Mark Pijl Zieber* and Beverley Williams

The Experience of Nursing Students Who Make Mistakes in Clinical

Abstract: The experience of nursing students who make mistakes during clinical practice is poorly understood. The literature identifies clinical practice mistakes as a significant issue in nursing practice and education but there is very little research on the topic. This study used a grounded theory approach to explore the experience of undergraduate nursing students who had made at least one mistake in their clinical practice. What emerged is a theory that illuminates the process of how students move through the positive and negative elements of the mistake experience the core variable that emerged from the study was "living through the mistake experience." The mistake experience was clearly a traumatic process for nursing students and students reported feeling unprepared and lacking the capability to manage the mistake experience. A number of recommendations for nursing education are proposed.

Keywords: nursing education clinical, medical mistakes, systems theory, anxiety and fear

Background

One day, in an acute care clinical setting, a student approached one of the authors to fearfully admit that she had "made a mistake" and then she promptly burst into tears. When the mistake was deconstructed, it turned out to be clinically insignificant but the student had heard a rumor that mistakes would not be tolerated and would result in being expelled from the program. After debriefing the mistake and assuring the student that there was no such policy, the student carried on with her practice and ultimately graduated successfully from the program. This experience and in particular the fear and trauma demonstrated by the student, caused us to theorize about why making mistakes in clinical practice is so fear inducing and traumatic for nursing students. In this paper, we report the findings of a qualitative study in which we explored the process of how students encounter, experience, and recover from a mistake in clinical practice.

The literature is clear that clinical practice mistakes are a significant and troubling problem within both nursing practice (Johnson & Young, 2011) and nursing education (Attree, Cooke, & Wakefield, 2008; Begley & White, 2003; Brown, Neudorf, Poitras, & Rodger, 2007). The literature contains some prescriptive suggestions about how to interact with students who make mistakes in their clinical experiences, but there is very little actual evidence about the phenomenon itself. A number of suggestions target individual performance factors as the source of practice mistakes (Armitage, 2009; Brown et al., 2007; Lawton & Parker, 2002). The perspective that errors are the result of a moral or performance failure persists despite an overwhelming body of evidence that recognizes systems-based factors (Clancy, Effken, & Pesut, 2008; Dick, Weisbrod, Gregory, Dyck, & Neudorf, 2006; Gregory, Guse, Dick, & Russell, 2007). The systems theory perspective on human performance revolutionized the way that many industries, including the nuclear power and airline industries, view and react to human mistakes (Reason, 1990; Reason, Carthey, & DeLeval, 2001). The systems theory perspective postulates three key principles: (1) individuals are rarely solely to blame for mistakes; (2) a non-punitive response that promotes disclosure is the best reaction to mistakes; and, (3) environmental factors are significant components of any mistake (Institute of Medicine [IOM], 2000; Reason, 1990). While these three principles have been successfully adopted within the healthcare practice environment (Jones & Treiber, 2010; Kennedy, 2004; Munro, 2004), nursing education has been slow to adopt a systems-based approach in the education of students and the management of student mistakes (Gregory et al., 2007). While some nursing programs have adopted components of a systems-based approach (Barnard, Dumkee, Bains, & Gallivan, 2006; Dick et al., 2006), examples of its implementation are rare.

Historically, nursing education has largely subscribed to an individual performance perspective

*Corresponding author: Mark Pijl Zieber, Health Sciences, University of Lethbridge, 4401, University drive, Lethbridge, Alberta T1K 3M4, Canada, E-mail: m.pijlzieber@uleth.ca
Beverley Williams, Nursing, University of Alberta, Edmonton, AB, Canada, E-mail: beverley.williams@ualberta.ca

regarding student mistakes (Dick et al., 2006; Gregory, Guse, Dick, Davis, & Russell, 2009; Rodriguez, 2007). The prototypical response when errors occur is one of blaming individual students and using remedial measures such as learning contracts, clinical practice probation, and even clinical practice failure (Gregory et al., 2007). Polifroni, McNulty, and Allchin (2003) reinforce the individual blame perspective when they suggest that "individual [students] need to be held accountable for the basic skills necessary for minimum safe practice" (p. 456). Killam et al. (2010) relate unsafe student behavior to the individualistic dimensions of "compromised professional accountability, incomplete praxis and clinical disengagement" (p. 11). Although most authors express a desire to help students improve their performance, their recommendations do not extend beyond individual behavioral factors as the cause of mistakes. This individualistic perspective regarding mistakes remains dominant within nursing education despite the overwhelming evidence from a systems perspective that individuals are rarely the sole cause of errors (IOM, 2000).

Extant literature also reveals that nursing students struggle with how to anticipate, conceptualize, and manage mistakes in clinical practice (Belinsky & Tataronis, 2007; Brown et al., 2007; Rodriguez, 2007). Students soon realize that the standard for mistakes, especially for medication mistakes, is a perfect record of error-free practice. This belief creates confusion, tension, and anxiety for students in determining whether a mistake has occurred, the correct course of remediation, and whether to make oneself academically vulnerable by reporting it (Wolf, Ambrose, & Dreher, 1996). Although there is no evidence in the literature to suggest that students struggle with concealing their mistakes, evidence from the practice sector suggests that students do, in fact, face this pressure (Wolf, Serembus, Smetzer, Cohen, & Cohen, 2000). Although educators expect students to uphold the highest ethical and practice standards, they also reinforce a culture of fear and institute policies that make the ethical process of acknowledging mistakes difficult and risk-laden for students. In effect, the message to nursing students is that mistakes will not be tolerated, and that there will be significant individual consequences.

The voices and perspectives of nursing students who have made a mistake in clinical practice are absent from the literature. The literature indicates that nursing students bring significant anxiety and fear to their clinical practice (Begley & White, 2003; Melo, Williams, & Ross, 2010) but the reasons for this fear are largely unexplored. The present study sheds light on how pre-registration baccalaureate nursing (BN) students conceptualize their mistake experience, describes some of the influences on the mistake experience, and makes recommendations for a systems approach to error management within nursing education.

Research approach

A grounded theory approach was utilized for this study. Grounded theory examines social phenomena and identifies problems and processes involved (Charmaz, 2006; Deady, 2011). The experiences of nursing students who had made a mistake in their clinical practice were the basis for this study. Ethical approval was obtained from both nursing educational institutions where sampling occurred.

Data collection

Students were alerted to the study through posters at participating institutions and recruited through visits to large group lectures in all years of the nursing programs. All participants signed a consent to be part of a study after all risks and benefits had been discussed. Interviews consisted of a semi-structured interview held at a location amenable to the participant.

Making a mistake in clinical is a traumatic experience for students (Begley & White, 2003; Gregory et al., 2007; Seiden, Galvan & Lamm, 2006) and participants demonstrated a willingness to explore and debrief their traumatic experiences, including an exploration of antecedents and consequences. The principal investigator struck a balance between allowing participants to freely express their experiences while occasionally redirecting the conversation to focus on how the error occurred and the subsequent events. As advocated by Nunkoosing (2005), reciprocity of questioning and balance within the power relationships was central to the research approach. The principal investigator negotiated this balance with participants in an ongoing manner by approaching the interview process with a stance of humility and a posture of being a learner. The principal investigator respected that students were sharing a traumatic experience and struck a balance between probing for complete meaning and being respectful of the recounting of a painful experience.

The interview questions arose from the extant literature and were modified as the data collection and analysis process proceeded. The principal question that was used to begin each interview required participants to

describe their mistake experience. Trigger questions guided the researcher and participants to explore the significance of when the participants realized they had made a mistake, the perceived contributing factors, the process that was followed after the mistake, and what participants felt they learned from the mistake experience. This approach was based on the work of Charmaz (2006), who uses the term "intensive interview" (p. 25), and suggests that grounded theory data-gathering should be an intensively directed conversation. Participants were encouraged to be as honest and specific as they felt they could be.

Following the interviews, each participant was assigned a pseudonym that was used for the remainder of the study process. Data were managed using the NVivo software package. NVivo was useful in capturing and retaining insights during the coding procedure as well as comparing and collapsing categories and deriving an understanding of the processes by which mistakes are made. Data analysis proceeded based on the techniques of constant comparison, theoretical sensitivity, simultaneous data collection and analysis, and sampling until theoretical saturation was evident (Charmaz, 2006; Glaser, 1978).

Findings

Demographics

Sixteen participants were involved in the research study. All participants were in the third or fourth year of an undergraduate nursing program in the Canadian province of Alberta. The described incidents of errors occurred throughout all years of the nursing programs. Participants' ages ranged from twenty-two years of age to forty-two years of age. The gender ratio of two male and fourteen female participants approximates the demographics of students currently in nursing education in Canada. The clinical settings in which the mistakes occurred represented the entire range of acute nursing practice; none of the described mistakes occurred in a community health setting. The participants were enrolled in a four-year Bachelor of Nursing program ($n = 9$) or Bachelor of Nursing after an Existing Degree program ($n = 7$). In this paper, pseudonyms are used to protect the identity of the participants.

Overview

The theoretical model generated by the study represents the process of how participants lived through the mistake experience. The process of living through the mistake experience began with several precursors that informed and influenced it. The next phase of the process was the actual mistake experience. Following this phase was the fallout or experience set in motion by the mistake. This "after-the-mistake" part of the process is where the majority of the mistake experience occurred. This model is depicted in Figure 1.

The model

The model outlining the process of nursing students "living through the mistake experience" begins on the
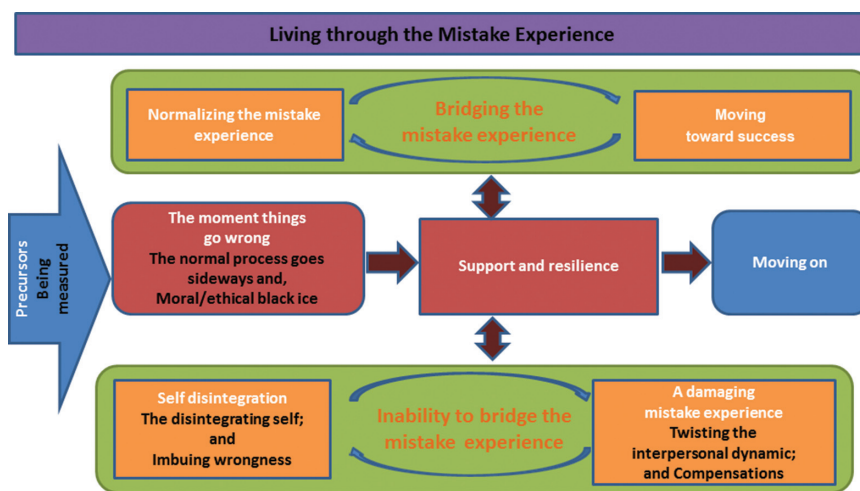

Figure 1: Living through the mistake experience.

left with the theme termed "precursors." The next theme is "the moment that things go wrong." The presence or absence of "support and resilience" determined whether participants moved toward bridging the mistake experience or experienced an inability to bridge the mistake experience. Often participants moved back and forth between the different components. Ultimately, if support and resilience were present, the participant was able to move beyond the mistake experience. While the resultant theoretical model follows a fairly chronological process, numerous minor variations in the progression of events were present.

The core variable

The core variable of "living through the mistake experience" was more than just a single incident in time or a discrete episode that was quickly forgotten. The mistake experience defined a participant's life often for an extended period of time. The reality of living through the mistake experience was a complex interaction of perceptions, influences, environments, and systems that had a profound impact on the student participants. Overall, the mistake experience was highly traumatic for students. Several participants indicated that making a mistake in clinical was one of the worst experiences that they had ever faced in their lives.

Precursors

Precursors were factors that participants brought into the mistake experience. These factors influenced and helped define the mistake experience. The first precursor was the reality of being evaluated. Participants were keenly aware that their performance was going to be precisely observed and measured. The result was significant anxiety and fear about their clinical performance. This anxiety initiated a process of imagining catastrophic scenarios, particularly involving medication mistakes. Foremost in many of the participants' minds was the perceived inevitability of making a mistake in clinical.

Some participants relayed that clinical instructors were very explicit that "mistakes would not be tolerated." Emily indicated that her instructor warned her clinical group not to make mistakes as it would "not be very pretty" if they did. This punitive stance was detrimental to Emily's conceptualization of the mistake experience and resulted in significant fear when she eventually did make a mistake.

> I learned lots of negative things [from that instructor] that term, and so I'm still trying to you know, not base my self worth on what she said, because she wasn't a very happy person, and she wasn't nice to anybody...I was terrified of my clinical instructor; she was just one of those people who makes you feel stupid all the time, and she told students they were stupid in front of patients. There was just lots of issues with her.

For Emily, the fear of making a mistake also resulted in a compulsion to conceal any further mistakes that might be made.

Participants also experienced mistakes vicariously through discussions with their clinical peers. Participants described how they felt distressed upon hearing other students talk about their mistake experiences. Marcie shared her perceptions as,

> other students had made mistakes and told me about it. It was a scary ordeal for them. They felt sick and couldn't sleep. I was already having the same feelings without having made a mistake yet.

The moment that things went wrong

The second theme, "the moment that things went wrong," was the moment when the participants realized that a mistake had occurred. This moment could happen at any point across a continuum of time, ranging from instant recognition to days or weeks later when the mistake was realized. Participants described how it seemed that the normal process of their clinical activities suddenly "went sideways." They described feelings of being shocked, horrified, and stunned. The extent and depth of these feelings depended on the conceptualization of the mistake that participants had pre-contemplated as a precursor to the experience.

During this phase of the mistake experience, participants described the moral and ethical reasoning and confusion that they experienced. Despite the fact that none of the mistakes resulted in clinically significant patient harm, participants were unclear as to the implications of the mistake, how to judge the severity of the mistake, and the correct procedures to follow after the mistake. None of the participants had any ethical difficulty in understanding that something unusual or incorrect had happened; their primary difficulty was the ethical decision-making about how to proceed. Emily expressed this tension as,

> I've never been afraid of mistakes before, but my fear totally overruled my ability and my desire to be an ethical person... Until the rubber hits the road, you just keep...thinking of ethics as an idea... It is easy to talk about ethics, but there's more to ethics than just the idea of what's the right thing to do.

This insecurity and difficulty in conceptualizing and then acting on what they thought was right was common to many participants.

Support and resilience

As the mistake experience proceeded it became clear that participants were either able to successfully negotiate all of the obstacles and incidences, or they were not. This successful or unsuccessful negotiation was labeled "bridging the mistake experience." This theme captured the insecurity, fear, and process of moving through the mistake experience. The term *bridging* was constructed from the data to capture the obstruction that the mistake experience represented, and the participant's process of moving on from this obstruction. The third theme was a junction point at which participants moved toward either successfully or unsuccessfully bridging the mistake experience, the latter being characterized by self-disintegration and a damaging mistake experience. The overwhelming characteristic of how participants progressed through the mistake experience was dependent upon the support and resilience that participants brought it. Frequently this support came from family members, especially if the family member was a nurse. Julie mentioned that,

> My mom's a nurse. That's been great for me because I been able to come home and talk with her. My confidence was down and I could not believe that this type of mistake would happen to me. She was able to reassure me that, you know mistakes happen and you just have to take them as a learning experience.

This support came from peers as well as their clinical instructor. Madhu recalled that,

> By the time I got back to the unit and was finished filling out the mistake form I felt like I needed to call my friend and just cry. Yeah, it just causes a lot of emotion.

If participants had good support networks, their transition to a more productive mistake experience was faster and less traumatic.

Resilience also was a characteristic unique to some participants that enabled them to successfully bridge the mistake experience. Possessing resilience allowed some participants to transition to a successful outcome more quickly than others. The term *resilience* was used based on the work of Edwards, Welch, and Chater (2009) who described the process of resilience as "balance and perseverance in traversing successfully the unpredictable and ever-changing terrain of daily life" (p. 592). For the participants in this study, the mistake experience was the unpredictable and ever-changing terrain that needed to be bridged and moved through. Some participants were able to demonstrate this attribute of resilience more than others. One participant discussed how, despite the caution and fear from her previous mistake experience, she pushed herself to confront her fears and made herself go back into a similar acute-care rotation. Her mechanism of confronting her fears was pivotal in bridging her mistake experience and moving on. This demonstration of resilience was rare in participants. A further description of this characteristic of resilience is a topic for future research as it appears to be critical to how participants negotiate the mistake experience.

Participants expressed a desire to learn from their mistakes. Several participants gave examples in which their instructor played a key role in making sense of the mistake experience. In most cases, instructor support was positive but there were cases of negative interactions. As a positive example, Marne described a situation in which her instructor utilized a mistake as a teaching moment. She stated that,

> My instructor showed it [the reconstitution skill] in a way that it made so much sense.... It helped me so much...She showed me a nice trick and after that I felt so much better.

Conversely, Pricilla related a negative story in which an instructor lost her temper following a student mistake. She quoted that her instructor said, "You guys are so stupid, you don't know how to use your heads." Pricilla went on to say, "and here I'm thinking I did a good job and apparently I missed the important stuff." This event was devastating to the student.

Inability to bridge the mistake experience

When participants' level of support and resilience was insufficient to deal with their mistake experience, there was a tendency to spiral down into a destructive mistake experience. Characteristic of this theme was a disintegrating sense of self, as well as a strongly negative social construction of both the particular mistake and mistakes in general. Participants also had a tendency to imbue themselves with an overwhelming sense of being wrong. The term *imbue* is an artistic term to paint or dye something and was constructed to represent how participants would "paint" themselves with feelings of being wrong even when there was no evidence to support that they were actually incorrect in their actions or attitudes. Katherine described this imbuing as,

The emotional personal stuff, the damage to my ego...the whole pressure I put on myself. Just as I was beginning to feel confident, I made a mistake and my confidence just crumbled. It's very fragile.

Participants wanted to be accurate and correct in their learning and in their clinical performance, but they adopted the notion that they must be wrong. This perception of being wrong resulted in participants actively, and usually unsuccessfully, striving for perfection. Karl states that,

> I'm a perfectionist so that's probably where my anxiety about making a mistake came from. I don't think any instructor has ever told us to "never make a medication error" but with all of those things like the seven rights that we learned, we realized that you can miss something. It was during those basics of medication administration where the fear started to set in.

Participants mentioned that once their sense of self started to disintegrate it became very difficult to regain their confidence. Emily related how making a mistake impacted both her personal and academic life. After making the mistake, which had negligible clinical consequences, she lost her ability to trust her clinical competence. Emily also experienced a major personal crisis in her relationship with her husband. She expressed that,

> My husband noticed it for sure that I became a bit of a different person since [the mistake]. A little more fearful and reluctant to try new things because I'm afraid. It makes me feel kind of anxious about what it's going to be like when I'm in my final preceptorship... I don't want it to rule my life, but I'm surprised at how much it's taken over my psyche in that sense.

Her post-mistake experience even manifested as a spiritual crisis. Emily stated that,

> I've never felt as unworthy as I had felt after this mistake. (Tearing up.) It changed how I spent time with God because before I was very free and kind of father/daughter kind of relationship. It changed my feelings about God, and my own feelings about myself. I distanced myself from God for quite some time afterwards, because I was so ashamed.

These findings demonstrate the difficulties that students experience in how they construct the meaning and significance of mistakes, which extend far beyond the clinical site and practice course and into the realm of holistic nursing competence and self worth.

In addition to self disintegration, participants described how the mistake experience was damaging to both themselves and their clinical relationships. The instructor–student relationship continued by necessity but it was as if their interactions with their instructor were "twisted" and "warped." Participants perceived

that their instructor treated them differently following the mistake. Marcie related that following her mistake she believed that her clinical instructor was "always quizzing her and was always on top of her." Several other participants also noticed a palpable change following their mistake. Participants acknowledge that some of the reason for this change was their own perceptions, but there was no doubt that the relationship had changed.

All participants went through at least some time in which they were unable to bridge the mistake experience but participants with strong support and/or greater resilience were able to move towards bridging the mistake experience more quickly.

Bridging the mistake experience

All participants in this study were eventually able to bridge the mistake experience, normalize the mistake experience, and move toward success. This process was unique to each participant but was characterized by each participant's ability to start assigning positive meaning to mistakes. Participants did not describe this as accepting, forgetting, minimizing, or getting over the mistake, but as moving on or moving through the mistake. Amanda mentioned that her process of moving on involved "making a reflective journal about the mistake and doing a bunch of learning activities." Other participants were able to use an apology to the patient as part of their process of moving on. Jaymee admitted that,

> Despite all the emphasis to not make mistakes, you're still going to... It's still going to happen... Afterwards, you tell someone that you respect, take accountability for it and then you move on. I think that's been the best advice that I've gotten from the nursing staff and my instructor.

The support of instructors was an important part of successfully bridging the mistake experience. Unfortunately there were a number of instances of instructors who were not supportive of students, but fortunately there were many examples where the support of instructors was pivotal to assisting participants to move through the mistake experience.

Marcie discussed an example where her instructor talked with her one-on-one after the mistake,

> She [the instructor] says "you know it's not about being perfect." I [the participant] think it is better that I made this kind of mistake as a student than when I am on my own after graduation. At least I had support for what happened with the mistake. At first I was intimidated by my instructor but through the mistake experience I realized how supportive she was.

Partially as a result of the support she received, Marcie was able to make the transition to moving through the mistake experience quickly compared to several of the participants who had a less supportive experience. Kathryn also had a supportive instructor help her through the mistake experience. Kathryn described her experience,

> An instructor actually sat me down and discussed what it means to link my confidence with my ability to manage mistakes and to fix them. I actually became more confident once I figured out that yes, I'm going to make mistakes but yes, I know what I need to do and how to fix them. Until then no one had discussed this with me.

This example illustrates how, with a supportive learning environment, participants were able to successfully move on to the point that the mistake did not continue to affect their ability to function either at a personal or clinical level. While ultimately, all participants in the study were able to move on, there were lingering after-effects to the mistake experience that remained a traumatic event in their memory. Emily stated that her participation in the study, almost two years after the incident, was part of her "healing journey." Similar long lasting effects and feelings of catharsis were common among many participants in this study.

Discussion and recommendations

The finding that students bring significant stress, fear, and anxiety to their clinical practice, especially in relation to mistakes, is supported in the literature (Gregory et al., 2007; Melo et al., 2010). These fears and anxieties negatively impact the capability of students to succeed in clinical practice. The present study reveals some of the origins of this fear and anxiety as they relate to making mistakes in clinical practice.

The findings of this study reveal that generally students are not adequately prepared for the inevitability of the mistake experience. It was clear from both the way that participants brought preconditions into their mistake experience, as well as the level of trauma the moment that mistakes occurred, that the current educational preparation for clinical experiences does not adequately prepare students to make mistakes. Medication delivery is the pre-eminent area in which mistakes are prevalent and the area about which most students express concerns about potential mistakes in clinical. However, it is not the only area where mistakes are common. Mistakes involving procedural skills and policy interpretation were also common. Interestingly, the mistake experience did not

differ radically by type of mistake. Overall, schools of nursing need to find ways to prepare students to meet the challenges involved with living through any type of clinical practice mistake. The current practice of "just do not make mistakes" is not only naïve but counterproductive. Using a systems theory perspective, mistakes could be portrayed as realities of both human cognitive fallibilities and the result of complex systems. Strategies to improve human performance could be implemented rather than initiatives to merely avoid mistakes.

Nurse educators need to be aware that students require considerable support following mistakes. The pivotal role of student support and resilience must be acknowledged and fostered. This support must go beyond efforts to make the students feel better about themselves and includes support to walk through the logistical processes involved with mistakes. Ideally, nursing programs would prepare simulation scenarios to practice the processes involved when a mistake occurs. This type of activity would help students pre-contemplate the error experience and would also help diminish the existential power of the mistake experience that dominates the student's psyche. There are a few examples in the literature of nursing programs that include a medication administration simulation (Goodstone & Goodstone, 2013; Sears, Goldsworthy, & Goodman, 2010) but most programs predominately use simulation activities for high acuity and critical care tasks. A clinical simulation activity that specifically focused on preparing nursing students for the mistake experience would be unique.

Mistakes are going to occur, and nursing education needs to provide better support, and to acknowledge and enhance individual students' resilience to allow them to successfully bridge the mistake experience and to move on. These cognitive abilities need to be developed and nurtured in undergraduate nursing students so that they have a repertoire of healthy coping strategies as they enter the professional nursing role.

Students also need assistance in learning how to determine the implications of mistakes and help in implementing mistake mitigation strategies. Arndt (1994) and Burke, Mason, Alexander, Barnsteiner, and Rich (2005) found that even experienced registered nurses struggle with how to correctly conceptualize and react to mistakes, and student nurses possess an even less sophisticated schema for determining the most effective response to a mistake. Decision-making skills surrounding mistake prevention and management are crucial to abating the incidence of mistakes and combating the immense negative psychosocial stigma surrounding practice mistakes.

Nurse educators and pre-registration nursing programs need to abandon the individualistic blame perspective related to mistakes. Students should be prompted and educated to look actively for risks to patient safety rather than putting so much time and effort into mistake avoidance. When mistakes occur, the response should take into consideration the influence of both fallible human performance and system influences. Numerous nursing practice settings have instituted systems-based approaches to managing mistakes, which include moves to avoid blaming individuals for mistakes (Lane, Stanton, & Harrison, 2006), anonymous error reporting (Grant & Larsen, 2007; Lehmann et al., 2007; Soleimani, 2006), and environmental risk assessment to look for systemic threats to patient safety (Clancy et al., 2008; Iedema, Jorm, Wakefield, Ryan, & Dunn, 2009). As long as mistakes are viewed as moral and personal failures, the experience of making mistakes will be traumatic, unproductive, and ultimately concealed. When mistakes are viewed as learning experiences and part of a risk management process, systems theory indicates that not only should there be fewer mistakes but when mistakes do occur there will be less psychological carnage to the individual involved.

Future research

A number of questions were raised for future research. A better understanding of what creates and sustains students' resilience would be valuable in supporting students and preparing them for the mistake experience. More data pertaining to the incidence and severity of nursing student mistakes would also be helpful in understanding them. Currently, nursing student mistake data is not well captured by either educational programs or clinical agencies. The implications of utilizing a systems-based approach in nursing education has not been well studied although systems-based interventions such as anonymous error reporting are well documented (Grant & Larsen, 2007; Martinez & Lo, 2008). Lastly, a better understanding of strategies for supporting nursing students in living through the mistake experience would be valuable.

Conclusion

The theory of how nursing students live through the mistake experience illuminates how nursing students progress through making mistakes in clinical practice. The theory highlights the value of a systems-based approach and reveals strategies for how nursing education can better prepare nursing students for the inevitability of making mistakes. Better prepared nursing students will not only have a less traumatic mistake experience, they will also be much better prepared to be proactive risk management and mistake prevention practitioners.

References

Armitage, G. (2009). Human error theory: Relevance to nurse management. *Journal of Nursing Management, 17*(2), 193–202. doi: 10.1111/j.1365-2834.2009.00970.x

Arndt, M. (1994). Nurses' medication errors. *Journal of Advanced Nursing, 19*(3), 519–526.

Attree, M., Cooke, H., & Wakefield, A. (2008). Patient safety in an English pre-registration nursing curriculum. *Nurse Education in Practice, 8*(4), 239–248.

Barnard, D., Dumkee, M., Bains, B., & Gallivan, B. (2006). Implementing a good catch program in an integrated health system. *Healthcare Quarterly, 9*, 22–27.

Begley, C. M., & White, P. (2003). Irish nursing students' changing self-esteem and fear of negative evaluation during their preregistration programme. *Journal of Advanced Nursing, 42*(4), 390–401.

Belinsky, S. B., & Tataronis, G. R. (2007). Past experiences of the clinical instructor and current attitudes toward evaluation of students. *Journal of Allied Health, 36*(1), 11–16.

Brown, Y., Neudorf, K., Poitras, C., & Rodger, K. (2007). Unsafe student clinical performance calls for a systematic approach. *Canadian Nurse, 103*(3), 29–32.

Burke, K. G., Mason, D. J., Alexander, M., Barnsteiner, J. H., & Rich, V. L. (2005). Making medication administration safe. *American Journal of Nursing, 105*(3), 2–3.

Charmaz, K. (2006). *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis*. London and Thousand Oaks, CA: Sage.

Clancy, T. R., Effken, J. A., & Pesut, D. (2008). Applications of complex systems theory in nursing education, research, and practice. *Nursing Outlook, 56*(5), 248–256.

Deady, R. (2011). Reading with methodological perspective bias: A journey into classic grounded theory. *Grounded Theory Review, 10*(1), 41–57.

Dick, D., Weisbrod, L., Gregory, D., Dyck, N., & Neudorf, K. (2006). Case study: On the leading edge of new curricula concepts, systems and safety in nursing education. *Canadian Journal of Nursing Leadership, 19*(3), 34–42.

Edwards, K., Welch, A., & Chater, K. (2009). The phenomenon of resilience as described by adults who've experienced mental illness. *Journal of Advanced Nursing, 65*(3), 587–595. doi: 10.1111/j.1365-2648.2008.04912.x

Glaser, B. (1978). *Theoretical sensitivity: Advances in the methodology of grounded theory*. Mill Valley, CA: Sociology Press.

Goodstone, L., & Goodstone, M. S. (2013). Use of simulation to develop a medication administration safety assessment tool. *Clinical Simulation in Nursing, 9*(12), 609–615. doi: 10.1016/j.ecns.2013.04.017

Grant, M. J. C., & Larsen, G. Y. (2007). Effect of an anonymous reporting system on near-miss and harmful medical error reporting in a pediatric intensive care unit. *Journal of Nursing Care Quality, 22*(3), 213–221.

Gregory, D., Guse, L., Dick, D., Davis, P., & Russell, C. (2009). What clinical learning contracts reveal about nursing education and patient safety. *Canadian Nurse, 105*(8), 20–25.

Gregory, D., Guse, L., Dick, D., & Russell, C. (2007). Patient safety: Where is nursing education? *Journal of Nursing Education, 46*(2), 79.

Iedema, R., Jorm, C., Wakefield, J., Ryan, C., & Dunn, S. (2009). Practising open disclosure: Clinical incident communication and systems improvement. *Sociology of Health & Illness, 31*(2), 262–277. doi: 10.1111/j.1467-9566.2008.01131.x

Institute of Medicine. (2000). *To err is human: Building a safer health system*. Washington, DC: National Academy Press.

Johnson, M., & Young, H. (2011). The application of Aaronson's taxonomy to medication errors in nursing. *Journal of Nursing Care Quality, 26*(2), 128–135. doi: 10.1097/NCQ.0b013e3181f54b14

Jones, J., & Treiber, L. (2010). When the five rights go wrong. *Journal of Nursing Quality, 25*(3), 240–247.

Kennedy, D. (2004). Analysis of sharp-end, frontline human error: Beyond throwing out "bad apples". *Journal of Nursing Care Quality, 19*(2), 116–122.

Killam, L., Montgomery, P., Luhanga, F., Adamic, P., & Carter, L. (2010). Views on unsafe nursing students in clinical learning. *International Journal of Nursing Education Scholarship, 7*(1), 1–18.

Lane, R., Stanton, N. A., & Harrison, D. (2006). Applying hierarchical task analysis to medication administration errors. *Applied Ergonomics, 37*(5), 669–679. doi: 10.1016/j.apergo.2005.08.001

Lawton, R., & Parker, D. (2002). Barriers to incident reporting in a healthcare system. *Quality & Safety in Health Care, 11*(1), 15–18.

Lehmann, D. F., Page, N., Kirschman, K., Sedore, A., Guharoy, R., Medicis, J., Duggan, D. B. (2007). Every error a treasure: Improving medication use with a nonpunitive reporting system. *Joint Commission Journal on Quality & Patient Safety, 33*(7), 401–407.

Martinez, W., & Lo, B. (2008). Medical students' experiences with medical errors: An analysis of medical student essays. *Medical Education, 42*(7), 733–741. doi: 10.1111/j.1365-2923.2008.03109.x

Melo, K., Williams, B., & Ross, C. (2010). The impact of nursing curricula on clinical practice anxiety. *Nurse Education Today, 30*(8), 773–778. doi: 10.1016/j.nedt.2010.02.006

Munro, E. (2004). Mental health tragedies: Investigating beyond human error. *Journal of Forensic Psychiatry & Psychology, 15*(3), 475–493.

Nunkoosing, K. (2005). The problems with interviews. *Qualitative Health Research, 15*(5), 698–706.

Polifroni, E. C., McNulty, J., & Allchin, L. (2003). Medication errors: More basic than a system issue. *Journal of Nursing Education, 42*(10), 455–458.

Reason, J. T. (1990). *Human error*. New York: Cambridge University.

Reason, J. T., Carthey, J., & DeLeval, M. R. (2001). Diagnosing "vulnerable system syndrome": An essential prerequisite to effective risk management. *Quality in Health Care, 10*(Suppl 2), 21–25.

Rodriguez, L. A. (2007). *Confronting life and death responsibility: The lived experience of nursing students and nursing faculty response to practice breakdown and error in nursing school*. Doctoral dissertation. University of Southern California, San Francisco. San Francisco.

Sears, K., Goldsworthy, S., & Goodman, W. M. (2010). The relationship between simulation in nursing education and medication safety. *Journal of Nursing Education, 49*(1), 52–55. doi: 10.3928/01484834-20090918-12

Seiden, S. C., Galvan, C., & Lamm, R. (2006). Role of medical students in preventing harm and enhancing patient safety. *Quality and Safety in Health Care, 15*, 272–276. doi: 10.1136/qshc.2006.018044

Soleimani, F. (2006). Learning from mistakes in New Zealand hospitals: What else do we need besides "no-fault"? *The New Zealand Medical Journal, 119*(1239), U2099–U2099.

Wolf, Z. R., Ambrose, M. S., & Dreher, H. M. (1996). Clinical inference by nursing students and experienced nurses concerning harmful outcomes occurring after medication errors: A comparative study. *Journal of Professional Nursing: Official Journal of the American Association of Colleges of Nursing, 12*(5), 322–329.

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), 278–287.