

Health Care Professionals' Experiences After Making Errors in Practice:

An Integrative Review of the Literature

By

Tara Mants, RN, BScN University of British Columbia

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Supervisory Committee

Dr. Elizabeth Banister, RN, PhD, RPsych, School of Nursing

Professor, Supervisor

Dr. Lenora Marcellus, RN, BSN, PhD, School of Nursing

Associate Professor, Committee Member

Abstract

There is a common expectation among health care professionals to "do no harm" and, while this is the ideal, it is not the reality. Despite the best intentions of health care professionals, errors do occur. The objectives of this review were to explore how health care professionals were affected by their involvement in adverse events and to determine the types of support health care professionals required after making an error. An integrative literature review of eleven research articles was conducted to explore common themes. These eleven studies included four quantitative studies, six qualitative studies, and one mixed-methods study. The results of this literature review indicate that following an error, health care professionals experience emotional distress on both a personal and a professional level. Health care professionals require individual as well as organizational support to help them cope with the error. The findings of the integrative literature review have important implications for nursing practice, nursing leaders and advanced practice nursing.

Keywords: medical error, adverse event, medication error, nursing error, second victim, coping

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Table of Contents

Acknowledgements.....	4
Abstract	3
Table of Contents.....	5
Chapter One: Introduction.....	7
Definitions.....	10
Error.	10
Health care professional.	10
Chapter Two: Approach to Inquiry.....	12
Methodological Approach	12
Identifying the problem.	13
Conducting a literature search.....	13
Inclusion and exclusion criteria.....	15
Studies included in review.....	16
Evaluating the data.....	17
Analyzing the data.	18
Reducing the data.....	18
Displaying the data.....	18
Comparing the data.....	19
Drawing conclusions and verification.	19
Presenting the review.	20
Theoretical Perspective: Lazarus' Cognitive-Motivational-Relational-Theory.....	26
Emotions within the CMRT.	30
Chapter Three: Findings.....	34
Emotional Effects on the Health Care Professional.....	34
Guilt-shame	35
Anxiety-fear.....	36

Anger	37
Sadness	37
Coping with the Error	38
Problem-focused coping	38
Emotion-focused coping	39
Social Support Needs.....	40
Organizational Support Needs	42
Long Term Effects.....	43
Models Emerging from the Research	45
Theory of self-reconciliation	45
Six stages of recovery	46
Chapter 4: Discussion	48
Emotional Distress.....	48
Coping Strategies	50
Long-Term Effects	52
Support Needs	52
Theoretical Perspective.....	54
Limitations of this Review	55
Implications for Nursing Practice.....	56
Implications for Nursing Education	58
Suggestions for Future Research.....	62
Conclusion	63
References	65
Appendix A.....	77
Appendix B Critical Review Form – Quantitative Studies	78
Appendix C Critical Review Form – Qualitative Studies (Version 2.0).....	82
Appendix D Primary and Secondary Appraisal Decisions for Guilt and Shame	88

Chapter One: Introduction

Historically, errors made by health care professionals were thought to be rare events. It was not until the year 2000 when the Institute of Medicine (IOM) published its seminal report, *To Err is Human* (Corrigan, Donaldson, & Kohn, 2000), that the actual frequency of errors was brought to the forefront of study (Crigger, 2005). The IOM estimated that close to 100,000 Americans died every year as a result of medical errors (Corrigan et al., 2000). As this statistic only reflects errors that cause patient death, the actual number of errors made by health care professionals is arguably higher (National Quality Forum, 2010). One Canadian study estimated that medical errors occurred in 7.5% of all hospital admissions (Baker et al., 2004). Other studies predict that this number may be much higher and that medical errors may occur in as many as 16.6% (Canadian Nurses Association, n.d.) to 25% (Landrigan et al., 2010) of admissions. In looking only at medication errors, the IOM (Institute of Medicine of the National Academies, 2007) estimates that "one medication error occurs per patient per day" (p. 12).

When health care professionals make an error, the patients who experience the negative impacts of the error are usually viewed as the primary victims (Christensen, Levinson, & Dunn, 1992; Scott et al., 2009; Treiber & Jones, 2010). They are not, however, the only people who are negatively affected by the error. The well-intentioned health care professionals involved in the error may also experience significant emotional trauma and, in this way, they can become the second victims of the error (Christensen et al., 1992; Scott et al., 2009; Treiber & Jones, 2010). The term "second victim" was first introduced by Wu (2000) who used the term to describe doctors who were traumatized after being involved in a medical error (p. 726). Wu (2000) described the experience of second victims in the following way:

Virtually every practitioner knows the sickening realisation of making a bad mistake. You feel singled out and exposed . . . You agonise about what to do, whether to tell anyone, what to say. Later, the event replays itself over and over in your mind. You question your competence. . . sadly, the kind of unconditional sympathy and support that are really needed are rarely forthcoming." (p. 726)

There are varying estimates regarding the number of health care professionals who will become second victims, but researchers estimate that the prevalence is somewhere between 10% and 50% (Edrees, Paine, Feroli, & Wu, 2011; Scott et al., 2009, p. 330; Wolf, Serembus, Smetzer, Cohen, & Cohen, 2000).

Nurses often practice within cultures that expect them to be perfect practitioners who do not make errors (Crigger, 2005; Jones & Treiber, 2012). This errorless imperative of 'do no harm' is at the heart of nursing practice and was reflected in the words of Florence Nightengale when she said, "the very first requirement in a hospital is that it should do the sick no harm" (Grant & Carter, 2004, p. 28). Nurses are socialized and educated to function at a high level of proficiency (Leape, 1994). For many nurses, making an error is antithetical to their personal and professional goals (Arndt, 1994). However, the reality of practice is that errors are inevitable (Jones & Treiber, 2012; Leape, 1994; Reason, 2008). For many years, errors in health care were often handled from a punitive "Name, Blame, Shame, and Retrain" perspective in which individual health care professionals were held responsible for errors regardless of any other mitigating factors (Paparella, 2011, p. 263). This led health care professionals to view their errors as personal and professional failures of character (Leape, 1994). In the past few years, however, there has been a shift in healthcare towards a *Just Culture* environment that recognizes

that perfection is not possible and that even the most experienced and competent health care professionals will make errors (Roesler, Ward, & Short, 2009, p. 164).

Within Just Culture environments, health care professionals "are not punished for actions, omissions or decisions taken by them that are commensurate with their experience and training, but . . . gross negligence, willful violations and destructive acts are not tolerated" (EUROCONTROL Performance Review Commission, 2006, p. i). Just Culture models recognize that many errors are due to system failures, not individual faults, and health care professionals should not be responsible for these system failures (Roesler et al., 2009). In recognizing that errors will occur, despite the best efforts of health care professionals, Just Culture environments promote a focus on assisting health care professionals to successfully cope with the error and use the experience to make positive changes to their future practice.

Health care professionals who are involved in an error in practice often experience intense emotional distress (Chard, 2010). To cope with the emotional distress, they may require support from family, friends, colleagues and their institution. If they are unable to effectively cope with the event, they may be left with lasting effects that place them at an increased risk for developing depression and burnout (Schwappach & Boluarte, 2009; West, Tan, Habermann, Sloan, & Shanafelt, 2006) and many will consider leaving their profession (Chard, 2010; Joesten, Cipparrone, Okuno-Jones, & DuBose, 2014). In turn, health care professionals who are depressed or burnt out are at greater risk for making another error in practice (Fahrenkopf et al., 2008; West et al., 2006). Therefore, without proper intervention and adequate care for the health care professional, this may develop into a reciprocal cycle that culminates in unsafe patient care (Schwappach & Boluarte, 2009).

In this paper, I outline the results of an integrative literature review exploring the subject of medical errors and their impact on health care professionals. As the literature varies in how errors are defined, and the role of the health care professionals who participated in the studies, the following two definitions error and health care professional are provided for clarity.

Definitions

Error. In exploring the literature for this integrative literature review, I noted there was little consistency within the research regarding the words that were used to describe errors that health care professionals made in practice. Some of the terms used included: error, medical error, adverse event, mistake, incident, patient safety event, and sentinel event. For the purposes of this review, the word error will be inclusive of all of the terms listed above. In addition, the literature varied with regards to the type of error being studied. Some research defined a very specific type of error, such as first-time medication errors, while others were broad in their definitions and focused on any error that occurred in practice. As the purpose of this integrative literature review was to explore all errors, I chose to utilize a broad definition and considered errors to include "all errors that [occurred] within the health care system, including mishandled surgeries, diagnostic errors, equipment failures, and medication errors" (Lassetter and Warnick, 2003, p. 175). This definition of errors will also include errors for which no harm occurred to the patient. These types of errors are referred to in the literature as close calls, non-mistakes, and near-misses (Peate, 2009, p. 23).

Health care professional. For the purposes of this integrative literature review, the definition of health care professional was confirmed to be inclusive of all health care professionals represented in the studies. This included any professional who provided health care services to patients such as nurses, physicians, physician's assistants, allied health care

professionals and students from each of these various professions. Throughout this review, when referring to studies that were conducted with nurse participants solely, I will use the term 'nurse.' When referring to studies that were conducted with nurses and other health care professionals together, I will use the broader term 'health care professional.'

Errors in practice are inevitable, and when they occur, both the patient and the erring health care professional may experience emotional distress. Research indicates that as many as 50% of health care professionals have been negatively impacted by making an error in practice (Edrees et al., 2011). In the following chapters, I present the results of my integrative literature review that explored health care professionals' reactions and coping after making an error in practice. In Chapter Two, I discuss the methodological approach to inquiry and theoretical perspective underpinning this integrative literature review. In Chapter Three, I present the findings that emerged from my review. Finally, in Chapter Four, I summarize the findings, provide implications for nursing practice, and make suggestions for future research.

Chapter Two: Approach to Inquiry

In this chapter, I introduce the methodological and theoretical underpinnings that guided my integrative literature review. First, I describe the study methodology, which was informed by the integrative literature review methodology proposed by Whitemore and Knafl (2005). Then, I describe the Cognitive Motivational Relational Theory (CMRT) of emotion, which provided the lens through which I interpreted the findings of my review (Lazarus, 1991b).

Methodological Approach

I engaged in an integrative literature review to explore the ways that health care professionals react to and cope with making errors in practice. There were three reasons why I believed this was the most appropriate methodology for an exploration of this topic. Firstly, the purpose of an integrative literature review is to locate, critique and synthesize the available research on a particular phenomenon with the goal of gaining a more comprehensive understanding of that phenomenon (Whitemore & Knafl, 2005). As the broadest type of review, the integrative literature review allows researchers to explore and synthesize empirical findings from a variety of diverse methodologies including experimental, non-experimental, and mix-method study designs (Whitemore & Knafl, 2005). This was important to this integrative literature review as the research that has been conducted on errors has been done using a variety of research methods and an exploration of findings from each methodology was necessary to fully understand the topic. Secondly, through conducting an integrative literature review, I was able to evaluate the quality and strengths of each of the review's studies; this helped to improve the strength of the review. Lastly, through an integrative review I was able to locate gaps in the literature and make suggestions for future nursing research.

Integrative literature reviews are "research of research" and must meet strict standards for methodological rigor (Whittemore and Knafl, 2005, p. 548). If a literature review is conducted without strict adherence to a systematic method, there is a high risk for error (Whittemore & Knafl, 2005). In an effort to achieve methodological rigor and minimize errors, I utilized the integrative literature review methodological framework proposed by Cooper (1998) and refined by Whittemore and Knafl (2005). This framework consists of five stages, namely: (1) identifying the problem, (2) conducting a literature search, (3) evaluating the data, (4) analyzing the data, and (5) presenting the review. I will describe each stage in the following paragraphs.

Identifying the problem. Cooper (1998) states, "all empirical work must begin with careful consideration of the research problem" (p. 12). In the problem identification stage, the researcher formulates the research problem and clearly defines the purpose of the literature review (Whittemore & Knafl, 2005). In addition, the researcher determines the variables of interest and the types of evidence to be included in the review (Whittemore & Knafl, 2005). The purpose of my integrative literature review was to explore the various ways health care professionals react to, and cope with, making errors in practice. Specifically I looked to answer the following two questions: (a) how do health care professionals respond to being involved in a medical error; and (b) what types of support do health care professionals require after being involved in an error?

Conducting a literature search. In this stage, the researcher utilizes a well-defined and comprehensive search strategy to locate literature that is relevant to the review (Whittemore & Knafl, 2005). Whittemore and Knafl (2005) state that literature searches within computerized databases are not sufficient on their own and suggest that researchers utilize at least two other search strategies. A thorough search strategy is important as an incomplete review of the

literature increases the chance that biases are introduced into the data (Whittemore & Knafl, 2005). For the purposes of this review, I utilized a four-step search strategy to locate as much of the relevant literature as possible.

In the first step, I consulted with the Distance Education Librarian at the University of Victoria and searched for relevant literature in the Cumulative Index of Nursing and Allied Health Literature with Full Text (CINAHL) and Medical Literature Analysis and Retrieval System Online (MEDLINE) electronic databases. I searched CINAHL and MEDLINE utilizing the following search terms: "second victim," "medication errors," "health care errors," "adverse event," "medical error," "mistake," "patient safety event," "nursing error," "health care professional error," "coping," "emotions," "attitudes," and "responses." I then reviewed the relevant articles and evaluated each for concordance with the inclusion criteria of my review (see the inclusion and exclusion section below). Any articles that did not meet the inclusion criteria were discarded at this stage.

In the second step, I used the same search terms as in step one, but this time I conducted the search utilizing the Google Scholar search engine. As with step one, I compared each of the articles against my inclusion criteria and discarded any articles that did not meet these criteria.

In the third step, I conducted an ancestry search in which I manually searched the reference lists of the relevant articles identified in the previous steps to locate any other studies that should be included in my review.

In the final step, I again used Google Scholar, but this time I utilized a unique Google Scholar function called "cited by." This function allowed me to locate any newly published articles that had referenced any of the articles that I located in the previous steps. Once I

completed steps three and four, I again read over the abstracts for each of the articles, evaluated them against the inclusion criteria, and discarded any that did not fit the criteria.

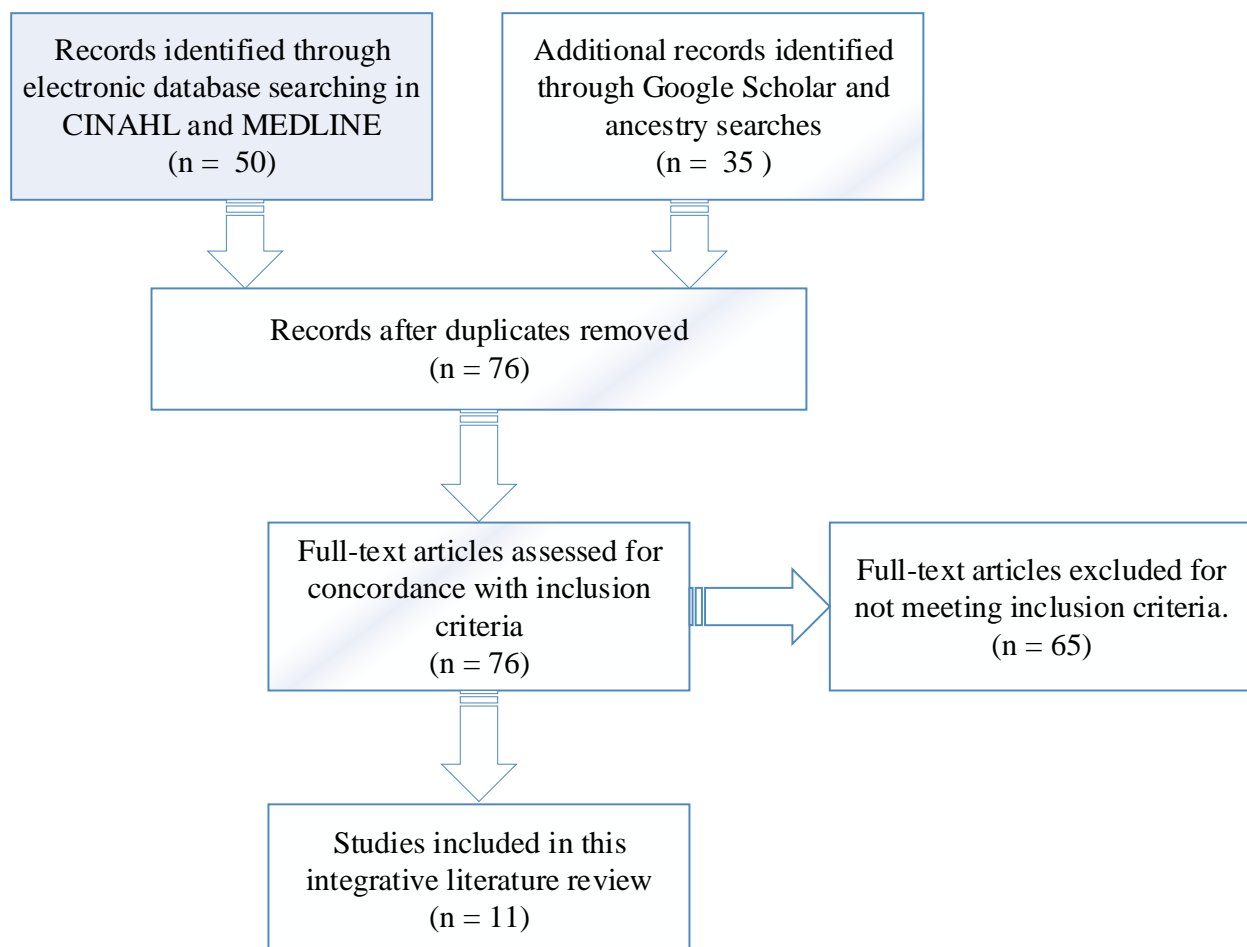
Inclusion and exclusion criteria. For an article to be included in my review it needed to meet the following inclusion criteria: (a) use a qualitative, quantitative, or mix-methods design, (b) focus on how health care professionals were impacted by, reacted to, or coped with being involved in a medical error, (c) include nurses as part of the population studied, (d) conducted with health care professionals in a hospital setting in a developed country, (e) published within the last ten years in a peer-reviewed journal, and (f) written in English. I excluded literature reviews and theoretical articles. I excluded research that was conducted with participants who had not committed an error but were asked to imagine how they would react if they were to be involved in an error. I excluded research that was conducted with participants who had witnessed, but had not actually been involved in an error. I also excluded articles if there were multiple publications stemming from one research study; in this case I included the primary research article only.

When I initially began my literature search, I had planned to focus specifically on errors made by nurses. However, I had difficulty locating sufficient research that focused solely on this population. After consulting with a librarian at the University of Victoria and reading through the few nursing-only studies that I located, I learned that there is a paucity of nursing-specific research in this area (Chard, 2010; Rassin, Kanti, & Silner, 2005; Treiber & Jones, 2010). When I broadened my search criteria to include other health care professionals, I located a few studies that had been conducted with nurses along with other health care professionals and several more that were carried out with physicians only. As it was necessary for me to broaden my sample, I

decided to include the studies that were conducted with nurses along with other health care professionals but to exclude physician-only studies.

Studies included in review. Through completing step one of my literature search, I identified 41 potential articles. After reviewing the abstracts for each of these articles, I excluded nine as they were not research articles. After completing steps two, three and four of the literature search process, I identified an additional 35 articles. After assessing each article for compliance with my inclusion criteria, I located eleven studies that were appropriate for this review (Figure 1, p. 16). A summary of all of the studies included in this review is available in Table 1 on pages 21-26.

Figure 1. Summary of the Literature Search Results



Evaluating the data. The goals of this stage are to appraise and evaluate any relevant data from the literature search (Whittemore & Knafl, 2005) and identify the strengths and limitations of each study (Coughlan, Cronin, & Ryan, 2013). To assess the quality, integrity, and soundness of the evidence and conclusions of each research article included in this integrative literature review, I conducted a critical appraisal based upon a set of guidelines created by the McMaster Occupational Therapy Evidence-Based Practice Research Group (2008). I chose these guidelines for several reasons. The tools have been found to be reliable with an inter-rater agreement of 75–86% (McMaster Occupational Therapy Evidence-based Practice Research Group, 2008). The evaluation criteria are clear, straightforward and easy to apply. Each tool comes with a guide that provides detailed explanations as to how to assess and apply each of the evaluation criteria (Law et al., 1998b; Letts et al., 2007b). The guidelines include separate tools for evaluating qualitative and quantitative studies that take into account the unique assumptions, concepts, and perspectives of each research paradigm.

I critiqued the qualitative studies using the Critical Review Form - Qualitative Studies Version 2.0 (see Appendix B for a sample of this form) (Letts et al., 2007a). These guidelines focus on critiquing the following categories: study purpose, literature review, design, sampling, data collection, data analysis, overall rigor (including credibility, transferability, dependability, and confirmability), conclusions and implications. As a part of the critique, I assigned a point value to each category and then scored each research study based upon how effectively it met the criteria for each category. I then added the scores from each category together and assigned each research article an overall score out of ten.

I critiqued the quantitative studies using the Critical Review Form – Quantitative Studies (see Appendix C for a sample of this form) (Law et al., 1998a). These guidelines focus on

critiquing the following categories: study purpose, supporting literature, design, sampling, outcomes (including reliability and validity), interventions, results, conclusions and implications. As with the qualitative critiques, I assigned a point value for each category, critiqued each study, scored each section based upon how well it met the criteria for each category, and then I then added the scores from each category together and assigned each research article a score out of ten.

To assist me in determining which articles to include in my review, I set a minimum quality score of seven out of ten for both qualitative and quantitative studies. All eleven studies exceeded this minimum score and therefore no studies were excluded based upon these critiques. (See appendixes B and C for samples of the critiquing forms).

Analyzing the data. The fourth stage of the integrative literature review involves a "thorough and unbiased interpretation of primary sources" along with an "innovative synthesis of the evidence" (Whittemore & Knafl, 2005, p. 550). This is completed through a series of four steps: reducing the data, displaying the data, comparing the data, and drawing conclusions and verification (Whittemore & Knafl, 2005).

Reducing the data. During this step, data from each of the primary research sources is broken down into smaller subgroups in order to facilitate analysis (Whittemore & Knafl, 2005). Then, the data is extracted, coded, and organized into a manageable framework, spreadsheet, or matrix (Whittemore & Knafl, 2005). For this integrative literature review, I utilized a detailed spreadsheet to code my data and compiled one spreadsheet for each study. This allowed me to ensure that I was systematically comparing each of the studies based upon consistent criteria.

Displaying the data. In this step, the data obtained in data reduction step is collated and organized around specific variables or subgroups and then organized around a visual display

(Whittemore & Knafl, 2005). This visual display may take the form of a table, graph, or chart and serves to clarify and enhance the patterns and relationships within the data (Whittemore & Knafl, 2005). For this integrative literature review I chose to utilize a spreadsheet containing several different worksheets that represented the variables that were present in the data.

Comparing the data. According to Whittemore & Knafl (2005), the goals of this step are to iteratively examine the "data displays of primary source data in order to identify patterns, themes, or relationships" (p. 551) and to display the data in a visual format such as a concept map. For this integrative literature review, I began this step by examining the data that I had recorded in each worksheet that I created in the previous (displaying the data) step. I then collated this information into common themes that were emerging from the data. Finally, I created a pictorial representation of the overall experience of making an error: from the time that the error occurs, through the phase of coping, and extending to the long term effects for the health care professional (see Appendix A).

Drawing conclusions and verification. During this final stage of data analysis, the focus of the integrative literature review shifts from a description of patterns and relationships to a higher level of abstraction (Whittemore & Knafl, 2005). In this stage, the researcher delineates processes and patterns, identifies commonalities and differences, and presents generalizations that are emerging from each subgroup (Whittemore & Knafl, 2005). These patterns, themes and conclusions are then verified against the primary data to ensure accuracy and confirmability (Whittemore & Knafl, 2005). It is important for the researcher to review the primary data and themes to ensure that all of the pertinent evidence has been included (Whittemore & Knafl, 2005). During this stage, conflicting evidence is also addressed. Cooper (1998) suggests that one way to resolve conflicting evidence is to consider the frequency of each of the conflicting

findings. Whittmore and Knafl (2005) suggest that conflicting evidence be explored by considering the confounding variables such as sample characteristics. No matter which technique a researcher opts for, a finding of conflicting evidence points to the fact that additional research in the area is necessary (Whittmore & Knafl, 2005). The final step of this process involves taking the conclusions from each subgroup and synthesizing them into an integrated summation (Whittmore & Knafl, 2005).

Presenting the review. As stated previously, eleven studies were included in this integrative literature review (see Table 1, pp. 21-26 for a summary of the studies). The studies were conducted using a variety of research methodologies and included four quantitative studies, six qualitative studies, and one mixed-methods study. Six of the studies focused only on nurses (Chard, 2010; Crigger & Meek, 2007; Karga, Kiekkas, Aretha, & Lemonidou, 2011; Rassin et al., 2005; Schelbred & Nord, 2007; Treiber & Jones, 2010). The remaining five studies were conducted with nurses and other health care professionals (Edrees et al., 2011; Harrison et al., 2013; Joesten et al., 2014; Scott et al., 2009; Ullström, Sachs, Hansson, Øvretveit, & Brommels, 2014). One study looked specifically at intraoperative nursing errors (Chard, 2010), three focused on nursing medication errors (Rassin et al., 2005; Schelbred & Nord, 2007; Treiber & Jones, 2010), and the remainder looked at all types of errors as defined by the study participants (Crigger & Meek, 2007; Edrees et al., 2011; Harrison et al., 2013; Joesten et al., 2014; Scott et al., 2009; Ullström et al., 2014).

Table 1

Summary of Included Studies

Author(s) & year	Participants & error details	Methodology, sampling type & study location	Brief overview of study aims and findings
Chard (2010)	158 registered nurses Intraoperative registered nurses who self-reported that they had committed an error	Quantitative Descriptive correlational study Paper-and-pencil questionnaires Randomized selection of perioperative registered nurses USA	The purposes of this study were to examine how nurses react to errors and how coping relates to the emotional distress nurses experience and the practice change they make after an error. Most nurses showed some level of emotional distress following an error. "Seeking social support" and "planful problem solving" coping strategies were significant predictors of constructive changes in practice. (Chard, 2010)
Crigger and Meek (2007)	10 registered nurses Nursing practice errors	Qualitative Grounded Theory study (Glaser's methodology) Theoretical sampling of registered nurses in a community hospital USA	The purpose of this study was to explore of how nurses respond to making an error in practice. Based upon the results, the authors suggest a four-stage process of self-reconciliation that nurses undergo after making an error. Nurses initially experienced feelings and emotions such as shock, fear, anger, remorse. They acted to report (or decided not to report) the error. Finally they attempted to evaluate the harm and find ways to cope and move on. (Crigger & Meek, 2007)

Author(s) & year	Participants & error details	Methodology, sampling type & study location	Brief overview of study aims and findings
Edrees, Paine, Feroli, and Wu (2011)	140 Health care professionals: 46.3% RNs 11% nurse managers or charge nurses 42.7% various other health care professionals. Health care professionals who were involved in an adverse event - type of event not specified	Mixed methods design Cross sectional Paper based survey Health care professionals who attended a particular session at the "Johns Hopkins Medicine 1st Annual Patient Safety Summit USA	The aim of Part I of this study was to assess health care professionals' awareness of the issue of second victims. The aim of Part II was to explore the supports that second victims require after being involved in an adverse event. The authors also wanted to emphasize the emotional impact that adverse events have on health care professionals. After being involved in an adverse event second victims required reassurance, understanding, compassion, and support. If second victims were met with silence from peers, or if peers were not understanding, the second victim experienced further distress. Peer support programs were preferred over institutional programs. (Edrees et al., 2011)
Harrison, Lawton, Perlo, Gardner, Armitage, and Shapiro (2013)	265 Health care professionals: 145 nurses 120 physicians Health care professionals who were involved in a medical error - type of error not specified	Quantitative Descriptive correlational study Cross-sectional, cross-country survey Responder sample from two large teaching hospitals United Kingdom and USA	The objectives of this study were to explore (a) the personal and professional effects of making an error, (b) the coping strategies and emotional responses of health care professionals who make an error, (c) the relationship between emotional response and coping strategy, and (d) health care professionals' perceptions of institutional support. After making an error, health care professionals experienced both personal and professional disruption. They experienced negative emotions such as guilt and self-doubt, but they also experienced positive emotions. After making an error, nurses reported stronger negative feelings than physicians. Support from peers was preferred over formal support services. (Harrison et al., 2013)

Author(s) & year	Participants & error details	Methodology, sampling type & study location	Brief overview of study aims and findings
Joesten, Cipparron, Okuno-Jones, and DuBose, (2014)	120 Health care professionals: 82 nurses 12 physicians 24 other health care professionals Health care professionals who self-reported as being involved in a patient safety event within the hospital	Quantitative Descriptive study Convenience sample from a community teaching hospital USA	The main purpose of the study was to "establish a baseline of perceived availability of institutional support services or interventions and experiences following an adverse patient safety event" (Joesten et al., 2014, p. 1). The researchers also wanted to know what specific symptoms the health care professionals experience following an error. Following a patient safety event, health care professionals experienced a range of negative emotions and outcomes. Many expressed a desire to receive formalized support following an event, but were not aware of the services available to them. (Joesten et al., 2014)
Karga, Kiekkas, Aretha, and Lemonidou (2011)	536 registered nurses and licensed practical nurses with a clinical practice Nurses who made any type of error in practice	Quantitative prospective, correlational multicentre study Purposive sample from five public hospitals Greece	The objectives of this study were to investigate: (a) how nurses respond emotionally after making an error, (b) nurses' perceptions of senior staffs' responses, (c) the various strategies that nurses use to cope with making an error (d) whether or not the coping strategy used is associated with changes in practice. After making an error, nurses reported feeling depressed, angry at self, guilty, and professionally inadequate. "Accepting responsibility" and "seeking social support" coping strategies were predictive of constructive changes in practice Positive senior staff responses were predictive of constructive changes in practice. Negative senior staff responses (as perceived by the nurse) were predictive of defensive changes in practice. (Karga et al., 2011)

Author(s) & year	Participants & error details	Methodology, sampling type & study location	Brief overview of study aims and findings
Rassin, Kanti, and Silner (2005)	20 nurses Nurses who were responsible for medication errors (first time errors only).	Qualitative study Semi-structured interviews Convenience sample from a major national medical center Israel	The purpose of this study was to examine the ways that nurses cope with making an error and the social and mental effects they experience. Making an error had severe short-term and long-term consequences for nurses. They often experienced emotions such as guilt, fear and shame. For some, these effects lasted long after the event and resembled the symptoms of posttraumatic stress disorder. (Rassin et al., 2005)
Schelbred and Nord (2007)	10 registered nurses Nurses who made serious medication errors that led, or could have led to, substantial harm	Qualitative Exploratory Descriptive study using phenomenological text analysis Semi structured interviews Convenience sample Norway	The purposes of this study were: (a) to describe nurses' experience with making errors, (b) to explore the meaning of the experience, and (c) to investigate the types of support the nurses received after making a serious error. Making a serious medication error could have devastating consequences for nurses, even if patients were not harmed by the error. Nurses were willing to accept complete responsibility for the error. Nurses needed to be able to share their experience with a trusted person and this helped them to cope. (Schelbred & Nord, 2007)

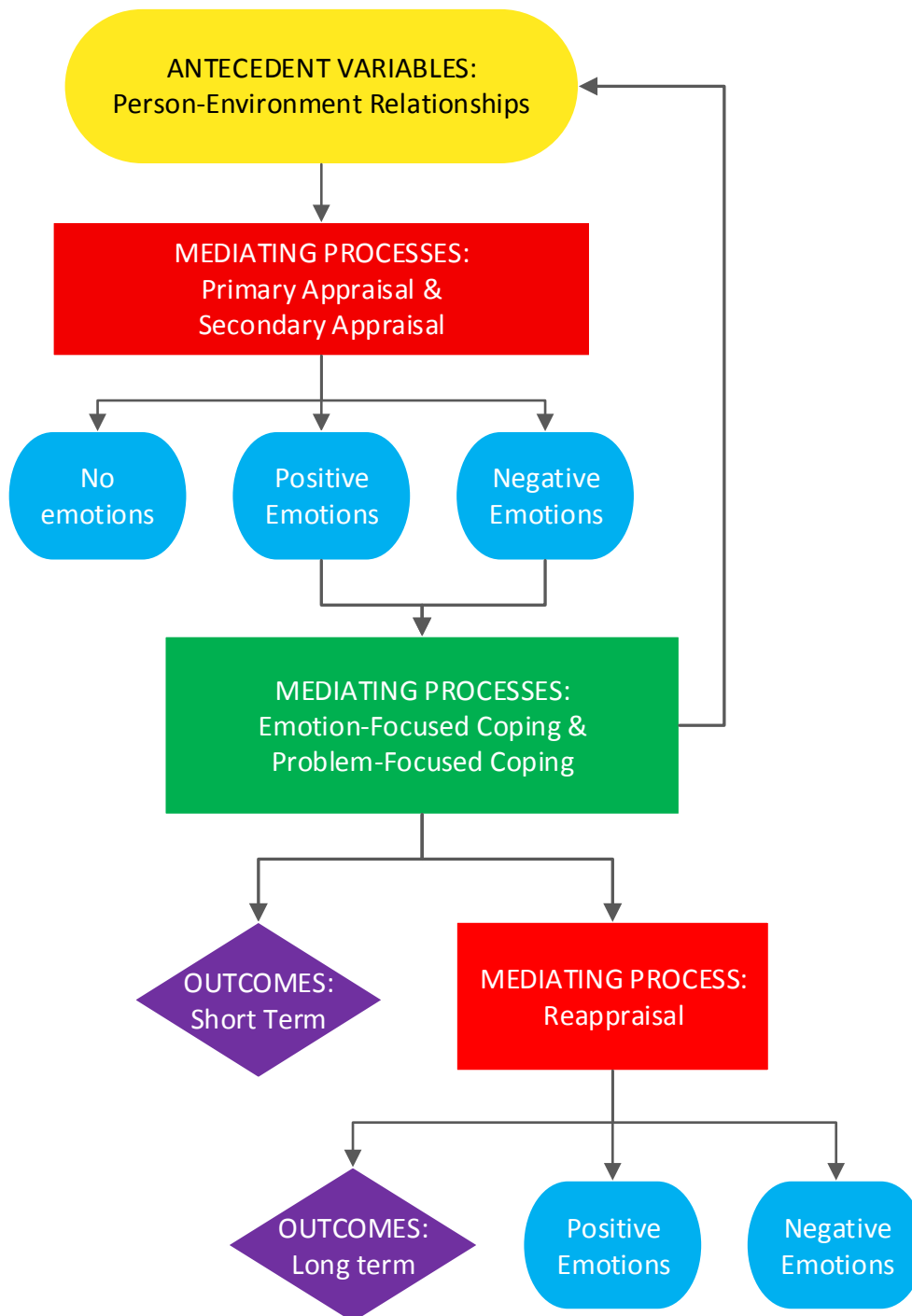
Author(s) & year	Participants & error details	Methodology, sampling type & study location	Brief overview of study aims and findings
Scott, Hirschinger, Cox, McCoig, Brandt, and Hall, (2009)	31 Health care professionals: 11 registered nurses 10 physicians 10 allied health care professionals All clinical patient safety events that impacted the health care professional	Qualitative study Cross-sectional Semi-structured interview Purposive sample of health care professionals at the University of Missouri Health Care USA	The purpose of this study was to explore the experiences and recovery trajectory of second victims with regards to the impact of a clinical event. The post-event trajectory was predictable and occurred in six stages: (1) chaos and accident response, (2) intrusive reflections, (3) restoring personal integrity, (4) enduring the inquisition, (5) obtaining emotional first aid and (6) moving on - which led to dropping out, surviving or thriving. (Scott et al., 2009)
Treiber and Jones (2010)	158 nurses Nurses who made self-identified medication errors	Qualitative Interpretive analysis Descriptive survey with open-ended questions Surveys sent to a random sampling of registered nurses in the state of Georgia USA	The purpose of this study was to investigate nurses' perceived causes of medication errors and to more fully understand the ways that nurses deal with making errors in practice. Nurses accepted responsibility for errors but also identified other factors that contributed to error. Many nurses described errors during nursing school or when they were new to practice. Nurses experienced strong reactions regardless of the level of patient harm. (Treiber & Jones, 2010)

Author(s) & year	Participants & error details	Methodology, sampling type & study location	Brief overview of study aims and findings
Ullström, Sachs, Hansson, Øvretveit, and Brommels (2014)	21 Health care professionals: 9 registered nurses 10 physicians 2 allied HCPs Health care professionals who were involved in avoidable events where patient was harmed or was at risk of being harmed	Qualitative study Semi-structured interviews Convenience sample of healthcare professionals from a Swedish University Hospital Sweden	The purposes of this study were: (a) to investigate the ways that health care professionals are affected by being involved in an adverse event and (b) to explore the organizational support health care professionals require after being involved in an adverse event and how well those needs are currently being met. After being involved in an adverse event health care professionals experienced emotional distress. For some, this distress was long lasting. After an event, peer support was crucial and helped health care professionals to ease the emotional distress they were feeling. (Ullström et al., 2014)

Theoretical Perspective: Lazarus' Cognitive-Motivational-Relational-Theory

Lazarus' Cognitive Motivational Relational Theory (CMRT) of emotion was used to guide this literature review (Lazarus, 1991b) (see Appendix A and Figure 2, p. 27). The CMRT is a theory of emotion that explains how individuals react to, and cope with, stressful events (Lazarus, 1993). Within the CMRT, emotions and coping are created through interactions between people and their environments (Krohne, 2001; Lazarus, 1991a). When individuals encounter a situation (also known as a person-environment relationship), they make cognitive appraisals about the impact that the situation will have on their lives (Lazarus, 1991a). Depending on their appraisal, they will experience emotions and employ certain coping strategies (Lazarus, 1991a).

Figure 2. *Cognitive-Motivational-Relational-Theory of Emotion: Coping as a Mediator of Emotion*



Adapted from: "Coping as a mediator of emotion" by S. Folkman and R. S. Lazarus, (1988) *Journal of Personality and Social Psychology*, 54(3).

There are three main components to the CMRT of emotion: antecedent variables, mediating processes, and outcomes (Lazarus, 1991b). The antecedent variables consist of the individual's personality characteristics and the environmental situation that come together to form a person-environment relationship (situation) (Lazarus, 1991b). The mediating processes, which will be discussed in detail in the following paragraphs, involve the individual's cognitive appraisal of the situation and their perceived ability to cope (Lazarus, 1991b). The outcome variables consist of the short-term emotional responses to the situation and the long-term effects on individuals' somatic health and well-being (Lazarus, 1991b).

There are three mediating processes: primary appraisal, secondary appraisal and coping processes (Lazarus, 1991b). When individuals encounter new situations, they begin the primary appraisal process (Lazarus, 1991a). During primary appraisal, individuals cognitively appraise three aspects of the situation (see Table 2, p. 29 for a sample of the primary appraisal components) (Lazarus, 1991a). The appraisal begins with a determination as to whether the situation is significant to the individuals' well-being (Lazarus, 1991a). If the situation is deemed to be personally irrelevant, no emotion will result and no further appraisal or coping will be required (Lazarus, 1991a). If, however, the situation is personally relevant, individuals will then assess whether the situation is congruent with their personal goals (Lazarus, 1991b). If there is goal congruence, the individual will experience positive emotion, if there is goal incongruence, negative emotions will result (Lazarus, 1991b). The final step of primary appraisal involves a determination of the type of ego-identity¹, or one's sense of self, that is affected by the situation (Lazarus, 1991b). Depending on the type of ego-identity that is involved, specific positive or negative emotions will be elicited (Lazarus, 1991b). If, at the end of primary appraisal, the

¹ Lazarus (1991b) defined six types of ego involvement: "(1) self- and social esteem, which involves commitment to

situation is deemed to be relevant and significant to the person, secondary appraisal will then occur (Lazarus & Folkman, 1984).

Table 2

Sample of Primary Appraisal Components

<u>Primary Appraisal Components</u>	<u>Possible Outcomes</u>
1. Is the situation personally relevant to the individual's goals?	1. If the situation is not relevant, the individual will not experience any emotions and no further appraisal will be required. If the situation is relevant, the individual will explore the answer to appraisal question number two.
2. Is the situation congruent with the individual's goals?	2. If the situation is congruent with their goals, positive emotions will be experienced, if it is incongruent, negative emotions will be experienced
3. What type of ego-identity is affected by the situation?	3. The specific positive or negative emotion that will be experienced will be dependent upon the type of ego-involvement (i.e. self-esteem involvement may lead to anger, anxiety or pride)

Adapted from: *Emotion and Adaptation* (pp. 133-151) by R. S. Lazarus, 1991, New York, NY: Oxford University Press

The mediating process of secondary appraisal also involves three decisions (processes): blame or credit, coping potential, and future expectancy (Lazarus, 1991b). In blame or credit, a person determines whether any specific individual was responsible for the situation, and if so, then blame is assigned to that individual (Lazarus, 1991b). This may include self-blame in situations where individuals themselves are responsible (Lazarus, 1991b). In the coping potential decision, individuals make determinations regarding their ability to cope with the situation (Lazarus, 1993). With future expectancy, individuals decide whether (over time) their situation is likely to become more or less congruent with their personal goals (Lazarus, 1991b). If, for example, is it likely to remain incongruent, then the negative emotions they are experiencing are likely to continue as well (Lazarus, 1991b).

Coping is the final mediating process. Lazarus and Lazarus (1994) define coping as the cognitive and behavioral efforts that individuals utilize to control and manage emotions resulting from stressful situations. The CMRT outlines two main types of coping: problem-focused coping and emotion-focused coping (Lazarus, 1991b). With problem-focused coping, individuals act directly on themselves or the environment in an attempt to control or change the situation itself (Lazarus, 1991b). In emotion-focused coping, individuals attempt to change the relational meaning of the situation through altering the way that they think about the situation (Lazarus, 1992). One type of coping is not inherently better, and what is effective in one situation may not be effective in another (Folkman & Moskowitz, 2004; Lazarus & Folkman, 1984). What is important for effective coping is that there is a fit between individuals' appraisal of the situation and the coping strategy they employ (Folkman, 1984). This means that problem-focused coping is typically more effective in situations where individuals have some control over their situation, and emotion-focused coping strategies are more effective when individuals have little or no control over the situation so their only option is to change the way they think about the situation (Folkman, 1984).

After individuals have completed the mediating processes, primary appraisal, secondary appraisal, and coping, they will reappraise the person-environment relationship. Depending on the results of this reappraisal, they may continue to experience the same emotions, they may experience new emotions, or they may not experience any lingering emotions if the situation is no longer personally relevant to their goals (Figure 2, p. 27) (Folkman & Lazarus, 1988).

Emotions within the CMRT. Within the CMRT, emotions are both antecedents and outcomes of coping efforts; emotion shapes coping, and coping shapes emotion (Lazarus, 1991b) (Figure 2, p. 27). Lazarus (1991b) suggests that there are 15 discrete emotions. Nine of these

emotions are negative emotions: anger, fright-anxiety, guilt-shame, sadness, envy, jealousy, and disgust; while six are positive: happiness/joy, love/affection, pride, and relief (Lazarus, 1991b). Inherent within the CMRT are two assumptions regarding emotions. The first is that emotions always occur in response to a relational meaning (Lazarus, 1993). The relational meaning is a "person's sense of the harms and benefits in a particular [situation]" (Lazarus, 1993, p. 13). For instance, the relational meaning for the emotion of envy is "wanting what someone else has" (Lazarus & Lazarus, 1994). The second assumption is that the emotions that individuals experience are dependent upon the results of the primary and secondary appraisal processes (Lazarus, 1991b). There are six appraisal related decisions, three primary and three secondary, therefore, for each type of emotion, there are up to six appraisal-related decisions that individuals must make (Lazarus, 1991b) (see Appendix D for an example of the appraisal decisions for guilt and shame). For the purposes of this review, the appraisal processes and relational meanings of guilt-shame, anxiety, anger, and sadness warrant further exploration.

The emotions of guilt and shame both share the relational theme of being related to the perception of a personal failure (Lazarus & Lazarus, 1994). The emotion of guilt is expressed when individuals experience a moral lapse, and shame occurs when individuals fail to live up to personal, or societal ideals (Lazarus & Lazarus, 1994). For a person to experience guilt or shame, four appraisal related decisions are necessary (Lazarus, 1991b) (see Appendix D). For both emotions, the situation must be personally relevant (the first decision of primary appraisal), and there must goal incongruence (the second decision of primary appraisal). The individual themselves must have been responsible for the situation and thus to blame for what occurred (the first decision of secondary appraisal) (Lazarus, 1991b). The main difference in the appraisal of guilt versus shame comes with the third decision of primary appraisal (Lazarus, 1991b). For

guilt to be experienced, there needs to be an ego-involvement which is directed at managing a moral imperative, whereas for shame, there must be a failure of the individual to live up to an ego-ideal (Lazarus, 1991b). If individuals feel positive about their ability to cope with the situation, they may lessen their guilt by apologizing and lessen their shame working diligently to live up to their ego-ideal (Lazarus, 1991b).

The emotion of anxiety is intimately tied to an individual's self-identity (Lazarus & Lazarus, 1994) and the relational meaning is "facing uncertain, existential threat" (Lazarus, 1993, p. 13). For the emotion of anxiety to be generated, only primary appraisal components are required (Lazarus, 1991b). The situation must be relevant to the person and incongruent with his or her goals (the first and second decisions of primary appraisal) (Lazarus, 1991b). The ego-involvement must require the individual to protect his or her ego-identity against existential threats (the third decision of primary appraisal) (Lazarus, 1991b). Once these three criteria have been met, anxiety is the only emotion that is possible (Lazarus, 1991b).

The emotion of anger is connected with the relational meaning of "a demeaning offense against me and mine" (Lazarus, 1993, p. 13) and requires a determination for each of the three decisions of primary appraisal and the first decision of secondary appraisal (Lazarus, 1991b). With anger, the situation must be personally relevant and incongruent the individual's personal goals (the first and second decisions of primary appraisal) (Lazarus, 1991b). The ego involvement must be centered on the preservation of self-esteem or social-esteem (the third decision of primary appraisal) (Lazarus, 1991b). The first decision of secondary appraisal dictates where individuals will direct their anger (Lazarus, 1991b). If they themselves are responsible and therefore to blame, then their anger is directed internally at themselves (Lazarus,

1991b). However, if someone else is responsible for the situation, their anger will be directed externally towards the responsible person (Lazarus, 1991b).

The relational meaning for sadness is based upon an individual "having experienced an irrevocable loss" (Lazarus, 1993, p. 13). For sadness, five of the six appraisal components need to be analyzed (Lazarus, 1991b). As with all negative emotions, the situation must be personally relevant but incongruent with the individuals' goals (the first and second decisions of primary appraisal) (Lazarus, 1991b). Sadness can result from any of type of loss to ego-identity, for example, self-esteem, life-goals, moral value, or ego-ideal (the third decision of primary appraisal) (Lazarus, 1991b). With regards to blame, the first decision of secondary appraisal, the individuals must not hold anyone accountable for the situation (Lazarus, 1991b). For coping potential, the second decision of secondary appraisal, the individuals must not believe that they will be able to compensate for the loss of ego-identity. For future expectancy, the third decision of secondary appraisal, if individuals believe that the situation will remain incongruent with their goals, then they are likely to experience enduring feelings of hopelessness and depression (Lazarus, 1991b).

This literature review was guided by the methodology of Whitemore and Knafl (2005) and informed by Lazarus' Cognitive-Motivational-Relational-Theory of emotions (Lazarus 1991b). In the next chapter, I present the findings of this review.

Chapter Three: Findings

In this chapter, I present the major findings of my integrative literature review. I begin with a description of the most common emotions that health care professionals experienced after making an error in practice. I then explore the most common problem-focused and emotion-focused coping strategies employed by health care professionals. Next, I discuss the types of post-error supports that health care professionals found most helpful. Then, I describe some of the long-term effects that health care professionals experienced after being involved in an error. Lastly, I summarize two models that have been developed from two of the research articles that were included in this review.

Emotional Effects on the Health Care Professional

Following the discovery that they had made an error, health care professionals experienced emotional distress that affected them on both a personal and a professional level (Harrison et al., 2013; Rassin et al., 2005; Schelbred & Nord, 2007; Scott et al., 2009; Ullström et al., 2014). In describing this distress, the health care professionals in this review used a variety of words to describe particular emotions. For instance, when they described feeling fear, they used words such as scared, worried, concerned, and nervous. Informed by Lazarus' CMRT (1991) and an emotion classification system developed by Shaver, Schwartz, Kirson and O'Connor (1987), I collated these various words and grouped them into four major categories of emotion: guilt-shame, anxiety-fear, anger, and sadness (Table 3, p. 35). I describe each of these in the upcoming paragraphs.

Table 3

Classification of Emotions

<u>Guilt and Shame</u>	<u>Anxiety and Fear</u>	<u>Anger</u>	<u>Sadness</u>
Remorse/Remorseful	Fearful	Angry with	Grief
Self-blame	Shock	self/myself	Despair
Disbelief	Panic	Angry with others	Isolation
Feeling bad	Worry		Depressed
Feeling sorry	Distresses		Devastation/Devastated
Embarrassed	Scared		Heartbroken
	Nervous		
	Concerned		

Based upon: *Emotion and Adaptation* (pp. 133-151) by R. S. Lazarus, 1991, New York, NY: Oxford University Press and *Emotion knowledge* by P. Shaver, J. Schwartz, D. Kirson, and C. O'Connor, C. (1987). *Journal of Personality and Social Psychology*, 52(6), 1061-1086.

Guilt-shame. Guilt and shame are closely related emotions and both are centered around the perception of a personal failure (Lazarus, 1991b). People experience guilt when they believe they have committed a moral transgression and shame when they believe they have not lived up to their personal ideals (Lazarus, 1991b). Guilt and shame were two of the most common emotions that health care professionals expressed after making an error in practice. Frequent reports of these emotions were described in most of the studies included in this review (Chard, 2010; Crigger & Meek, 2007; Harrison et al., 2013; Karga et al., 2011; Rassin et al., 2005; Schelbred & Nord, 2007; Ullström et al., 2014). Chard (2010), Karga et al. (2011), and Harrison et al. (2013) used quantitative measures to examine guilt. Eighty five percent of the nurses in the study by Chard, and 44% of the nurses in the study by Karga et al. reported feelings of guilt after making an error in practice. In the study by Harrison et al., guilt was the most commonly reported negative emotion expressed by the health care professionals. For some health care professionals, their feelings of guilt and shame were intensified when they recognized their own

responsibility for the error and realized that the error may have been prevented if they had acted differently (Crigger & Meek, 2007; Scott et al., 2009).

Anxiety-fear. Feelings of fear and anxiety were frequently expressed by health care professionals after making an error (Chard, 2010; Crigger & Meek, 2007; Edrees et al., 2011; Harrison et al., 2013; Karga et al., 2011; Rassin et al., 2005; Treiber & Jones, 2010; Ullström et al., 2014). Immediately after recognizing that an error occurred, many health care professionals described feelings of shock, disbelief, and panic (Ullström et al., 2014). Some nurses described feeling as though they were paralyzed (Schelbred & Nord, 2007). One nurse described their initial reaction as "a heart-attack moment" and stated "I was shocked and shaking all over" (Rassin et al., 2005, p. 877). Scott et al. (2009) described the time right after an error as confusing and chaotic. Health care professionals found that they were so adversely affected by what had happened, they were unable to continue caring for their patients and needed other clinicians to take over immediately after the error occurred (Scott et al., 2009). However, this inability to provide care was not expressed by all health care professionals across all studies. For example, many nurses reported that despite experiencing these same visceral reactions of shock and panic, they were still able to effectively practice and provide appropriate care to their patients immediately following the error (Rassin et al., 2005; Schelbred & Nord, 2007).

For most health care professionals, the first fear they experienced was externally directed and they worried about the effects the error may have on their patients (Chard, 2010; Karga et al., 2011; Rassin et al., 2005; Treiber & Jones, 2010; Ullström et al., 2014). It was not until later that their fear turned inwards and they began to worry about how the error may impact them on a personal and professional level (Rassin et al., 2005). These internally focused fears took many different forms. They included fear of getting fired, fear of punishment, and fear of

repercussions (Chard, 2010; Karga et al., 2011; Rassin et al., 2005; Treiber & Jones, 2010; Ullström et al., 2014). Many health care professionals also worried about how the error might damage their professional reputation (Scott et al., 2009) and they expressed concerns regarding what their peers would think of them (Joesten et al., 2014). As stated by one nurse, "there were staff members who thought that 'she, with all her academic degrees and smooth talking, isn't so smart after all...'" and the fear, eventually, is to lose the respect of those important to you" (Rassin et al., 2005, p. 881).

Anger. Anger was another common emotional reaction that health care professionals described after making an error (Chard, 2010; Crigger & Meek, 2007; Karga et al., 2011; Rassin et al., 2005; Scott et al., 2009). Similar to the emotion of fear, anger may be directed internally or externally (Lazarus, 1991b). If health care professionals felt that they were to blame for the error, they would direct their anger inwardly towards themselves. However, if they felt that someone else was to blame, their anger was directed externally toward the responsible person. Chard (2010) reported that that 93% of the 158 nurses reported feeling angry with themselves after committing an error and 38% reported feeling angry at other people. Similarly, Karga et al. (2011) found that 52.4% of the 536 nurses reported that they felt angry with themselves, and 14.9% felt angry at others. Scott et al. (2009) reported that the 65% of the health care professionals in their study experienced anger, although they did not differentiate between anger that was directed towards self or towards others.

Sadness. Feelings of sadness, grief, and depression were also commonly expressed by health care professionals after making an error (Chard, 2010; Karga et al., 2011; Scott et al., 2009; Treiber & Jones, 2010; Ullström et al., 2014). More than 75% of the nurses in the study by Chard (2010) reported feeling devastated that they may have hurt someone and 31% reported

that they became depressed following the error. Similarly, Karga et al. (2011) revealed that 34% of the nurses said they were devastated that they may have hurt their patient and 67% reported feeling depressed. In addition, Scott et al. (2009) found that 55% of health care professionals felt depressed following an error, 65% reported feeling grief, and 68% reported feeling extreme sadness.

Coping with the Error

After making an error, the health care professionals in this review employed two main coping processes, namely problem-focused coping and emotion-focused coping. As stated previously, problem-focused coping is aimed at altering or changing the stressful situation itself and emotion-focused coping is directed at minimizing the emotional distress associated with the stressful situation (Folkman & Lazarus, 1980).

Problem-focused coping. Immediately following the discovery of the error, many nurses employed problem-focused coping strategies (Rassin et al., 2005). The coping strategies of "problem solving" (Karga et al., 2011, p. 3248) and "doubl[ing] my efforts to get things done" (Chard, 2010, p. 140) were often used right after the error as nurses sought out help to manage the acute needs of their patients (Rassin et al., 2005). This form of coping continued as nurses remained at the bedside during the tumultuous post-error period, and worked diligently to ensure no further harm came to the patient (Rassin et al., 2005; Schelbred & Nord, 2007).

Another form of problem focused coping was demonstrated by the nurses in the Treiber and Jones (2010) study when they carried out behaviors to "cover their tracks" and give the illusion that the error never occurred (p. 1334). For example, if a nurse gave an incorrect medication to a patient, the nurse would ask for a covering doctor's order to give that medication, thereby giving the illusion that the error did not occur (Treiber & Jones, 2010).

Emotion-focused coping. After discovering the error and tending to the patients' immediate needs, health care professionals would often turn to emotional-focused strategies to cope with the error (Rassin et al., 2005). The most commonly utilized emotion-focused strategies were seeking social support and accepting responsibility for the error (Harrison et al., 2013; Karga et al., 2011). The strategy of seeking social support was utilized by health care professionals in all the studies in this review (Chard, 2010; Crigger & Meek, 2007; Edrees et al., 2011; Harrison et al., 2013; Joesten et al., 2014; Karga et al., 2011; Rassin et al., 2005; Schelbred & Nord, 2007; Scott et al., 2009; Treiber & Jones, 2010; Ullström et al., 2014). For many health care professionals seeking social support was their primary emotion-focused coping strategy (Chard, 2010; Karga et al., 2011). Health care professionals who sought social support and accepted responsibility for the error were more likely to successfully cope with the error and to make constructive changes in their professional practice (Chard, 2010; Karga et al., 2011). Conversely, health care professionals who utilized the emotional self-control coping strategies such as trying not to think about the error and trying not to let other people from knowing how bad things were, were more likely to make defensive changes in practice (Chard, 2010).

The emotion-focused coping strategies of distancing and escape-avoidance were also used by a few health care professionals shortly after they made the error (Schelbred and Nord, 2007). In the study by Schelbred and Nord (2007), all but one of the nurses choose to speak with the patient and family shortly after the error occurred (accepting responsibility), but then many of them avoided any further contact with the patient and family after. Avoiding further contact is a form of the emotion focused coping strategy of distancing. As one nurse stated, "it was hard every time I had to meet the patient. It was painful," and confronting the patient to tell them

about the error had been so difficult that any further contact was avoided (Schelbred & Nord, 2007, p. 320).

Social Support Needs

To assist with coping with the emotional distress they experienced following an error, health care professionals consistently expressed a need for emotional support from another person (Chard, 2010; Edrees et al., 2011; Harrison et al., 2013; Karga et al., 2011; Schelbred & Nord, 2007; Scott et al., 2009; Ullström et al., 2014). They described this support as being crucial to their emotional well-being and stated that without it, they would have had a difficult time coping with the error (Scott et al., 2009; Ullström et al., 2014). For some health care professionals this support was given by a peer, colleague, or supervisor (Chard, 2010; Edrees et al., 2011; Joesten et al., 2014; Schelbred & Nord, 2007; Scott et al., 2009; Ullström et al., 2014). For others, it was provided by a loved one or friend (Joesten et al., 2014; Rassin et al., 2005; Schelbred & Nord, 2007; Scott et al., 2009; Ullström et al., 2014).

More than 55% of the health care professionals in the Joesten et al. (2014) study, described their family or their friends as the mainstay of their support, however, 64% said that their colleagues also provided them with meaningful support. Some of the health care professionals in the Scott et al. (2009) study said they preferred the support of loved ones more than peers. However, they expressed that obtaining this type of support was often difficult because they did not always know what they could say without violating legal and privacy regulations (Scott et al., 2009). In contrast, for the majority of the health care professionals in the Ullström et al. (2014) and Schelbred and Nord (2007) studies, it was the support of other health care professionals, not loved ones or friends, which was integral to their coping. They described this peer support as beneficial because other health care professionals were able

empathize and imagine themselves being involved in an error and could better understand what they were going through (Ullström et al., 2014).

For those health care professionals who sought out the support of colleagues or supervisors, the reactions that they received from these people impacted how well they were able to cope with the emotional trauma of the error (Edrees et al., 2011; Schelbred & Nord, 2007; Ullström et al., 2014). If they received positive support, they were able to cope better with the error and were more likely to make constructive changes in their practice (Karga et al., 2011). If they did not receive the adequate support, health care professionals found it difficult to move forward with their coping processes (Ullström et al., 2014). Health care professionals said that they felt supported when they felt listened to and heard (Edrees et al., 2011). They were comforted if their colleagues were non-judgemental and shared their own experiences with making errors (Schelbred & Nord, 2007). Hearing about the experiences of others helped to alleviate their own feelings of shame, guilt, and fear and helped to improve their self-confidence (Schelbred & Nord, 2007).

It was important for health care professionals to feel respected by their supervisors and colleagues so if there was "grapevine gossip" regarding the error, they faced increasing self-doubt and diminishing confidence in their professional abilities (Scott et al., 2009, p. 328). The health care professionals in both the Edrees et al. (2011) and Schelbred and Nord (2007) studies described how it was detrimental to their coping if their colleagues minimized or made light of the error because in doing so, they were also minimizing the emotional trauma they were experiencing. This made it more difficult for them to cope with their fears about the effects of the error on the patient (Schelbred & Nord, 2007). Similarly, if their supervisor or colleagues

did not acknowledge the error and just remained silent, this too was detrimental to their coping (Edrees et al., 2011; Karga et al., 2011; Schelbred & Nord, 2007; Scott et al., 2009).

Health care professionals expressed a desire for long-term support that was tailored to meet their changing needs as they worked through their coping processes (Ullström et al., 2014). Some health care professionals stated that while they received adequate support right after the error, the support did not last and, after a short period of time, they were left to cope alone (Scott et al., 2009; Ullström et al., 2014). In the study by Joesten et al. (2014) only 37.5% of the health care professionals reported receiving "meaningful and sustained support after the event" (p. 4). As stated by one nurse in the Schelbred and Nord (2007) study, "I wish she (the head nurse) could have seen me. It seemed like she had forgotten it 2 days after I told her about it. She took it for granted that I could handle it on my own" (p. 321).

Organizational Support Needs

Many second victims stated that organizational support was beneficial to their recovery after an error; however, for various reasons, few received this type of support (Harrison et al., 2013; Joesten et al., 2014; Scott et al., 2009; Ullström et al., 2014). Some health care professionals said that they did not receive organizational support because they did not know where, or to whom they could go for support within their institution (Harrison et al., 2013; Joesten et al., 2014; Scott et al., 2009; Ullström et al., 2014). They described a lack of organized structures and routine processes for obtaining help after making an error (Joesten et al., 2014; Scott et al., 2009; Ullström et al., 2014). Health care professionals also expressed their concerns over the mental health stigma that may be attached to them if they sought out professional support, and said that this prevented them from seeking out this type of support (Edrees et al., 2011).

Health care professionals also expressed a need for their organization to learn from their error (Ullström et al., 2014). They wanted their organization to allow them the opportunity to talk about the working conditions, such as understaffing or inadequate routines, that may have contributed to the error (Ullström et al., 2014). If the organization chose not to examine these types of root causes, it increased the health care professionals' levels of distress (Ullström et al., 2014).

Long Term Effects

Following an error, some health care professionals experienced long-term emotional distress that affected them on both a professional and personal level (Harrison et al., 2013; Rassin et al., 2005; Schelbred & Nord, 2007; Scott et al., 2009; Ullström et al., 2014). The most common psychosocial symptoms experienced by health care professionals included flashbacks/reliving the event, loss of confidence, and extreme sadness (Crigger & Meek, 2007; Rassin et al., 2005; Scott et al., 2009; Ullström et al., 2014).

Nearly 66% of the health care professionals in the Joesten et al. (2014) study agreed with the statement "memories of what happened to the patient kept troubling me for a long time after the event" (p. 4). For some health care professionals there were specific triggers that brought on the flashbacks, but for others, the memory would just enter their mind without provocation (Scott et al., 2009). As one participant described it, "I still think about it. Just randomly you forget and then something will happen and it just pops into your head. You go over it again, what could I have done differently, what could I have said, what should I have done?" (Scott, 2009, p. 326).

Health care professionals experienced decreased self-confidence in their abilities at work and some reported feeling professionally inadequate (Chard, 2010; Crigger & Meek, 2007; Karga et al., 2011; Schelbred & Nord, 2007). Many found that the error posed a direct threat to

their professional image and they struggled to form a new self-image as an imperfect health care professional (Schelbred & Nord, 2007; Treiber & Jones, 2010). These feelings caused two of the nurses in the Schelbred and Nord (2007) study to distance themselves from their work by reducing their hours or changing their practice location. Some health care professionals reported being so affected by the error that they doubted their career choice (Scott et al., 2009; Ullström et al., 2014) or considered leaving the profession (Chard, 2010; Joesten et al., 2014; Karga et al., 2011). Thirty-nine percent of the health care professionals in the study by Scott et al. (2009) said that the error had caused them to second guess their career choice. Nearly 20% of the health care professionals in the study by Joesten et al. (2014) agreed with the statement "I seriously considered leaving my profession because of the event or what happened afterwards" (p. 4).

For many of the nurses, time was a great healer (Schelbred & Nord, 2007). They reported that as time passed, their anguish over the event lessened and they were better able to cope with their emotions and with the reality of what had occurred (Schelbred & Nord, 2007). This, however, was not the experience of all health care professionals. Some experienced clinical depression and needed sick leave from work (Ullström et al., 2014). Some nurses described their anxiety as enduring and said that their emotional state actually worsened over time:

[Half year after the error] Absurdly it got worse with time. At first I rationalized it, belittled it, nothing happened. But with time, the burden got heavier. Sometimes I have nightmares, I dream that the patient died, it all comes to me in flashbacks . . . but I try to forget (Rassin et al., 2005, p. 882).

Models Emerging from the Research

Based upon what I discovered during my literature search for this review, two theoretical frameworks have emerged from the research in this area. Crigger and Meek (2007) proposed the "theory of self-reconciliation" which is a model of "mistake making in nursing practice" (p. 177). In addition, Scott et al. (2009) proposed a six-stage recovery process that health care professionals transition through after they make an error in practice.

Theory of self-reconciliation. Based upon the results of their grounded research study, Crigger and Meek (2007) proposed a four-stage process of self-reconciliation after making an error. During the "reality hitting" stage, nurses experienced strong dysphoric responses as they realized an error had occurred (Crigger & Meek, 2007, p. 180). They compared their actions against their personal expectations and experienced shame and loss of self-esteem if they did not live up to their personal ideals (Crigger & Meek, 2007). During the stage of "weighing in," nurses decided whether to disclose the error (Crigger & Meek, 2007, p. 180). If the error caused, or could have caused, harm to the patient, nurses were more likely to disclose what had happened (Crigger & Meek, 2007). The experiences of nurses during the stage of "acting to make things right" were dependent on whether they chose to disclose their error (Crigger & Meek, 2007, p. 182). If they had disclosed the error to the patient, nurses would often apologize and make restitution to the patients and families affected by the error (Crigger & Meek, 2007). The nurses who did this described feeling "relief and a sense of closure when the mistake was disclosed and dealt with" (Crigger & Meek, 2007, p. 181). During the "resolving" stage, nurses evaluated the amount of harm that was experienced by the patient and family so that they (the health care professional) could move on from the error (Crigger & Meek, 2007, p. 181). Resolution of this stage was often incomplete because nurses were not able to find out what happened to their

patients or because they felt personally responsible for the patient's adverse outcomes (Crigger & Meek, 2007). If this step was left unresolved, nurses experienced long-lasting pain, guilt, and self-deprecation (Crigger & Meek, 2007).

Six stages of recovery. Based upon a study 31 health care professionals who made errors in practice, Scott et al. (2009) concluded that the post-error recovery trajectory for health care professionals was predictable in six stages: "(1) chaos and accident response, (2) intrusive reflections, (3) restoring personal integrity, (4) enduring the inquisition, (5) obtaining emotional first aid and (6) moving on" (p. 326). Stage 1 was a chaotic stage during which health care professionals discovered the error and struggled to understand what happened (Scott et al., 2009). During stage 2, health care professionals isolated themselves from others, replayed the situation in their minds, and asked themselves "what if" questions (Scott et al., 2009). During stage 3, health care professionals emerged from their self-isolation and attempted to restore their self-confidence through seeking out the support of others (Scott et al., 2009). If they were met with unsupportive or negative responses, they would stall at this stage and have difficulty moving forward (Scott et al., 2009). During stage 4, health care professionals began to consider how the error might affect their career and whether or not there would be any legal repercussions (Scott, 2009, p. 328). In stage 5, health care professionals sought out support from a variety of sources in order to find answers to questions such as "where can I turn for help" and "why did I respond in this manner" (Scott et al., 2009, pp. 328-329). In stage 6, the final stage of recovery, health care professionals followed one of three paths: "dropping out, surviving, or thriving" (Scott et al., 2009, p. 330). Those who dropped out, did so by moving to a different practice location or by leaving the profession all together (Scott et al., 2009). Those who survived were able to practice their profession competently, but remained plagued by the error (Scott, 2009).

Those who thrived were able to use the error as a learning experience and make constructive changes to their practice (Scott, 2009).

In summary, as a result of being involved in an error, health care professionals experienced emotional distress and range of negative emotions. The most common coping strategy that health care professionals used after an error was seeking social support. This support, when provided appropriately, promoted the coping ability of the health care professional. Following involvement in an error, some health care professionals were able to cope adaptively and did not suffer any long term negative effects. However, others developed symptoms of posttraumatic stress disorder which, for some, led to their leaving the profession.

Chapter 4: Discussion

My purpose in conducting this integrative literature review was to explore ways in which health care professionals reacted and coped after making an error in practice. In particular, I wanted to answer two questions: (a) how do health care professionals respond to being involved in a medical error? (b) what types of support do health care professionals require after being involved in an error? In this chapter, I provide the answers to these questions by summarizing the main findings of my review. I discuss some of the major limitations of this literature review. I explore the implications for advanced nursing practice. Lastly, I provide suggestions for future nursing research.

Emotional Distress

After making errors in practice, health care professionals experienced feelings of intense emotional distress. The most commonly reported emotions were anxiety-fear, guilt-shame, anger, and sadness. Immediately upon discovering the error, health care professionals described feelings of shock and panic (Ullström et al., 2014). For some, this emotional distress was so severe that they were unable to continue caring for the patient after the error (Scott et al. 2009). After making an error, some health care professionals felt they had betrayed their patients, their colleagues, and even their own families (Schelbred & Nord, 2007). They expressed concerns regarding how the error might affect the health and well-being of the patient (Chard, 2010; Karga et al., 2011). They also worried about the effects that the error may have on their own career (Rassin et al. 2005).

These findings are consistent with studies that have been conducted with physicians. Schwappach and Boluarte (2009) conducted a systematic review to explore the ways that physicians were impacted by making an error in practice. They determined that the most

common reactions described by physicians included "distress, self-doubt, confusion, fear, remorse, guilt, feelings of failure and depression, anger, shame and inadequacy" (Schwappach & Boluarte, 2009, p. 10). Despite these similar findings, it appears that there may be differences in the ways that nurses and physicians react to making an error (Harrison et al., 2013; Wolf et al., 2000). Harrison et al. (2013) compared the emotional reactions of nurses and physicians and found that nurses reported significantly higher scores on all of the most commonly reported negative emotions. Wolf et al. (2000) examined how nurses and physicians responded to making medication errors. They found that nurses reported higher levels of guilt, worry, and embarrassment when compared with physicians (Wolf et al., 2000). They also found nurses had higher levels of fear than physicians with regards to patient outcome, disciplinary action and punishment (Wolf et al., 2000).

Although not specifically addressed in the studies in this review, there are many individual traits and characteristics (antecedent variables) (Lazarus, 1991b) that may impact how health care professionals react to making an error in practice. Two such variables include gender and generational differences.

Previous research has found that there are differences in the ways men and women experience emotional distress (Kaldjian et al., 2008; Muller & Ornstein, 2007; Waterman et al., 2007). Female physicians have been found to be more likely than male physicians to suffer adverse emotional effects after making an error in practice (Kaldjian et al., 2008; Muller & Ornstein, 2007; Waterman et al., 2007). Similarly, female medical students have been shown to be more likely than males to feel guilty and angry with themselves after making an error, and more likely to experience self-doubt, and to fear repercussions (Muller & Ornstein, 2007).

Clipper (2012) reports that generational differences may have an influence on nurses' perceptions regarding how their job impacts their self-image (Clipper, 2012). As the impact on self-image (ego identity) is an integral component of appraisal, it may influence the emotions, coping and long term effects health care professionals experience after making an error (Lazarus, 1991b).

One finding from this review was different from what has been reported in previous research. Based upon the results of a systematic review, Schwappach and Boluarte (2009) concluded that poor patient outcomes led to increased levels of distress in physicians. However, the results of this review indicated that the emotional reactions experienced by the health care professionals after making an error were not affected by the level of harm experienced by the patient (Harrison et al., 2013; Joesten et al., 2014; Schelbred & Nord, 2007; Treiber & Jones, 2010; Ullström et al., 2014). Many health care professionals found that they were deeply troubled by errors, even when patients were not harmed (Schelbred & Nord, 2007). In fact, some health care professionals reported that they were just as affected by the thought of what might have happened to the patient, as they were by what actually happened (Schelbred & Nord, 2007; Ullström et al., 2014).

Coping Strategies

Following involvement in an error, the health care professionals used a variety of problem-focused and emotion-focused coping strategies (Chard, 2010; Harrison et al., 2013; Karga et al., 2011; Rassin et al., 2005; Schelbred & Nord, 2007). Certain types of coping strategies were found to be predictive of constructive (positive) changes in practice, whereas others were predictive of defensive changes. The use of escape-avoidance (Chard, 2010; Karga et al., 2011) and distancing (Karga et al., 2011; Meurier, Vincent, & Parmar, 1997) coping

strategies tended to be predictive of defensive changes in practice. The use of problem solving (Chard, 2010; Meurier et al., 1997), seeking social support (Chard, 2010; Karga et al., 2011; Meurier et al., 1997), and accepting responsibility (Karga et al., 2011; Meurier et al., 1997) coping strategies were predictive of constructive changes in practice. Therefore, after making an error in practice, health care professionals should be encouraged to seek support from peers and to accept responsibility for their error as these strategies are likely to promote constructive practice changes.

It is worth noting, however, that health care professionals who accept responsibility for the error are more likely to experience increased anxiety, decreased self-confidence, and increased self-blame (Chard, 2010; Meurier et al., 1997; Meurier, Vincent, & Parmar, 1998; Smith & Forster, 2000; Zeelenberg, 1999). Despite this, health care professionals should be encouraged to accept responsibility for their error as accepting responsibility is a significant predictor of adaptive coping (Wu, Folkman, McPhee, & Lo, 2003). Health care professionals who do not accept responsibility are much less likely to seek social support and this will negatively their ability to successfully cope with the error (Meurier et al., 1997). In addition, in order for health care professionals to lessen their guilt, they need to apologize for their error (Lazarus, 1991b), and to do this, they must first accept responsibility for the error (Crigger, 2004). Therefore, even though accepting responsibility will increase the emotional distress of health care professionals, it will also provide them with the opportunity to reconcile the error, move forward, and begin to heal (Crigger & Meek, 2007).

Accepting responsibility and disclosing errors are supported by the Canadian Disclosure Guidelines that recommend any error that results in harm, or has the potential to lead to harm in the future, must be disclosed to the patient (Canadian Patient Safety Institute, 2011). For near-

misses and close call errors, they suggest the decision on whether to report should be based upon what is best for the patient (Canadian Patient Safety Institute, 2011).

Long-Term Effects

For some health care professionals, the emotional distress they experienced after making an error imprinted long-term emotional scarring. In the initial month following an error, many experienced symptoms that were consistent with acute stress disorder (Crigger & Meek, 2007; Rassin et al., 2005; Schelbred & Nord, 2007; Scott et al., 2009; Wu, Boyle, Wallace, & Mazor, 2013). Acute stress disorder is characterized by acute stress reactions and includes "symptoms of intrusion, dissociation, negative mood, avoidance, and arousal" (Bryant, 2014, para. 1). For some health care professionals, these symptoms subsided within the first few weeks after the error. For others, the symptoms lingered on and they developed symptoms of Posttraumatic Stress Disorder. Posttraumatic Stress Disorder is characterized by "intrusive thoughts, nightmares and flashbacks of past traumatic events, avoidance of reminders of trauma, hypervigilance, and sleep disturbance" (Ciechanowski, 2014, para. 1). For example, after making an error, some health care professionals expressed sleep disturbances, insomnia, and nightmares that lasted for years after the event (Crigger & Meek, 2007; Schelbred & Nord, 2007; Scott et al., 2009; Ullström et al., 2014). Health care professionals also reported that, as result of making an error, they doubted their career choice (Scott et al., 2009; Ullström et al., 2014) and some even left the profession (Schelbred & Nord, 2007).

Support Needs

It was evident from this integrative literature review that health care professionals were not only affected by the error itself, but were also greatly impacted by the way the error was handled by their peers and their health care organization (Edrees et al., 2011; Schelbred & Nord,

2007; Scott et al., 2009; Ullström et al., 2014; Waterman et al., 2007). Reactions from friends, family, colleagues, managers and the organization either positively or negatively impacted the health care professional's ability to successfully cope after making an error. If health care professionals received adequate social and organizational support, the negative effects from the error were lessened (Scott et al., 2010; Sirriyeh, Lawton, Gardner, & Armitage, 2010). Whereas, if no support was provided, or if the support was inadequate, the negative impacts were intensified and enduring (Edrees et al., 2011; Schelbred & Nord, 2007; Scott et al., 2009; Ullström et al., 2014; White et al., 2008).

In the Canadian Disclosure Guidelines, the Canadian Patient Safety Institute (2011) recommends that after making an error, health care professionals receive emotional and practical support to assist them in coping. This same need for support is also reflected in the National Quality Forum's safe practice recommendations (2010). In this document, the National Quality Forum recommends that health care professionals receive timely, compassionate, and respectful support, regardless of whether the error resulted from a human error, a system failure, or a combination of both.

There are two main methods by which that organizations can conceptualize an error: the person approach and the system approach (Reason, 2000). The person approach, which has been dominant in health care for many years, focuses on individuals as the cause of the error and directs blame towards them (Reason, 2000). With this type of approach, the opportunity for organizations to learn from the error is limited and thus there is little opportunity to improve patient safety (World Health Organization, 2008). In addition, this blame-focused approach increases the emotional distress felt by the health care professionals who were involved in the error.

The system approach, however, rests on the assumption that humans are fallible, and focuses on the environmental and contextual risk factors, rather than on individuals (Reason, 2000). Shifting the blame away from the individual mitigates against increased emotional trauma for the health care professional. In addition, it allows for the organization to learn from the error and to design systems to prevent or minimize the harm caused by errors (Reason, 2000; World Health Organization, 2008). This system approach is congruent with Just Culture environments where health care professionals are able to shift their focus from feeling accountable for making an error to feeling accountable for reporting the error and using it as a learning opportunity to improve patient safety (EUROCONTROL Performance Review Commission, 2006; Marx, 2001).

Theoretical Perspective

I utilized Lazarus' Cognitive-Motivational-Relational-Theory of emotions to guide me in this literature review. Through this lens, I explored the ways that nurses reacted to and coped with making error in practice. Exploring this topic from the perspective of the CMRT enriched my learning in several ways. It enabled me to conceptualize the appraisal processes health care professionals undertake after making an error and to understand how these processes were linked to the emotions the health care professionals were likely to experience. In addition, it helped me to understand that the majority of the emotions that health care professionals experienced after an error were negative because they were incongruent with most health care professionals' goal of doing no harm to their patients. It also enabled me to visualize how, through adaptation and reappraisal (Figure 2, page 27), some health care professionals also experienced positive emotions after making an error in practice. The CMRT's goodness-of-fit (GOF) hypothesis posits that if a person is able to make changes to their situation, problem-focused coping

strategies should be employed (Lazarus & Folkman, 1984). However, if a person no longer has any direct control over their situation, then emotion-focused strategies are more adaptive (Lazarus & Folkman, 1984). Having this knowledge assisted me in understanding why problem-focused strategies were effective for health care professionals to employ as soon as the error occurred. During this time, health care professionals still had the ability to act directly on the situation and to prevent further harm to the patient. It also allowed me to understand why, after the error had occurred and health care professionals no longer had the ability to change the situation, it was more adaptive for them to employ emotion-focused coping strategies such as accepting responsibility for the error and seeking social support from family, friends, and colleagues. Through examining the findings through the perspective of the CMRT, I was also able to locate gaps in the research and make suggestions for future research regarding how the individual characteristics of nurses may affect their emotions and the coping processes that they utilize after making an error.

Limitations of this Review

There were several limitations of this integrative literature review. I was the sole reviewer for this review and as such, I independently selected, analyzed, and synthesized the data and this may have introduced bias into these steps. As mentioned previously, my original interest was to examine the literature pertaining to the experiences of nurses who made errors in practice. However, the paucity of nursing-only research required that I expand my sample to include other health care professionals. In broadening the population to include other health care professionals, I cannot definitively state that the findings are representative of the experiences of nurses. Furthermore, even after utilizing a four-step method to identify relevant literature and broadening the sample to include other health care professionals, the final sample size was small

with only eleven studies including four quantitative studies, six qualitative studies, and one mixed methods study. In addition, all of the studies in this review used volunteer subjects, so each study had a potential for self-selection bias. Finally, each of the studies had the possibility of social-desirability bias as participants may have chosen to provide responses based upon what they think they should say, rather than what they actually felt and experienced after making an error.

Despite the limitations of this review, the analysis revealed several fundamental implications for nursing practice. After conducting a Root Cause Analysis of sentinel event data from 2010-2012, the Joint Commission (n.d.) determined the most frequently identified root causes of errors were: (1) human factors (e.g. staffing levels, staff orientation, in-service education, and staff supervision); (2) communication (e.g. oral, written, and electronic communication amongst staff and with patients and families); and (3) leadership related to organizational culture, leadership collaboration, inadequate policies and procedures, or standardization (e.g. clinical practice guidelines). It is imperative, therefore, that frontline nurses, nurse educators and nursing leadership examine these factors within their own organizations.

Implications for Nursing Practice

Protection of patient safety is one of the fundamental roles of nurses (Canadian Nurses Association, & University of Toronto Faculty of Nursing, 2004). In order to practice safely, nurses must be aware of their own scope of practice as set out by legislation and agency policy, and must practice within this scope (College of Registered Nurses of British Columbia. (2015b). They must also be aware of the scope of practice of other health care practitioners that they work

alongside, such as licensed practical nurses and unregulated health care professionals and understand their own role in mentoring others and delegating tasks.

In addition, experienced nurses must understand the competencies of newly graduated nurses. Recognizing that newly graduated nurses will develop most effectively when provided with the appropriate mentoring and support, experienced nurses can provide new nurses with opportunities to consolidate their learning and develop their required competencies (College of Registered Nurses of British Columbia, 2015a). Furthermore, to ensure safe care and minimize the potential of making an error, nurses must undertake quality assurance activities to support their ongoing competence and professional development. This may be achieved by meeting minimum practice hours, seeking feedback from peers, completing self-assessments, and implementing a professional development plan (College of Registered Nurses of British Columbia, 2014).

It is also fundamental that nurses ensure a good work-life balance, which includes an awareness of being over-worked and efforts to reduce job-related stress. Evidence indicates that there is a direct link between higher nurse staffing levels and better patient outcomes and that understaffing nurses poses a significant threat to patient safety (Canadian Nurses Association, 2005; National Expert Commission, 2012). The national nursing shortage has led to nurses working longer hours, taking fewer breaks, and working more overtime shifts (Canadian Nurses Association, 2005). These factors, combined with nurses' increased workloads, higher patient to nurse ratios, and increased patient acuity, can negatively affect patient safety (Canadian Nurses Association, 2005). Nurses at all levels must advocate for health care reform to address these unsafe working conditions that contribute to increased errors and decreased patient safety.

Implications for Nursing Education

The literature indicates that many health care professionals will make their first error during their clinical practice placements as students (Bell, Moorman, & Delbanco, 2010; Treiber & Jones, 2010). For this reason, education regarding errors should be a part of undergraduate nursing curriculum; this education would be well placed within nursing ethics classes. The Canadian Nurses Association (2008) Code of Ethics states that nurses must “admit mistakes, and take all necessary actions to prevent or minimize harm arising from an adverse event. They work with others to reduce the potential for future risks and preventable harms” (Canadian Nurses Association, 2008, p. 9). Nursing ethics courses could review this requirement and allow students to explore their vital role in error reduction and prevention.

Furthermore, nurse educators could teach students to acknowledge human fallibility and understand that if they make or witness an error, they have a professional responsibility to report. As reporting and disclosing an error may be difficult for nursing students, teaching them effective communication and coping skills including self-awareness, stress reduction, and conflict resolution, will be integral to their success. Students could also be provided with opportunities to practice their communication skills when reporting and disclosing medical errors through case studies, role play, or simulation.

Of additional importance, interprofessional collaboration and patient-centred practices have been shown to positively impact patient safety (Enhancing Interdisciplinary Collaboration in Primary Health Care Initiative, 2005). According to a joint commission “70% of patient adverse events were due to lack of collaboration and communication between providers as a main cause of error” (Fewster-Thuente & Velsor-Friedrich, 2008, p.40). Therefore, a focus on these concepts should be threaded throughout nursing curricula.

Finally, evidence shows that increased nursing vigilance leads to a decrease in medical errors (Institute of Medicine of the National Academies, 2004). Nurse educators in the clinical setting could encourage students to question and report anything that they see that may pose a risk to patient safety. Post-conferences are an ideal time to discuss patient safety with students and reinforce the need to be vigilant.

Implications for Advanced Practice Nurses

Through planning and implementation of orientation and training programs, advanced practice nurses in hospital settings support new graduates in developing the competencies required for safe, competent, and ethical nursing practice (Canadian Nurses Association, 2007). Advanced practice nurses also support experienced nurses to develop or maintain their competencies and ensure they stay current with changing knowledge and technology (Institute of Medicine of the National Academies, 2004). These orientation and training programs should include information on error reporting and disclosure. They should also guide the health care professional in how and where to they would go for support after an error. The concepts of Just Culture could form the theoretical underpinnings of this training.

Nurses' moral and ethical imperative to care should not stop with their patients but should extend to include their colleagues and peers. As previously stated, the National Quality Forum (2010) recommends that patient safety improves when health care professionals receive compassionate and supportive care after making an error. In addition, the CNA Code of Ethics states that nurses should "refrain from judging, labeling, demeaning, stigmatizing and humiliating behaviours toward . . . other healthcare professionals and each other" (Canadian Nurses Association, 2008, p. 17). Advanced practice nurses can assist organizations in

supporting these recommendations through the development of peer-support programs that teach health care professionals how to support each another after an error.

Advanced practice nurses also have a moral and ethical responsibility to support nurses who are involved in making an error in practice. This could be accomplished by providing anticipatory guidance to nurses, including information about the symptoms of acute stress disorder that the nurse may experience in the first few weeks after the error (Rassin et al., 2005). Discussion could also include information about the stages of reconciliation (Crigger and Meek (2007) and the post-error recovery process that the nurse is likely to experience (Scott et al. 2009).

Simulation offers nurses the opportunity to practice their nursing skills in an environment where, if they make an error, there is no risk to an actual person (World Health Organization, 2008). The use of simulation would be invaluable to advanced practice nurses who are responsible for assisting nurses to learn new skills and helping experienced nurses to reinforce their skills. Simulation may be used for a wide range of situations, from intravenous line insertion through to Advanced Life Support skills. The use of simulation could also be applied to simulated errors or near-misses and allow the advanced practice nurse the opportunity to walk through the post error processes—from disclosure to the patient, to entering the error into a reporting learning system, through to where the nurse would seek support after the error.

Often, the role of advanced practice nurses includes the development of protocols, policies, and best-practice guidelines. When developed and utilized appropriately, these tools lead to decreased errors and increased patient safety (Wong, & Beglaryan, 2004). Advanced practice nurses may be involved in quality improvement initiatives and take on roles as patient

safety champions who are responsible for designing and improving patient safety systems (Wong, & Beglaryan, 2004).

Quality improvement initiatives may include Root Cause Analyses and interpretation of data from interprofessional patient safety learning systems (Wong, & Beglaryan, 2004). Root Cause Analysis involves the systematic analysis of all the factors that led to, or had the potential to prevent, a medical error (World Health Organization, 2008). Root Cause Analyses look beyond human fallibility and consider the contextual factors that contribute to medical errors (World Health Organization, 2008). They provide organizations with the opportunity to understand how and why the error occurred and to determine ways to prevent future occurrences (World Health Organization, 2008). Through conducting Root Cause Analyses, organizations may also strengthen nurse-physician relationships by supporting interprofessional collaboration throughout the investigation process (Wong, & Beglaryan, 2004). After the analysis is complete, the results and lessons learned could be disseminated to staff so that everyone may learn from the event. During this reporting process, the anonymity of those who were involved in the error must be protected to avoid causing them any further emotional harm.

Advanced practice nurses can support this focus on quality improvement initiatives and delivery of high quality patient care by promoting their organization to move towards becoming a high reliability organization. High reliability organizations provide safe care to patients and have specific training to minimize errors (Gauthier, Davis, & Schoenbaum, 2006). They are preoccupied with errors and are attentive to even the smallest sign that something may be unsafe (Weick and Sutcliffe, 2007). In addition, they require the reporting of all errors and near misses and create environments where everyone feels safe reporting safety issues and errors (Weick and Sutcliffe, 2007). Another predominant characteristic of high reliability organizations is that

they are resilient (Weick and Sutcliffe, 2007). Resilient organizations are not error-free, but when errors do occur, they do not disabling for the organization (Weick and Sutcliffe, 2007). High reliability organizations promote Just Culture environments where staff are empowered to identify safety issues and take measures to remediate the situation before patient safety is compromised (Agency for Healthcare Research and Quality, 2008).

As to err is human, it is unavoidable that medical errors will occur and the implications for nursing practice are numerous. It is imperative that nurses are educated not only around error prevention but also on how to seek support for themselves in the aftermath of an error. Advanced practice nurses can assist with this support and education for nurses. Advanced practice nurses also have key roles in risk management, quality assurance, and quality improvement. Additionally, nurse leaders must create a climate of just culture and promote the principles of high reliability organizations. Despite what is already known about error prevention and best-practices to support nurses after making an error, there are several areas where more research is needed.

Suggestions for Future Research

Research examining the ways that nurses react to and cope with making errors in practice is still in its infancy. The impact on nurses has not been fully explored in the literature and there is a paucity of empirical evidence exploring the experiences of nurses who make errors in practice (Lewis, Baernholdt, & Hamric, 2013; Waterman et al., 2007; Wu, 2000). A greater number of studies have looked at the experiences of physicians; however, there appears to be differences between the ways that physicians and nurses experience errors, so these results cannot be generalized to include nurses. It is important that more research be conducted that

looks specifically at the experiences of nurses and takes into consideration the psychological, emotional, spiritual, moral, and physical effects of making an error in practice.

This literature review was guided by Lazarus' Cognitive-Motivational-Relational-Theory of emotion; within this theory, emotions and coping are viewed as relational concepts (Lazarus, 1991b). Emotions and coping are created through interactions between people and their environments, and cannot be predicted by examining the individual or the environment in isolation (Krohne, 2001; Lazarus, 1991a). The majority of the studies in this review did not examine individual characteristics of the health care professional, and instead, focused only on the type of error made. Further research can be conducted to better understand how individual characteristics such as gender, length of time in practice, generation, or level of education may affect the emotional and coping experiences of nurses who make an error in practice.

Most of the research in this review focused only on the negative effects that the error had on health care professionals. However, recent research is beginning to explore the concept of posttraumatic growth (PTG) which is "positive change that occurs as a result of the struggle with highly challenging life crises" (Tedeschi & Calhoun, 2004, p. 1). With PTG, health care professionals who make an error would "move through a process of rumination and, with self-disclosure and social support, [be] able to . . . grow (Plews-Ogan, Owens, & May, 2013, p. 236). Research is needed to explore the concept of PTG in the context of health care professionals making errors in practice.

Conclusion

The purpose of this integrative literature review was to explore the ways in which health care professionals reacted to, and coped with making an error in practice. This review was guided by Whittemore and Knafel's (2005) integrative literature review framework. Findings

indicate that, as a result of being involved in an error, health care professionals experience emotional distress that affects them on a personal as well as professional level. The most commonly expressed emotions were guilt, shame, anxiety, fear, anger, and sadness. The severity of the emotional distress was not affected by the level of harm that occurred to the patients; indeed, health care professionals were significantly impacted by errors that did not cause patient harm. Although health care professionals used various forms of problem-focused and emotion-focused coping, seeking social support was the most frequently used coping strategy. When effective support was provided to health care professionals, it enhanced the ability to adaptively cope with the error. Most health care professionals were able to adaptively cope after the event, but for some the negative emotional distress affected them for years after the event.

To date, there has been limited research examining the experiences of nurses who make errors in practice. The results of this review contribute to the development of knowledge in this burgeoning field and may be used to inform advanced practice nursing in academic and health care settings.

References

- Agency for Healthcare Research and Quality. (2008). *Becoming a high reliability organization: Operational advice for hospital leaders*. (Publication No. 08-0022). Falls Church, VA: The Lewin Group,
- Arndt, M. (1994). Nurses' medication errors. *Journal of Advanced Nursing*, *19*(3), 519-526.
doi:10.1111/j.1365-2648.1994.tb01116.x
- Baker, G. R., Norton, P. G., Flintoft, V., Blais, R., Brown, A., Cox, J., . . . Tamblyn, R. (2004). The Canadian adverse events study: The incidence of adverse events among hospital patients in Canada. *CMAJ : Canadian Medical Association Journal*, *170*(11), 1678-1686.
doi:10.1503/cmaj.1040498
- Bell, S. K., Moorman, D. W., & Delbanco, T. (2010). Improving the patient, family, and clinician experience after harmful events: The "when things go wrong" curriculum. *Academic Medicine : Journal of the Association of American Medical Colleges*, *85*(6), 1010-1017. doi:10.1097/ACM.0b013e3181dbedd7
- Bryant, R. (2014). Acute stress disorder: Epidemiology, pathogenesis, clinical manifestations, course, and diagnosis. In M. B. Stein, & R. Hermann (Eds.), *UpToDate*. Waltham, MA.
- Canadian Nurses Association. (n.d.). *Position statement on patient safety*. (No. PS-70). Canadian Nurses Association. Retrieved from https://www.cna-aaic.ca/~media/cna/page-content/pdf-en/8%20-%20ps70_patient-safety_en.pdf?la=en
- Canadian Nurses Association. (2005). *Research summary nurse staffing: Long working hours of hospital RNs associated with increased errors*. Ottawa, ON: Author. Retrieved from https://cna-aaic.ca/~media/cna/page-content/pdf-en/rs_long_working_hours_e.pdf?la=en

- Canadian Nurses Association. (2007). *Framework for the practice of registered nurses in Canada*. Ottawa, ON: Author. Retrieved from <https://www.cna-aiic.ca/~media/cna/page-content/pdf-en/framework-for-the-practice-of-registered-nurses-in-canada.pdf?la=en>
- Canadian Nurses Association. (2008). *Code of ethics for registered nurses*. Ottawa, ON: Author. Retrieved from <https://www.cna-aiic.ca/~media/cna/page-content/pdf-fr/code-of-ethics-for-registered-nurses.pdf?la=en>
- Canadian Nurses Association, & University of Toronto Faculty of Nursing. (2004). *Nurse and patient safety: A discussion paper*. Ottawa, ON: Authors. Retrieved from http://www.cna-aiic.ca/~media/cna/files/en/patient_safety_discussion_paper_e.pdf?la=en
- Canadian Patient Safety Institute. (2011). *Canadian disclosure guidelines: Being open with patients and families*. Edmonton, AB: Author.
- Chard, R. (2010). How perioperative nurses define, attribute causes of, and react to intraoperative nursing errors. *AORN Journal*, 91(1), 132-145.
doi:10.1016/j.aorn.2009.06.028
- Christensen, J. F., Levinson, W., & Dunn, P. M. (1992). The heart of darkness: The impact of perceived mistakes on physicians. *Journal of General Internal Medicine : JGIM*, 7(4), 424-431. doi:10.1007/BF02599161
- Ciechanowski, P. (2014). Posttraumatic stress disorder: Epidemiology, pathophysiology, clinical manifestations, course, and diagnosis. In M. B. Stein, & R. Hermann (Eds.), *UpToDate*. Waltham, MA.
- Clipper, B., (2012). *The nurse managers guide to an inter-generational workforce*. Indianapolis, IN: Sigma Theta Tau International.

- College of Registered Nurses of British Columbia. (2014). *Quality assurance program checklist for registered nurses*. (Pub. No. 366). Vancouver, BC: Author. Retrieved from <https://crnbc.ca/QA/Documents/366QualityAssurancechecklist.pdf>
- College of Registered Nurses of British Columbia. (2015a). *Competencies in the context of entry level registered nurse practice in British Columbia*. (Pub. No. 375) Vancouver, BC: Author. Retrieved from <https://crnbc.ca/Registration/Lists/RegistrationResources/375CompetenciesEntrylevelRN.pdf>
- College of Registered Nurses of British Columbia. (2015b). *Scope of practice for registered nurses: Standards limits and conditions*. (Pub. No. 433). Vancouver, BC: Author. Retrieved from <https://www.crnbc.ca/Standards/Lists/StandardResources/433ScopeforRegisteredNurses.pdf>
- Cooper, H. M. (1998). *Synthesizing research : A guide for literature reviews*. Thousand Oaks, CA: Sage Publications.
- Corrigan, J., Donaldson, M. S., & Kohn, L. T. (2000). *To err is human : Building a safer health system*. Washington, D.C: National Academy Press.
- Coughlan, M., Cronin, P., & Ryan, F. (2013). *Doing a literature review in nursing, health and social care*. London ; Thousand Oaks, CA: SAGE.
- Crigger, N. J. (2004). Always having to say you're sorry: An ethical response to making mistakes in professional practice. *Nursing Ethics*, 11(6), 568-576. doi:10.1191/0969733004ne739oa
- Crigger, N. J. (2005). Two models of mistake making in professional practice: Moving out of the closet. *Nursing Philosophy*, 6(1), 11-18. doi:10.1111/j.1466-769X.2004.00203.x

Crigger, N. J., & Meek, V. L. (2007). Toward a theory of self-reconciliation following mistakes in nursing practice. *Journal of Nursing Scholarship*, 39(2), 177-183. doi:10.1111/j.1547-5069.2007.00164.x

Edrees, H. H., Paine, L. A., Feroli, E. R., & Wu, A. W. (2011). Health care workers as second victims of medical errors. *Polskie Archiwum Medycyny Wewnętrznej*, 121(4), 101-108.

Enhancing Interdisciplinary Collaboration in Primary Health Care Initiative. (2005). The principles and framework for interdisciplinary collaboration in primary health care. Ottawa: Author. Retrieved from <http://www.eicp.ca/en/principles/march/eicp-principles-and-framework-march.pdf>

EUROCONTROL Performance Review Commission. (2006). *Legal and cultural issues in relation to ATM safety occurrence reporting in Europe: Outcome of a survey conducted by the performance review unit in 2005-2006*. Brussels, Belgium: European Organisation for the Safety of Air Navigation.

Fahrenkopf, A. M., Sectish, T. C., Barger, L. K., Sharek, P. J., Lewin, D., Chiang, V. W., . . .

Landrigan, C. P. (2008). Rates of medication errors among depressed and burnt out residents: Prospective cohort study. *BMJ: British Medical Journal*, 336(7642), 488-491. doi:10.1136/bmj.39469.763218.BE

Fewster-Thuente, L. & Velsor-Friedrich, B. (2008). Interdisciplinary collaboration for healthcare professionals. *Nursing Administration Quarterly*, 32(1), 40-48.

Folkman, S. (1984). Personal control and stress and coping processes: A theoretical analysis. *Journal of Personality and Social Psychology*, 46(4), 839-852. doi:10.1037/0022-3514.46.4.839

- Folkman, S., & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior, 21*(3), 219-239.
- Folkman, S., & Lazarus, R. S. (1988). Coping as a mediator of emotion. *Journal of Personality and Social Psychology, 54*(3), 466-475. doi:10.1037/0022-3514.54.3.466
- Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology, 55*(1), 745-774. doi:10.1146/annurev.psych.55.090902.141456
- Gauthier, A. K., Davis, K., & Schoenbaum, S. C. (2006). Commentary: Commentary--achieving a high-performance health system: High reliability organizations within a broader agenda. *Health Services Research, 41*(4p2), 1710. doi:10.1111/j.1475-6773.2006.00617.x
- Grant, T., & Carter, S. (2004). *Women in medicine: A celebration of their work*. Richmond Hill, ON; Buffalo, NY: Firefly Books.
- Harrison, R., Lawton, R., Perlo, J., Gardner, P., Armitage, G., & Shapiro, J. (2013). Emotion and coping in the aftermath of medical error: A cross-country exploration. *Journal of Patient Safety, 11*(1), 28-35. doi:10.1097/PTS.0b013e3182979b6f
- Institute of Medicine of the National Academies. (2004). *Keeping Patients Safe: Transforming the Work Environment of Nurses*. Washington, DC: National Academies Press.
- Institute of Medicine of the National Academies. (2007). *Preventing medication errors*. Washington, DC: The National Academies Press.
- Joesten, L., Cipparrone, N., Okuno-Jones, S., & DuBose, E. R. (2014). Assessing the perceived level of institutional support for the second victim after a patient safety event. *Journal of Patient Safety, 1*-6. doi:10.1097/PTS.0000000000000060
- Jones, J., H., & Treiber, L., A. (2012). When nurses become the 'second' victim. *Nursing Forum, 47*(4), 286-291. doi:10.1111/j.1744-6198.2012.00284.x

- Kaldjian, L. C., Forman-Hoffman, V. L., Jones, E. W., Wu, B. J., Levi, B. H., & Rosenthal, G. E. (2008). Do faculty and resident physicians discuss their medical errors? *Journal of Medical Ethics, 34*(10), 717-722. doi:10.1136/jme.2007.023713
- Karga, M., Kiekkas, P., Aretha, D., & Lemonidou, C. (2011). Changes in nursing practice: Associations with responses to and coping with errors. *Journal of Clinical Nursing, 20*, 3246-3255. doi:10.1111/j.1365-2702.2011.03772.x
- Krohne, H. W. (2001). Stress and coping theories. In N. J. Smelser, & P. Baltes B. (Eds.), *International encyclopedia of the social & behavioral sciences* (pp. 15163-15170). Pergamon, Oxford: Elsevier Ltd. doi:10.1016/B0-08-043076-7/03817-1
- Landrigan, C. P., Parry, G. J., Bones, C. B., Hackbarth, A. D., Goldmann, D. A., & Sharek, P. J. (2010). Temporal trends in rates of patient harm resulting from medical care. *The New England Journal of Medicine, 363*(26), 2573-2573. doi:10.1056/NEJMx100096
- Lassetter, J. H., & Warnick, M. L. (2003). Medical errors, drug-related problems, and medication errors: A literature review on quality of care and cost issues. *Journal of Nursing Care Quality, 18*(3), 175-181. doi:10.1097/00001786-200307000-00003
- Law, M., Stewart, D., Pollock, N., Letts, L., Bosch, J., & Westmorland, M. (1998a). *Critical review form – Quantitative studies*. Hamilton, ON: McMaster University. Retrieved from <http://www.srs-mcmaster.ca/Portals/20/pdf/ebp/quantreview.pdf>
- Law, M., Stewart, D., Pollock, N., Letts, L., Bosch, J., & Westmorland, M. (1998b). *Guidelines for critical review form – quantitative studies*. Hamilton, ON: McMaster University. Retrieved from <http://www.srs-mcmaster.ca/Portals/20/pdf/ebp/quanguidelines.pdf>
- Lazarus, R. S. (1991a). Progress on a cognitive-motivational-relational theory of emotion. *American Psychologist, 46*(8), 819-834. doi:10.1037/0003-066X.46.8.819

Lazarus, R. S. (1991b). *Emotion and adaptation*. New York, NY: Oxford University Press.

Lazarus, R. S. (1992). Coping theory and research: Past, present, and future. *Psychosomatic Medicine*, 55(3), 234-247. doi:10.1097/00006842-199305000-00002

Lazarus, R. S. (1993). From psychological stress to the emotions: A history of changing outlooks. *Annual Review of Psychology*, 44(1), 1-22.
doi:10.1146/annurev.ps.44.020193.000245

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer Publishing Company, Inc.

Lazarus, R. S., & Lazarus, B. N. (1994). *Passion and reason : Making sense of our emotions*. New York, NY: Oxford University Press.

Leape, L. L. (1994). Error in medicine. *JAMA*, 272(23), 1851-1857.
doi:10.1001/jama.1994.03520230061039

Letts, L., Wilkins, S., Law, M., Stewart, D., Bosch, J., & Westmorland, M. (2007a). *Critical review form - Qualitative Studies (version 2.0)*. Hamilton, Ontario: McMaster University.
Retrieved from http://www.srs-mcmaster.ca/Portals/20/pdf/ebp/qualreview_version2.0.pdf

Letts, L., Wilkins, S., Law, M., Stewart, D., Bosch, J., & Westmorland, M. (2007b). *Guidelines for critical review form: Qualitative studies (version 2.0)*. Haminton, Ontario: McMaster University. Retrieved from http://www.srs-mcmaster.ca/Portals/20/pdf/ebp/qualguidelines_version2.0.pdf

Lewis, E. J., Baernholdt, M. B., & Hamric, A. B. (2013). Nurses' experience of medical errors: An integrative literature review. *Journal of Nursing Care Quality*, 28(2), 153.

- Marx, D. (2001). *Patient safety and the "Just Culture:" A primer for health care executives medical event reporting system – transfusion medicine (MERS-TM)*. Dallas, TX: David Marx Consulting.
- McMaster Occupational Therapy Evidence-based Practice Research Group. (2008). Retrieved from <http://www.srs-mcmaster.ca/ResearchResources/ResearchGroups/CentreforEvidenceBasedRehabilitation/EvidenceBasedPracticeResearchGroup/tabid/630/Default.aspx>
- Meurier, C. E., Vincent, C. A., & Parmar, D. G. (1997). Learning from errors in nursing practice. *Journal of Advanced Nursing*, 26(1), 111-119. doi:10.1046/j.1365-2648.1997.1997026111.x
- Meurier, C. E., Vincent, C. A., & Parmar, D. G. (1998). Nurses' responses to severity dependent errors: A study of the causal attributions made by nurses following an error. *Journal of Advanced Nursing*, 27(2), 349-354. doi:10.1046/j.1365-2648.1998.00512.x
- Muller, D., & Ornstein, K. (2007). Perceptions of and attitudes towards medical errors among medical trainees. *Medical Education*, 41(7), 645-652. doi:10.1111/j.1365-2923.2007.02784.x
- National Expert Commission. (2012). *A nursing call to action*. Ottawa, ON: Canadian Nurses Association. Retrieved from https://www.cna-aiic.ca/~media/cna/files/en/nec_report_e.pdf
- National Quality Forum. (2010). *Safe practices for better healthcare – 2010 Update*. Washington, DC: National Quality Forum.
- Paparella, S. (2011). Caring for the caregiver: Moving beyond the finger pointing after an adverse event. *Journal of Emergency Nursing*, 37(3), 263-265. doi:<http://dx.doi.org.ezproxy.library.uvic.ca/10.1016/j.jen.2011.01.001>

- Peate, I. (2009). Principles of patient safety. In L. Lawson, & I. Peate (Eds.), *Essential nursing care: A workbook for clinical practice*. West Sussex, UK: John Wiley & Sons.
- Plews-Ogan, M., Owens, J. E., & May, N. B. (2013). Wisdom through adversity: Learning and growing in the wake of an error. *Patient Education and Counseling, 91*(2), 236-242.
doi:<http://dx.doi.org.ezproxy.library.uvic.ca/10.1016/j.pec.2012.12.006>
- Rassin, M., Kanti, T., & Silner, D. (2005). Chronology of medication errors by nurses: Accumulation of stresses and PTSD symptoms. *Issues in Mental Health Nursing, 26*(8), 873-886. doi:10.1080/01612840500184566
- Reason, J. (2000). Human error: models and management. *BMJ, 320*(7237), 768-770.
- Reason, J. (2008). *The human contribution: Unsafe acts, accidents and heroic recoveries*. Burlington, VT: Ashgate Publishing Limited.
- Roesler, R., Ward, D., & Short, M. (2009). Supporting staff recovery and reintegration after a critical incident resulting in infant death. *Advances in Neonatal Care: Official Journal of the National Association of Neonatal Nurses, 9*(4), 163-173.
doi:10.1097/ANC.0b013e3181afab5b
- Schelbred, A., & Nord, R. (2007). Nurses' experiences of drug administration errors. *Journal of Advanced Nursing, 60*(3), 317-324. doi:10.1111/j.1365-2648.2007.04437.x
- Schwappach, D. L., & Boluarte, T. A. (2009). The emotional impact of medical error involvement on physicians: A call for leadership and organisational accountability. *Swiss Medical Weekly, 139*(1-2), 9.
- Scott, S. D., Hirschinger, L. E., Cox, K. R., McCoig, M., Brandt, J., & Hall, L. W. (2009). The natural history of recovery for the healthcare provider "second victim" after adverse patient events. *Quality & Safety in Health Care, 18*(5), 325-330. doi:10.1136/qshc.2009.032870

Scott, S. D., Hirschinger, L. E., Cox, K. R., McCoig, M., Hahn-Cover, K., Epperly, K. M., . . .

Hall, L. W. (2010). Caring for our own: Deploying a systemwide second victim rapid response team. *Joint Commission Journal on Quality and Patient Safety / Joint Commission Resources*, 36(5), 233.

Shaver, P., Schwartz, J., Kirson, D., & O'Connor, C. (1987). Emotion knowledge: Further exploration of a prototype approach. *Journal of Personality and Social Psychology*, 52(6), 1061-1086. doi:10.1037/0022-3514.52.6.1061

Sirriyeh, R., Lawton, R., Gardner, P., & Armitage, G. (2010). Coping with medical error: A systematic review of papers to assess the effects of involvement in medical errors on healthcare professionals' psychological well-being. *Quality and Safety in Health Care*, 19(6), 1-8. doi:10.1136/qshc.2009.035253

Smith, M. L., & Forster, H. P. (2000). Morally managing medical mistakes. *Cambridge Quarterly of Healthcare Ethics*, 9(1), 38-53. doi:10.1017/S0963180100901051

Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry*, 15(1), 1-18.

The Joint Commission. (n.d.). Sentinel event data root causes by event type 2004-2012.

Retrieved from

http://www.jointcommission.org/assets/1/18/Root_Causes_Event_Type_04_4Q2012.pdf

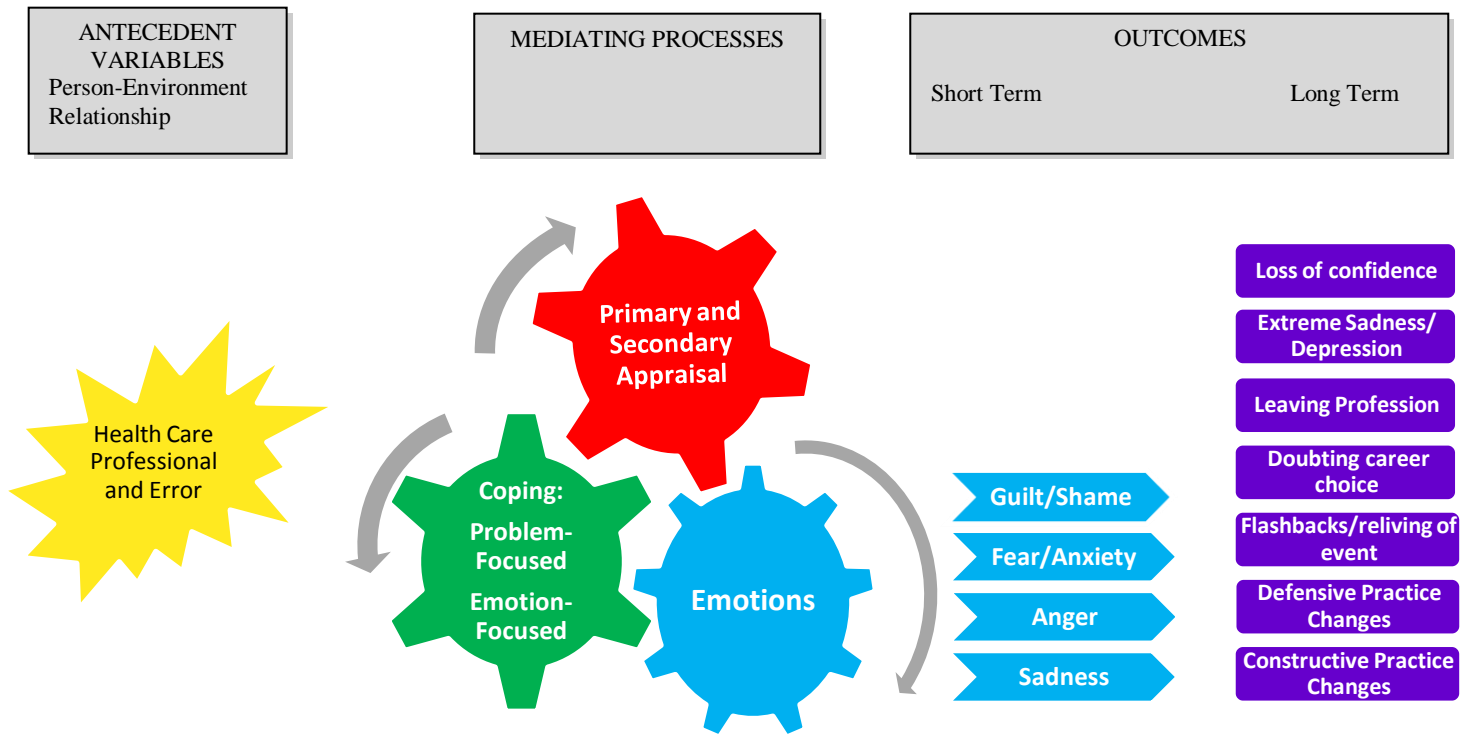
Treiber, L., A., & Jones, J., H. (2010). Devastatingly human: An analysis of registered nurses' medication error accounts. *Qualitative Health Research*, 20(10), 1327-1342.

doi:10.1177/1049732310372228

- Ullström, S., Sachs, M., Andreen, Hansson, J., Øvretveit, J., & Brommels, M. (2014). Suffering in silence: A qualitative study of second victims of adverse events. *BMJ Quality & Safety*, 23(4), 325-331. doi:10.1136/bmjqs-2013-002035
- Waterman, A., Garbutt, J., Hazel, E., Dunagan, W., Levinson, W., Fraser, V., & Gallagher, T. (2007). The emotional impact of medical errors on practicing physicians in the United States and Canada. *The Joint Commission Journal on Quality and Patient Safety*, 33(8), 467-476.
- Weick, K. E., & Sutcliffe, K. M. (2007). *Managing the unexpected: Resilient performance in an age of uncertainty*, San Francisco, CA: John Wiley & Sons.
- West, C. P., Tan, A. D., Habermann, T. M., Sloan, J. A., & Shanafelt, T. D. (2006). Association of perceived medical errors with resident distress and empathy: A prospective longitudinal study. *JAMA*, 296(9), 1071-1078. doi:10.1001/jama.296.9.1071
- White, A. A., Gallagher, T. H., Krauss, M. J., Garbutt, J., Waterman, A. D., Dunagan, W. C., . . . Larson, E. B. (2008). The attitudes and experiences of trainees regarding disclosing medical errors to patients. *Academic Medicine : Journal of the Association of American Medical Colleges*, 83(3), 250.
- Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5), 546-553. doi:10.1111/j.1365-2648.2005.03621.x
- Wolf, Z. R., Serembus, J. F., Smetzer, J., Cohen, H., & Cohen, M. (2000). Responses and concerns of healthcare providers to medication errors. *Clinical Nurse Specialist CNS*, 14(6), 278-290. doi:10.1097/00002800-200011000-00011
- Wong, J., & Beglaryan, H. (2004). *Strategies for hospitals to improve patient safety: A review of the research*. The Change Foundation.

- World Health Organization. (2008). *Patient safety workshop: Learning from error*. Switzerland: 22 Design. Retrieved from http://www.who.int/patientsafety/activities/technical/vincristine_learning-from-error.pdf
- Wu, A. W. (2000). Medical error: The second victim: The doctor who makes the mistake needs help too. *BMJ: British Medical Journal*, *320*(7237), 726-727.
- Wu, A. W., Boyle, D. J., Wallace, G., & Mazor, K. M. (2013). Disclosure of adverse events in the United States and Canada: An update, and a proposed framework for improvement. *Journal of Public Health Research*, *2*(3), 32. doi:10.4081/jphr.2013.e32
- Wu, A. W., Folkman, S., McPhee, S. J., & Lo, B. (2003). Do house officers learn from their mistakes? *Quality & Safety in Health Care*, *12*(3), 221-226. doi:10.1136/qhc.12.3.221
- Zeelenberg, M. (1999). The use of crying over spilled milk: A note on the rationality and functionality of regret. *Philosophical Psychology*, *12*(3), 325-340. doi:10.1080/095150899105800

Appendix A
Lazarus' Cognitive-Motivational-Relational-Theory of Emotions
and Errors in Practice



Adapted from: "Emotion and Adaptation," by R. S. Lazarus. 1991, p. 209. New York, NY: Oxford University Press.

Appendix B
Critical Review Form – Quantitative Studies

©Law, M., Stewart, D., Pollock, N., Letts, L. Bosch, J., & Westmorland, M.
[McMaster University](#)

- Adapted Word Version Used with Permission –

The EB Group would like to thank Dr. Craig Scanlan, University of Medicine and Dentistry of NJ, for providing this Word version of the quantitative review form.

Instructions: Use tab or arrow keys to move between fields, mouse or spacebar to check/uncheck boxes.

CITATION	Provide the full citation for this article in APA format:	
STUDY PURPOSE Was the purpose stated clearly? <input type="checkbox"/> Yes <input type="checkbox"/> No	Outline the purpose of the study. How does the study apply to your research question?	SCORE² / 0.5
LITERATURE Was relevant background literature reviewed? <input type="checkbox"/> Yes <input type="checkbox"/> No Was relevant background literature reviewed? <input type="checkbox"/> Yes <input type="checkbox"/> No	Describe the justification of the need for this study:	SCORE / .25

² This form was adapted from the original to allow for the inclusion of this scoring column..

<p>DESIGN</p> <p><input type="checkbox"/> Randomized (RCT)</p> <p><input type="checkbox"/> cohort</p> <p><input type="checkbox"/> single case design</p> <p><input type="checkbox"/> before and after</p> <p><input type="checkbox"/> case-control</p> <p><input type="checkbox"/> cross-sectional</p> <p><input type="checkbox"/> case study</p>	<p>Describe the study design. Was the design appropriate for the study question? (e.g., for knowledge level about this issue, outcomes, ethical issues, etc.)</p> <p>Specify any biases that may have been operating and the direction of their influence on the results.</p>	<p>SCORE</p> <p>/</p> <p>1.0</p>
<p>SAMPLE</p> <p>N =</p> <p>Was the sample described in detail?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>Was sample size justified?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> N/A</p>	<p>Sampling (who; characteristics; how many; how was sampling done?) If more than one group, was there similarity between the groups?</p> <p>Describe ethics procedures. Was informed consent obtained?:</p>	<p>SCORE</p> <p>/</p> <p>1.25</p>
<p>OUTCOMES</p> <p>Were the outcome measures reliable?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Not addressed</p> <p>Were the outcome measures valid?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> Not addressed</p>	<p>Specify the frequency of outcome measurement (i.e., pre, post, follow-up):</p> <p>Outcome areas:</p> <p>List measures used.:</p>	<p>SCORE</p> <p>/</p> <p>1.0</p>

<p>INTERVENTION</p> <p>Intervention was described in detail?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed</p> <p>Contamination was avoided?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed <input type="checkbox"/> N/A</p> <p>Cointervention was avoided?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed <input type="checkbox"/> N/A</p>	<p>Provide a short description of the intervention (focus, who delivered it, how often, setting). Could the intervention be replicated in practice?</p>	<p>SCORE</p> <p>/</p> <p>1.0</p>
<p>RESULTS</p> <p>Results were reported in terms of statistical significance?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed <input type="checkbox"/> N/A</p> <p>Were the analysis method(s) appropriate?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed</p>	<p>What were the results? Were they statistically significant (i.e., $p < 0.05$)? If not statistically significant, was study big enough to show an important difference if it should occur? If there were multiple outcomes, was that taken into account for the statistical analysis?</p>	<p>SCORE</p> <p>/</p> <p>2.0</p>

Clinical importance was reported <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed	What was the clinical importance of the results? Were differences between groups clinically meaningful? (if applicable)	
Drop-outs were reported? <input type="checkbox"/> Yes <input type="checkbox"/> No	Did any participants drop out from the study? Why? (Were reasons given and were drop-outs handled appropriately?)	
CONCLUSIONS AND IMPLICATIONS Conclusions were appropriate given study methods and results <input type="checkbox"/> Yes <input type="checkbox"/> No	What did the study conclude? What are the implications of these results for practice? What were the main limitations or biases in the study?	SCORE / 2.0

Total Score: / 10³

Adapted From: Law, M., Stewart, D., Pollock, N., Letts, L., Bosch, J., & Westmorland, M. (1998b). *Guidelines for critical review form – quantitative studies*. Hamilton, ON: McMaster University. Retrieved from <http://www.srs-mcmaster.ca/Portals/20/pdf/ebp/quanguidelines.pdf>

As stated previously in the footnotes, the only modifications made to the original form were the addition of the scoring column and the total score at the end of the document. The inclusion of these two items was necessary solely for the purposes of this review.

³ This form was adapted from the original to allow for the inclusion of a Total Score.

Appendix C
Critical Review Form – Qualitative Studies (Version 2.0)

© Letts, L., Wilkins, S., Law, M., Stewart, D., Bosch, J., & Westmorland, M., 2007
McMaster University

CITATION	Provide the full citation for this article in APA format:	
STUDY PURPOSE Was the purpose and/or research question stated clearly? <input type="checkbox"/> Yes <input type="checkbox"/> No	Outline the purpose of the study and/or research question.	SCORE⁴ / 0.5
LITERATURE Was relevant background literature reviewed? <input type="checkbox"/> Yes <input type="checkbox"/> No	Describe the justification of the need for this study. Was it clear and compelling?	SCORE / 1.25
	How does the study apply to your practice and/or to your research question? Is it worth continuing this review? ⁵	
STUDY DESIGN What was the design? <input type="checkbox"/> phenomenology <input type="checkbox"/> ethnography <input type="checkbox"/> grounded theory <input type="checkbox"/> participatory action research <input type="checkbox"/> other	Was the design appropriate for the study question? (i.e., rationale) Explain.	SCORE / 1.25

⁴ This form was adapted from the original to allow for the inclusion of this scoring column.

⁵ When doing critical reviews, there are strategic points in the process at which you may decide the research is not applicable to your practice and question. You may decide then that it is not worthwhile to continue with the review.

<p>Was a theoretical perspective identified?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Describe the theoretical or philosophical perspective for this study e.g., researcher's perspective.</p>	
<p>Method(s) used:</p> <p><input type="checkbox"/> participant observation <input type="checkbox"/> interviews <input type="checkbox"/> document review <input type="checkbox"/> focus groups <input type="checkbox"/> other</p>	<p>Describe the method(s) used to answer the research question. Are the methods congruent with the philosophical underpinnings and purpose?</p>	
<p>SAMPLING:</p> <p>Was the process of purposeful selection described?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Describe sampling methods used. Was the sampling method appropriate to the study purpose or research question?</p>	<p>SCORE / 1.5</p>
<p>Was sampling done until redundancy in data was reached?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed</p>	<p>Are the participants described in adequate detail? How is the sample applicable to your practice or research question? Is it worth continuing?</p>	
<p>Was informed consent obtained?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed</p>		
<p>DATA COLLECTION: Descriptive Clarity</p>	<p>Describe the context of the study. Was it sufficient for understanding of the "whole" picture?</p>	<p>SCORE 1.0 /</p>

<p>Clear & complete description of:</p> <ul style="list-style-type: none"> • site: <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No • participants: <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>Role of researcher & relationship with participants:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No <p>Identification of assumptions and biases of researcher:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No 	<p>What was missing and how does that influence your understanding of the research?</p>	
<p>Procedural Rigour</p> <p>Procedural rigor was used in data collection strategies?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed 	<p>Do the researchers provide adequate information about data collection procedures e.g., gaining access to the site, field notes, training data gatherers? Describe any flexibility in the design & data collection methods.</p>	

<p>DATA ANALYSES: Analytical Rigour</p> <p>Data analyses were inductive?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed</p> <p>Findings were consistent with & reflective of data?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>Describe method(s) of data analysis. Were the methods appropriate? What were the findings?</p>	<p>SCORE</p> <p>1.0 /</p>
<p>Auditability:</p> <p>Decision trail developed?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed</p> <p>Process of analyzing the data was described adequately?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not addressed</p>	<p>Describe the decisions of the researcher re: transformation of data to codes/themes. Outline the rationale given for development of themes.</p>	
<p>Theoretical Connections:</p> <p>Did a meaningful picture of the phenomenon under study emerge?</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>	<p>How were concepts under study clarified & refined, and relationships made clear? Describe any conceptual frameworks that emerged.</p>	

<p>OVERALL RIGOUR</p> <p>Was there evidence of the four components of trustworthiness?</p> <ul style="list-style-type: none"> • Credibility <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No • Transferability <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No • Dependability <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No • Confirmability <ul style="list-style-type: none"> <input type="checkbox"/> Yes <input type="checkbox"/> No 	<p>For each of the components of trustworthiness, identify what the researcher used to ensure each.</p> <p>What meaning and relevance does this study have for your practice or research question?</p>	<p>SCORE</p> <p>/</p> <p>2.0</p>
<p>CONCLUSIONS AND IMPLICATIONS</p> <p>Conclusions were appropriate given the study findings?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p>The findings contributed to theory development & future nursing practice/ research?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>	<p>What did the study conclude? What were the implications of the findings for nursing⁶ (practice & research)? What were the main limitations in the study?</p>	<p>SCORE</p> <p>/</p> <p>1.5</p>

⁶ Throughout this form, the profession of "nursing" was substituted whenever the document made reference to the profession of "OT" ("occupational therapy")

Total Score: / 10⁷

Adapted From: Letts, L., Wilkins, S., Law, M., Stewart, D., Bosch, J., & Westmorland, M.

(2007a). *Critical review form - qualitative Studies (version 2.0)*. Hamilton, Ontario: McMaster

University. Retrieved from: <http://www.srs->

[mcmaster.ca/ResearchResources/ResearchGroups/CentreforEvidenceBasedRehabilitation/E](http://www.srs-mcmaster.ca/ResearchResources/ResearchGroups/CentreforEvidenceBasedRehabilitation/E)

[videnceBasedPracticeResearchGroup/tabid/630/Default.aspx](http://www.srs-mcmaster.ca/ResearchResources/ResearchGroups/CentreforEvidenceBasedRehabilitation/EvidenceBasedPracticeResearchGroup/tabid/630/Default.aspx)

As described in the footnotes, adaptations from the original include: (a) the replacement of the profession of OT (occupational therapy) with the profession of "nursing," (b) the addition of a column titled score, and (c) the addition of a total score at the end of the document. These amendments were necessary solely for the purposes of this review.

⁷ This form was adapted from the original to allow for the inclusion of a Total Score.

Appendix D
Primary and Secondary Appraisal Decisions for Guilt and Shame

<u>Appraisals of Guilt</u> ^a	<u>Appraisals of Shame</u> ^b
<p>Primary Appraisal Components</p> <ol style="list-style-type: none"> 1. If there is goal relevance, then any emotion is possible, including guilt. 2. If there is goal incongruence, then only negative emotions are possible, including guilt. 3. If the type of ego-involvement is to manage a moral transgression, then emotion possibilities narrow to anger, anxiety, guilt, and disgust <p>Secondary Appraisal Components</p> <ol style="list-style-type: none"> 1. If blame is to oneself, then emotion possibilities narrow to guilt. 2. If coping potential is favorable, then guilt may be expiated by apology or making amends. 3. If future expectations are favorable, then guilt may be mitigated or reduced. 	<p>Primary Appraisal Components</p> <ol style="list-style-type: none"> 1. If there is goal relevance, then any emotion is possible, including shame. 2. If there is goal incongruence, then only negative emotions are possible, including shame. 3. If the type of ego-involvement is to manage a failure to live up to an ego-ideal, then the possible emotions narrow to anger, anxiety, shame, and disgust <p>Secondary Appraisal Components</p> <ol style="list-style-type: none"> 1. If blame is to oneself, then emotion possibilities narrow to shame. 2. If coping potential is favorable, then shame can be mitigated by promising to redouble efforts to live up to an ideal. 3. If future expectations are favorable, then shame may be mitigated or reduced.
<p>^aAppraisal components sufficient and necessary for guilt are primary appraisals 1 through 3 and secondary appraisal 1.</p>	<p>^bAppraisal components sufficient and necessary for shame are primary appraisals 1 through 3 and secondary appraisal 1.</p>

Adapted from: *Emotion and Adaptation* (pp. 242-243) by R. S. Lazarus, 1991, New York, NY:

Oxford University Press