care nurses' job satisfaction; this is an important area to target in future interventions to improve job satisfaction in critical care units. Workplace stressors that lead to job stress can come from a variety sources, for example: environmental, relational, or role-related (Zeller and Levin, 2013). Attempts to address workplace stress by changing the physical environment, improving relationships, and/or reducing workload can involve straightforward approaches, once the source of stress has been identified (Spurgeon et al., 2012). However, several unique stress-promoting factors inherent in the critical care nursing role, such as dealing with critical life threatening illnesses, and supporting patients and families under conditions of extreme loss are often not amendable to straightforward approaches (Zeller and Levin, 2013). Managing these kinds of job stress demands require unique workplace interventions at the level of the critical care unit. Examples of such interventions that have been successfully implemented after the

source of job stress is identified include cognitive behavioral training, relaxation training, and music therapy (Edwards and Burnard, 2003, Marine et al., 2006, Zeller and Levin, 2013).

In our review, we also found that working rotating shifts and having sufficient staffing/personnel resources were positively associated with critical care nurses' job satisfaction. These factors were not assessed in the studies included in the review on general hospital nurses (Lu et al., 2012), so we cannot say definitely whether they should be part of hospital wide initiatives to improve nurse job satisfaction or only more locally, in critical care unit initiatives. Twenty-four hour work is unavoidable in nursing departments such as critical care units. However, organizations can offer rotating (in terms of hours worked – 8 and 12, and time of day worked– day, evening, and night) shifts to reduce some of the negative health effects and job dissatisfaction associated with working at night. Several organizational interventions for introducing rotating shifts have been studied and found to have positive health benefits for nurses. A recent systematic review (Neil-Sztramko et al., 2014), based on 15 studies, found positive health effects for nurses with: changing from backward (counter clock wise) to forward (clockwise) rotation and increasing the speed of rotation; changing from eight-hour to twelve-hour shifts; and flexible working conditions, including self-scheduling.

While several studies, as indicated above, have found the introduction of rotating shifts to hold promise in reducing nurse job dissatisfaction, potential logistical/operational barriers which will vary by organization, will need to be considered prior to implementation.

5.4 Review Limitations

While rigorous methods were used for this review, there were limitations. First, there are two main approaches to conducting systematic reviews – lumping or splitting (Squires et al., 2013). 'Splitting' is focusing on a single, narrow well-defined question, while 'lumping'

broadens the scope at the question, outcome and study type level. We took a lumping approach in this review. As a result, we adopted a broad definition of critical care, resulting in the inclusion of a wide variety of unit types rather than focusing on a single narrower conceptualization of critical care as an intensive care unit. The advantages of lumping as we did are that it: 1) reduces the risk of bias and 2) allows for generalizability across more critical care settings. A disadvantage of this approach is that it resulted in a heterogeneous sample of included studies; we had a wide variety of critical care units in our sample but none in sufficient quantity to allow for meaningful subgroup analyses. For example, our results showed that critical care nurses' job satisfaction levels fluctuated over time, but we were not able to further explore if this is a true effect or if there may be some confounding by geography and type of critical care unit, due to our small cell sizes. This also limits our ability to generalize the findings to all critical care unit types. A second disadvantage is that our lumping approach resulted in different subsets of the included studies being used to answer our three research questions as not all studies addressed all 3 research questions.

6. Conclusion

Our research reveals that critical care nurses are, at best, moderately satisfied with their jobs and that their levels of job satisfaction fluctuated over time. We isolated select employment (working rotating shifts, job stress, burnout-emotional exhaustion) and organizational (personnel resources and staffing, and teamwork and cohesion) factors that are important to critical care nurses' job satisfaction levels. Equally important, we did not identify any individual factors to be important to critical care nurses' job satisfaction and found three individual factors were not related to job satisfaction: age, gender/sex, and education level. The employment and organizational characteristics identified as playing a role in job satisfaction may hold promise as

targets for future interventions. While each of these factor are potentially modifiable, some can be more easily manipulated (e.g., offering rotating shifts, ensuring resources and staffing, and promoting teamwork and cohesion) and thus incorporated into interventions to increase job satisfaction more readily.

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