

Burnout Prevention in Undergraduate Nursing Students through Walking

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Abstract

Burnout is a significant problem in the nursing profession, contributing to psychological distress, job dissatisfaction, employee turnover, reduced quality of care, and increased healthcare costs. Nursing students are exposed to many of the same stressors that are associated with burnout in practicing nurses. The objective of this paper is to synthesize existing literature regarding the influence of a walking program on burnout in nursing students. A literature search was conducted using PubMed, CINAHL, The Cochrane Database of Systematic Reviews, Scopus, and Google Scholar. The following MeSH terms were included in the search: “Burnout, professional,” “walking,” “personnel turnover,” “nurses,” and “costs and cost analysis.” Studies provided evidence that a walking program could promote positive coping among nursing students, reducing the likelihood of burnout. Further research is necessary to determine a walking program’s specific effects on burnout in nursing students.

Burnout in Nursing Students

Professional burnout is an unfortunate situation experienced by many workers, and nurses are no exception. Whether through personal experience or that of a colleague, most nurses are familiar with burnout and its negative effects. Professional burnout, often simply referred to as burnout, is defined as exhaustion due to interpersonal stressors in professional relationships at the organizational level (Maslach, Schaufeli, & Leiter, 2001). While burnout can affect nurses of all specialties and experience levels, novice nurses are particularly vulnerable. The strain of learning in the field while lacking confidence in clinical knowledge and abilities has led some nursing students to exhibit signs of professional burnout while still in training.

Identification of the Topic

Burnout among nurses has been well documented in the literature, while burnout among nursing students has been studied to a lesser extent. As with any problem solving process, information about what is known and what has yet to be identified is essential at the outset. An overview of the history, definitions, contributing factors, and current management related to burnout in the nursing profession, and more specifically, in nursing students, is summarized in the proceeding paragraphs.

Historical Context. Staff burnout was initially described in the 1970s, when burnout was observed to be associated with somatic symptoms, such as illness and poor sleep, as well as behavioral symptoms, such as rigidity and negativity (Freudenberger, 1975). The topic of burnout gained further attention in the 1980s with the advent of the Maslach Burnout Inventory. A tool for assessing burnout among “people-workers”, the Maslach Burnout Inventory was originally tested on nurses, social workers, physicians, police, and various other human service professionals. It was found that working in a direct patient care role was associated with higher

levels of emotional exhaustion (Maslach & Jackson, 1981). Two decades later, a landmark study brought serious attention to the problem of nursing burnout, highlighting its role in increased patient mortality and increased costs to hospitals (Aitken, Clarke, Sloane, Sochalski, & Silber, 2002). Soon thereafter, a longitudinal study involving nursing students demonstrated that certain personality characteristics were significantly associated with components of burnout (Deary, Watson, & Hogston, 2003). Although several studies have been done in the last decade on burnout in nursing students, many questions remain unanswered.

Definitions. Several terms relevant to the discussion of professional burnout may be unfamiliar to the reader. Clarification of these terms will promote better understanding of the subject matter. The definitions of terms related to professional burnout are listed below.

- ***Professional burnout.*** To reiterate, burnout is exhaustion due to interpersonal stressors in professional relationships at the organizational level (Maslach, Schaufeli, & Leiter, 2001). Burnout consists of three components: Emotional exhaustion, depersonalization, and personal achievement (Maslach & Jackson, 1981). Throughout this paper, the terms “professional burnout” and “burnout” are used interchangeably.
- ***Emotional exhaustion.*** One component of burnout, emotional exhaustion (EE) is a measure of how one's work may lead to feelings of being emotionally overextended due to depletion of personal resources (Maslach & Jackson, 1981, Michalec et al., 2013).
- ***Depersonalization.*** A second component of burnout, depersonalization (DP) is a measure of the tendency to see recipients of one's care as objects instead of humans (Maslach & Jackson, 1981, Michalec et al., 2013).

- **Personal achievement.** Personal achievement (PA) refers to feelings of competence, achievement, and productivity in one's work with people, and is another component of burnout (Michalec et al., 2013).

Measurement of burnout. Burnout can be measured using the Maslach Burnout Inventory (MBI). The MBI measures the three components of burnout: EE, DP, and PA. Higher scores on the EE and DP subscales correspond with higher degrees of burnout (Maslach & Jackson, 1981). Conversely, lower scores on the PA subscale are associated with burnout (Maslach & Jackson, 1981). The MBI has served as a reliable tool for the measurement of burnout for over 30 years, and has demonstrated high reliability and validity (Maslach & Jackson, 1981).

Causes of burnout and factors contributing to burnout. There are many reasons why nurses are predisposed to burnout. The caring nature of the nursing profession naturally lends itself to potential for EE (Aycock & Boyle, 2009). The nurse-patient relationship often revolves around the patient's problems, and solutions for such problems are not always easily obtained (Maslach & Jackson, 1981). Repeatedly being involved in situations where patients are suffering, dying, or dealing with loss of functional capacity can take its toll on nurses over time. Especially in certain areas of nursing, frustration and despair can frequently permeate the nurse-patient relationship, leaving the nurse feeling "used up" at the end of the day. These types of situations can lead to EE, one of the key components of burnout.

Once a nurse is emotionally exhausted, a sense of negativity can develop. With personal resources depleted, the nurse may begin to display a cynical attitude. Often, this translates to DP, the nurse's failure to recognize and appreciate the patient's humanness (Maslach & Jackson, 1981). A constant sense of negativity can cause nurses to feel unhappy about themselves and

their job role. They may fall into a thought pattern of rating themselves poorly, and experience a lack of pride in their work (Maslach & Jackson, 1981). This describes the PA aspect of the burnout triad.

Additional factors can play a role in the development of nurse burnout. Work environment is one potential factor, as the demands of certain specialties may expose nurses to repeated opportunities for EE (McHugh, Kutney-Lee, Cimiotti, Sloane, & Aiken, 2011). Another potential factor in nursing burnout is workload, as each additional patient per nurse is associated with a 23% increased risk of burnout (Aitken et al., 2002). Other factors include poor support and resources, rapidly changing circumstances, difficult patients and their families, relationships with physicians, low institutional commitment to nursing, and the delivery of poor quality care (Chang, Hancock, Johnson, Daly, & Jackson, 2005). Unfortunately, the prevalence of nurse bullying in some work environments continues to erode the sense of camaraderie that nurses need to do their best work and avoid burnout (Hakojarvi, Salminen, & Suhonen, 2012). Research has shown that novice nurses, with little experience to draw upon, are at even higher risk for burnout than experienced nurses. During the first three years of their career, roughly one fifth of all nurses will find themselves “burned out” (Rudman & Gustavsson, 2011).

Stressors for nursing students. Nursing students must cope with some of the same stressors as practicing nurses, and they have additional stressors as well. Fundamental to success in nursing school is the commitment to long hours of study and an associated lack of free time, which many students find stressful (Jones & Johnston, 1997). Nursing students report that the engulfing demands of their nursing programs are physically debilitating, emotionally exhausting, and an impediment to their personal relationships (Beck, 1995). Additionally, nursing students often endure separation from home, financial worries, regular clinical and educational

assessment, and frequently changing clinical environments (Deary et al., 2003). Most nursing students experience insecurity about their developing clinical skills, as well as their perceived lack of practical skills that are so essential in the nursing field (Hamill, 1995). The increase in nontraditional student enrollment ushers in more concerns about burnout, as students with dependents frequently report disproportionate levels of stress (Gibbons, Dempster, & Moutray, 2008; Pryjmachuk & Richards, 2007). For a whole host of reasons, nursing students are prone to burnout during their nursing programs.

Current management of burnout. Existing efforts to curb burnout in the nursing profession are few. Addressing nurse workload, the state of California enacted a law that mandated a 1:5 nurse to patient ratio for medical surgical units over a decade ago (Aitken et al., 2002). Another strategy to reduce burnout in nurses is increased clinical supervision, which has proven effective at lowering psychological distress (Hyrkas, 2005). Promotion of Problem Based Learning has been shown to be effective at enhancing student empowerment and self-efficacy (Dunlap, 2005), which may be helpful in reducing burnout among the nursing student population. Mindfulness meditation has proven effective at reducing stress in nursing students, but encounters practicality issues as an intervention due to the need for professional training and guidance to learn the practice (Kang, Choi, & Ryu, 2009; Shirey, 2007). Other suggestions to reduce nurses' stress include increasing support staff and providing more opportunities for formal debriefing (LeSergent & Hanley, 2005). There is much room for improvement in the current management of nursing burnout, as large scale attempts to tackle the problem have yet to occur.

Significance of the Topic

Burnout in the nursing profession is a costly problem. While much attention has been given to the detrimental effects of burnout on nurses and their careers, there are other aspects of the problem worth examining. In terms of financial impact, a 2008 study indicated that nurse turnover resulted in costs to hospitals of at least \$82,000 per RN, a figure that has likely risen since then due to inflation (Jones, 2008). While there are multiple factors involved in nurse turnover, burnout is certainly a contributing factor because it relates to job dissatisfaction. According to the American Association of Colleges of Nursing (2014), more than 75% of registered nurses believe the nursing shortage presents a major problem for the quality of their work life, the quality of patient care, and the amount of time nurses can spend with patients. Another study that linked burnout to hospital acquired infections (HAIs) found that hospitals in which burnout was reduced by 30% had a total of 6,239 fewer infections, for an annual cost savings of up to \$68 million (Cimiotti, Aiken, Sloane, & Wu (2012). In keeping with the subject of costs, Mark, Lindley, & Jones (2009) concluded that positive working conditions for nurses—characterized by autonomy, participation in decision making, and relational coordination—do not significantly increase total salary costs on nursing units. Addressing burnout in the nursing profession makes sense not only from a business perspective, but also from a moral perspective. A landmark study on burnout and nurse staffing found that patient mortality increased by 7% with each additional patient per nurse (Aitken et al., 2002). Sadly, this study demonstrates that problem of nurse burnout can be measured in human lives.

In consideration of the above facts and figures, interventions to curtail burnout must be directed not only towards practicing nurses, but towards nursing students as well. Nursing students are the future of nursing, and they will inherit the problems of today's nurses, along

with new, unforeseen challenges. While in their formative period, nursing students are introduced to a healthcare system that will “make or break” them. They will develop habits and ways of coping in nursing school that will follow them throughout their careers. For example, it is already known that nursing students show a decline in empathy as they advance in their programs and have more interactions with patients (Ward, Cody, Schaal, & Hojat, 2012). This is concerning as it relates to the DP component of burnout. Nursing schools should not only be tasked with preparing nurses for safe practice, but also with helping them to arm their defenses against burnout for a long, productive, fulfilling career in nursing.

Purpose of the Paper

The purpose of this paper is to synthesize existing literature to help answer the following research question: In undergraduate nursing students, how does a walking program affect the incidence of burnout during the course of a nursing program and beyond? While the recommendation from the American College of Sports Medicine and the American Heart Association is for all healthy adults to engage in moderate-intensity aerobic activity for 30 minutes on five days each week, few Americans meet this goal (Haskell et al., 2007). A sedentary lifestyle can have negative consequences for both physical and mental health. This paper focuses on the concept of walking as a positive coping method to help nursing students overcome distress that leads to burnout. A review of the current literature on this topic will be presented, including a description of the search method, analysis of relationships, similarities, and themes across studies, and discussion of theoretical frameworks among studies. Additionally, this paper will examine the methodological strengths and limitations of studies, as well as identify major gaps in the literature. Finally, implications of studies will be presented, along with recommendations for future research.

Search Method

In order to gather information pertaining to the above PICOT question, a literature search was conducted using PubMed, CINAHL, The Cochrane Database of Systematic Reviews, Scopus, and Google Scholar. MeSH terms utilized in the PubMed search included: “Burnout, professional,” “walking,” “personnel turnover,” “nurses,” and “costs and cost analysis.” Additionally, the following general search terms were used in searches among other databases: “Burnout,” “nursing students and stress,” “walking and stress,” and “walking program nursing students.” Filters used to narrow the search for articles included: Human species, age adult 19+, research articles, and English language. Generally, the time frame for articles was limited to 5-10 years, with several exceptions, to allow for the inclusion of older articles with relevance to the topic. Some articles were obtained indirectly through PubMed, in that they were found as citations within articles obtained using PubMed, and sought out by other means. For this reason, some articles predate the years searched. A total of 50 research articles and two websites were obtained through online databases or search engines, as noted in the following table. One textbook and one reference article were also utilized as sources for this paper, as noted in the references.

Articles					
Database searched	Search terms	Years searched	Number of articles identified	Number of articles included	Number of articles excluded
PubMed	MeSH “Burnout, professional” with subheadings: <ul style="list-style-type: none"> • “nursing” • “education” • “prevention and control” 	2009-2014	158	23	135
	MeSH “Walking” with subheadings: <ul style="list-style-type: none"> • “education” • “psychology” • “trends” 	2009-2014	320	12	308
	MeSH "Personnel Turnover" AND "Nurses" AND "Costs and Cost Analysis"	2005-2014	12	4	8
CINAHL	General	2009-2014	280	0	280

	“Burnout” with subheadings: <ul style="list-style-type: none"> • “nursing” • “education” • “prevention and control” 				
	General “Nursing students and stress”	2009-2014	8	4	4
The Cochrane Database of Systematic Reviews	General “Nursing burnout”	2005-2014	2	0	2
	General “Walking AND mood”	2005-2014	124	0	124
Scopus	General “Walking AND stress”	2009-2014	737	3	734
Google Scholar	General “Walking program and nursing students”	2005-2015	17,000	4	16,996
Websites					
Search engine/website searched	Search terms	Years searched	Number of websites identified	Number of websites included	Number of websites excluded
http://www.aacn.nche.edu/media-relations/factsheets/nursing-shortage	n/a	n/a	1	1	0

Critical Review of the Literature

In this section, 26 of the 50 articles obtained will be examined for their potential contributions to guideline development. The findings of studies, organized by recurring themes, will first be described. Then a more focused review of the relationships between studies and the similarities across studies will be presented. A discussion of the commonalities in themes across studies will follow, along with an examination of the theoretical frameworks presented within the articles. This section will conclude with an analysis of the methodological strengths and limitations of the studies, as well as major gaps in the literature.

Major Themes

Several themes were identified in the 26 articles relating to burnout prevention in nursing students through implementation of a walking program. These major topics include: factors involved in burnout in nursing students, coping methods and burnout in nursing students, maximizing the mental health benefits of walking, and factors that affect walking program

participation. A thorough understanding of each of these themes is fundamental to exploration of the research question proposed in this paper.

Factors involved in burnout in nursing students. Six of the studies revealed that stress is associated with negative mental health outcomes in nursing students. Perceived burdens related to studying are positively associated with higher depression scores among students (Mikolajczyk et al., 2008). High levels of stress can contribute to psychological distress, a state not unlike burnout, characterized by the presence of somatic symptoms, anxiety, insomnia, social dysfunction and depression (Watson et al., 2009). Klainin-Yobas et al. (2013) found that stress has effects on poor physical health (β total = 0.27, $p = .01$) and psychological distress (β total = 0.70, $p = .01$) of nursing students. Watson et al. (2009) reached a similar conclusion, noting that stressful life events, such as financial problems and job applications, are significantly correlated across time with psychological distress in nursing students ($F = 15.4$, $p = .001$). Gibbons (2010) found that certain stressors described by students as hassles, such as learning and teaching demands, placement demands, and course organization demands, were significantly correlated with the components of burnout (EE, R squared = .252, $p = .01$; DP, R squared = .239, $p = .01$; PA, R squared = -.172, $p = .01$). Other common stressors that contribute to distress in nursing students include perceived lack of competence, uncertainty and impotence, fear of being harmed by the relationship with patients, fear of failing, examination/grades, amount and difficulty of material to be learned, and financial responsibilities (Gorostidi et al., 2007; Jones & Johnston, 1997). While stress certainly plays a substantial role in the development of burnout, there are other factors to consider.

Some nursing students may be more likely to experience burnout due to their individual characteristics. Deary et al. (2003) concluded that certain personality traits could serve as

predictors of burnout. They found that higher levels of neuroticism correlate with higher levels of EE ($r = 0.31, p = .01$), while lower levels of conscientiousness correlate with higher levels of DP ($r = -0.37, p = .05$) (Deary et al., 2003). They also noted that less conscientious, less agreeable students were less likely to finish their nursing programs. Conversely, Gibbons (2010) found that certain traits help students to avoid burnout. Self-efficacy was negatively correlated with EE ($R \text{ squared} = -0.384, p = .01$), as was dispositional control ($R \text{ squared} = -0.505, p = .01$) (Gibbons, 2010). Therefore, students with greater self-efficacy and dispositional control experience less EE. These studies demonstrate that one must consider both environmental stressors and individual traits when evaluating a student's burnout tendency.

Coping methods and burnout in nursing students. Six researchers focused on the mediating effects of coping on stress and burnout. Klainin-Yobas et al. (2013) found that 77% of the effects of stress on poor physical health and 11% on psychological distress were mediated by coping. Luo & Wang (2009) noted positive correlations between stressful events, negative coping style, and psychological distress ($r = 0.487, p < 0.01$), and negative correlations between positive coping style, social support, and psychological distress ($r = -0.192, p < 0.05$). Gibbons (2010) remarked that both approach-based coping and support-seeking coping were not significant predictors of any component of burnout. In general, most studies neglected to describe specific types of positive coping that help students. Furthermore, baseline information regarding positive coping of university students is discouraging, as only 42.5% reported utilizing stress-management skills, such as relaxation, meditation, or pacing oneself (Lee & Yuen Loke, 2005). Gorin (1992) noted similar findings in a survey on health promotion practices of nursing students. Engagement in the regular practice of relaxation methods was ranked as a low priority.

More telling evidence exists regarding the relationship between burnout and negative coping styles. Gibbons (2010) showed that avoidance coping was strongly associated with the components of burnout (EE, R squared = .521, p = .01; DP, R squared = .296, p = .01; PA, R squared = -.193, p = .05). Similar findings were noted by Deary et al. (2003), who observed a positive relationship between psychological distress and avoidance coping. In the same vein, Shikai et al. (2007) noted that nursing students who practice avoidance coping were more likely to be depressed, and students who utilize emotion-oriented coping were more likely to be depressed and anxious. The evidence is clear that students who procrastinate, ruminate, and self-preoccupy as a way of coping are more prone to burnout. While these studies do little to explain the positive coping methods most effectively employed by nursing students, the practice of walking for stress relief could be a worthwhile alternative to the coping methods mentioned above.

Maximizing the mental health benefits of walking. Numerous studies have noted the benefits of walking for mood improvement and stress reduction. Regular walkers report that walking provides stress relief (Rhodes, Blanchard, Courneya, & Plotnikoff, 2009). Barton, Griffin, & Pretty (2012) found a significant main effect for self-esteem ($F(1,147) = 38.2, p < .001$) and mood ($F(1, 142) = 65.8, p < .001$) after a single walking session. Furthermore, dose responses showed that both self-esteem and mood levels continued to improve over a six-week period with weekly 45-minute walks (Barton et al., 2012). Brenes et al. (2007) found that moderate exercise, such as brisk walking, is comparable to sertraline as an effective intervention for the treatment of minor depression. Nägel & Sonnentag (2013) noted the importance of sleep and exercise in predicting individuals' personal resources, such as resilience, pathway thinking, and optimism. They found that when employees engaged in exercise after work and slept at least

6.65 hours per night, they had more personal resources available the next day. Evidence supports the notion that walking can help individuals cope with stress, aiding them in functional improvement.

In addition to being an affordable form of exercise, one of the main advantages of walking is that the exercise environment can be tailored to the walker's preferences. Several studies note that certain walking environments, conditions, and techniques can help to maximize mental health benefits. Plante, Gustafson, Brect, Imberi, & Sanchez (2011) found a significant main effect for tension ($F(1, 126) = 7.96, p < .01$) and stress ($F(1, 228) = 4.99, p < .05$) when comparing outdoor versus indoor exercise. They concluded that outdoor workouts promote reduced tension and stress for individuals who exercise (Plante et al., 2011). In a wintertime walking study, Song et al. (2013) noted that subjects' heart rates were significantly lower (4.4%) after walking in an urban park (98.4 ± 0.9 bpm) than after walking in a city area (102.9 ± 1.1 bpm; $p < .05$), and that their "tension-anxiety" self-rating was significantly lower after walking in the urban park compared with the city area ($p < .01$). Roe & Aspinall (2011) concluded that walking in rural settings resulted in consistent significant ($p < .05$) positive change in mood and in mindset in relation to personal projects. Natural settings were also found to have an advantage over urban settings for the promotion of cognitive function. Berman, Jonides, & Kaplan (2008) found that an improvement in individuals' attention spans when walking in an arboretum was highly reliable, $t(36) = 4.783, p = .99$; but it was not when walking downtown, $t(36) = 1.708, p = .88$. Therefore, research supports the premise that outdoor walking has relaxing effects even in winter, and that park-like settings provide more advantageous venues for walking than city areas (Song et al., 2013).

Studies have shown that certain techniques can be implemented while walking to enhance the experience. In the case of mindful walking, walkers mindfully observe and focus on their bodily sensations during walks and remain focused on their moment-to-moment experiences without being lost in unhelpful or distressing thoughts. Teut et al. (2013) found that individuals who participated in a mindful walking program experienced significant ($p = .001$) reductions in stress and improvements in quality of life compared with individuals who received no intervention. Cognitive engagement strategies, similar to mindful walking, have also been associated with greater psychological benefits when compared with standard walking conditions. Cognitive engagement strategies are essentially awareness plans designed to influence how one engages in and interacts with the environment while walking (Duvall, 2011). In a study by Duvall (2011), participants who utilized a cognitive engagement strategy while walking experienced significant increases in attentional functioning (mean difference = 0.4, $p = .001$) and feelings of contentment (mean difference = 0.39, $p = .006$), along with a significant decrease in feelings of frustration (mean difference = -0.39, $p = .001$) compared with a control group. In total, there are various evidence-based strategies and techniques to employ, as well as environmental manipulations to consider in an effort to enhance the mental health benefits of walking.

Factors that affect walking program participation. Several factors that can affect participation in a walking program were identified in the literature. Burnout itself can have a negative impact on physical activity, but it depends on the individual's personality, as Liang, Kao, & Lin (2013) found in their survey of Taiwanese employees. They found that employees who are more driven or promotion-focused were more likely to forego physical activity when their work demands increased, whereas employees who were more complacent or prevention-

focused tended to maintain their physical activity routines even when work demands increased (Liang, Kao, & Lin, 2013). Raedeke, Focht, & King (2010) found that an intervention of weekly discussions with a walking mentor regarding cognitive behavioral strategies to utilize while walking significantly increased step counts compared with a control condition of pedometer use and self-monitoring only, $F(5, 570) = 10.1, p < .0001$. In addition, participants receiving the intervention condition in this study reported greater physical activity and self-efficacy, while the control group did not, $F(1, 77) = 5.6, p < .03$, Cohen $d = .47$ (Raedeke et al., 2010). Self-efficacy is an important factor in the promotion of walking, as Sylvia-Bobiak & Caldwell (2006) noted in their study. They found that self-efficacy had a significant effect on engagement in active leisure, β total = 0.40, $p = < .05$, suggesting that positive beliefs about physical activity led to higher levels of engagement in active leisure. Consistent with these findings is the discovery that people reporting high levels of self-efficacy are 93% more likely to attain sufficient levels of activity than those people reporting low levels of self-efficacy (Duncan & Mummery, 2005).

In line with evidence regarding belief-based targets, a survey by Rhodes et al. (2009) identified several beliefs about walking that individuals meeting national standards for physical activity were found to have. These included beliefs about feeling good, improving appearance, relieving stress, and walking taking too much time, chi-square = 14.34, $p = .01$; chi-square = 15.00, $p = .01$; chi-square = 21.34, $p = .01$; and chi-square = 21.36, $p = .01$, respectively. Survey research by Giles-Corti & Donovan (2003) indicated that a comprehensive strategy targeting social networks, infrastructure, and the cultural environment could increase walking program participation. Overall, studies suggest that efforts to promote walking should focus on support through mentoring, building self-efficacy, making time for regular walking, and emphasis of the affective advantages that regular walkers enjoy.

Relationships between Studies

Studies were compared for their similarities and differences regarding research design, level of evidence, and quality of evidence. While all 26 articles were quantitative studies, 4 of the studies utilized experimental designs, 5 employed quasi-experimental designs, and 17 used non-experimental designs. Of the 26 articles, there were four RCTs, five controlled trials without randomization, three cohort studies, and 14 descriptive studies that implemented cross-sectional and/or correlational designs. The Melynk Hierarchy of Evidence was used to determine the level of evidence of each of the studies (Melynk & Fineout-Overholt, 2014). The four RCTs included in the literature review were classified as Level II. Due to non-random allocation of participants to groups, the five controlled trials without randomization were assigned to Level III. The three cohort studies were ranked as Level IV, while the 14 descriptive studies were categorized as Level VI. All of the articles received a quality rating of B-2 per the Strength of Recommendation Taxonomy (SORT), as they all were of limited quality, but based on patient-oriented evidence (Ebell et al., 2004). Overall, the 26 articles included in the literature review encompassed a variety of research designs and levels of evidence, and were homogeneous with regard to quality of evidence.

Similarities across Studies

The target population for nine of the studies was nursing students. Seven of the studies looked at college students in general. Adults of working age were the target population for nine of the studies, while one study looked at older adults. Ten of the studies indicated that the sample population was primarily or completely female. Being that nursing is still largely a female-dominated profession, however, the findings of the mostly female studies may still be generalizable to nursing students.

Geographic location of the studies varied widely. Six of the studies were conducted in the United States. Three were conducted in Scotland. Two studies each occurred in Germany, the United Kingdom, Australia, and Japan. One study each was conducted in Spain, Canada, Thailand, China, Taiwan, and Hong Kong. One study took place in multiple Eastern European countries. Geographic information was not provided for two of the studies.

Similarities and differences were noted with regard to level of evidence and quality of evidence. The majority of the studies were Level VI on Melnyk's Hierarchy of Evidence, and there was modest representation of studies in Levels II, III, and IV as well. No trends were noted with regard to geographic location and level of evidence. There was no variance with regard to quality of evidence, as all studies ranked as B-2 for strength of recommendation per SORT (Ebell et al., 2004).

Theoretical Framework

Several studies used theoretical frameworks to conduct their research. The Transactional Model of Stress and Coping and the Theory of Planned Behavior were utilized. Applications of these models can aid in research as well as design and evaluation of health behavior interventions for nursing students.

Transactional Model of Stress and Coping. In their research on stress and coping in nursing students, Watson et al. (2009), Gibbons (2010), and Klainin-Yobas et al. (2013) referred to the Transactional Model of Stress and Coping (TMSC) as a theoretical framework. The TMSC proposes that stressful events are transactions between the person and the environment (Glanz & Schwartz, 2008). The person first conducts a primary appraisal, in which the stressor is evaluated as a potential threat or harm (Glanz & Schwartz, 2008). A secondary appraisal by the individual then results in a determination of whether or not the situation can be altered or

negative emotional reactions can be managed (Glanz & Schwartz, 2008). The outcomes of this process can be mediated by coping efforts. The TMSC serves as an effective framework for understanding how nursing students cope with stress and burnout.

Theory of Planned Behavior. Rhodes et al., (2009) used the Theory of Planned Behavior (TPB) in their study to better understand how beliefs about walking affect walking behavior. The TPB asserts that the best predictors of behavior are behavioral intention and perceived control over the performance of the behavior (Montaño & Kasprzyk, 2008). Behavioral intention is affected by attitude towards the behavior, as well as subjective norms (Montaño & Kasprzyk, 2008). Additionally, an individual's perception of the ease or difficulty of behavioral performance will affect behavioral intention (Montaño & Kasprzyk, 2008). The TPB can be used to predict a variety of behaviors, including health behaviors, and thus could be useful in exploring how a walking program affects burnout in nursing students.

Reliability, Validity, and Bias

The 26 articles cited in the Critical Review of the Literature section reveal various strengths and limitations with regard to reliability, validity, and bias. Each of these elements is defined below.

- Reliability refers to the consistency of an instrument in measuring the underlying construct (Melnik & Fineout-Overholt, 2014).
- Validity of study findings refers to whether or not the results of the study were obtained via sound scientific methods (Melnik & Fineout-Overholt, 2014).
- Bias refers to divergence of results from the true values or the process that leads to such divergence (Melnik & Fineout-Overholt, 2014). There are several common types of bias that are frequently seen in studies.

- Selection bias can occur if the sampling process or the way participants are allocated to groups inappropriately influences the results of the study (Melnyk & Fineout-Overholt, 2014).
- Researcher and participant bias is introduced in a study if the researchers or participants know who receives which intervention, or if the researchers are not blinded during the data entry process (Melnyk & Fineout-Overholt, 2014).
- Measurement bias can occur due to systematic errors in the measurement process, such as an incorrectly calibrated measurement device, or if researchers deviate from data collection protocols (Melnyk & Fineout-Overholt, 2014).
- Information bias occurs when researchers record different information from interviews or patient records, and is especially prevalent in cohort studies (Melnyk & Fineout-Overholt, 2014).

Methodological Strengths

During the literature review process, several strengths were noted in the articles. They are described below in relation to reliability, validity, and bias.

Reliability/Precision. The following strengths were noted in the 26 quantitative studies with regard to reliability and precision:

- Adequate test-retest reliability for instruments in four of the studies was demonstrated by correlation coefficients of 0.75 or greater.
- Adequate internal consistency reliability for instruments in 14 of the studies was shown by Cronbach's alpha values of 0.75 or greater.
- Researchers were trained to collect valid and reliable data in three of the studies.
- Narrow confidence intervals were present in 3 of the studies.

Validity/Accuracy. The following strengths were noted in the 26 quantitative studies with regard to validity and accuracy:

- Power analysis was used to determine sample size in two of the studies.
- Instruments of measurement were tested for accuracy in one of the studies.
- Adequate construct validity was demonstrated for instruments in four of the studies.
- Adequate content validity was shown for instruments in two of the studies.
- High survey response rates were noted in 11 of the studies.
- Intent-to-treat analysis was utilized in four of the studies.
- Instructions pertinent to the intervention or data collection procedure were given to participants in seven of the studies.
- Low or no attrition was noted in eight of the studies, which increases generalizability and validity.

Bias. The following strengths were noted in the 26 quantitative studies with regard to bias:

- Selection bias was reduced in six of the studies due to random sampling and/or random allocation of participants to groups.
- Measurement bias was reduced in three of the studies because the research associates received proper training in data collection procedures.
- Measurement bias was decreased in eight of the studies because there was minimal or no loss of participants to follow up.
- Information bias was reduced in two of the studies because the researchers measured and accounted for social desirability tendency in participant responses. This decreased response bias, which falls under information bias.

Methodological Limitations

In the literature review process, several limitations were also noted in the articles. They are described below in relation to reliability, validity, and bias.

Reliability/Precision. The following limitations were noted in the 26 quantitative studies with regard to reliability and precision:

- Adequate test-retest reliability for instruments in 25 of the studies was either not reported on or not demonstrated by correlation coefficients of 0.75 or greater.
- Adequate internal consistency reliability for instruments in 17 of the studies was either not reported on or not proven by Cronbach's alpha values of 0.75 or greater.
- Researchers were either not trained to collect valid and reliable data, or information regarding their training was omitted in 23 of the studies.
- Risk indexes such as RR, OR, NNT, and 95% CI were not noted in 23 of the studies, which decreases reliability.

Validity/Accuracy. The following limitations were noted in the 26 articles with regard to validity and accuracy:

- Power analysis was not used to determine sample size in 24 of the studies.
- Instruments of measurement were not tested or calibrated for accuracy in 16 of the studies.
- Adequate construct validity was not demonstrated for instruments in 24 of the studies.
- Adequate content validity was not shown for instruments in 23 of the studies.
- Low survey response rates or missing information regarding survey response rates were noted in 12 of the studies.

- Intent-to-treat analysis was either not utilized or information regarding its use was omitted in 20 of the studies.
- High attrition or missing information regarding attrition was noted in 12 of the studies, which decreases generalizability and validity.
- Gold standards were not utilized when calculating measurements in 12 of the studies.

Bias. The following limitations were noted in the 26 quantitative studies with regard to bias:

- Selection bias was increased in 22 of the studies due to non-random sampling and/or non-random allocation of participants to groups.
- Researcher/participant bias was increased in 25 of the studies due to lack of blinding.
- Measurement bias was increased in 24 of the studies either because the research associates received improper training in data collection procedures, or the instruments used in the study were not tested/calibrated prior to study initiation.
- Measurement bias was increased in nine of the studies due to excessive loss of participants to follow up.
- Information bias was increased in three of the studies because they were cohort studies.

Major Gaps in Knowledge of the Topic

Current literature provides significant information regarding burnout among practicing nurses, and adequate information about stress and burnout in nursing students. Additionally, ample literature exists regarding the concept of walking for mental health benefits. However, no research was found regarding walking as an intervention to reduce stress and burnout in nurses or nursing students specifically. Furthermore, systematic reviews and meta-analyses that relate to these topics in a meaningful way are scarce. The majority of the studies reviewed were descriptive in nature, as there are an insufficient number of RCTs concerning these subjects as

they relate to one another. Overall, there were numerous descriptive studies addressing isolated parts of the research question at hand, but few experimental studies in general, and none that studied a walking intervention on the identified target population.

Summary and Conclusions

Current research has established that stress and burnout are significant problems for nursing students. Multiple studies in the literature review identified various stressors that contribute to burnout and detract from nursing students' quality of life. Moreover, studies have identified various individual traits that make certain nursing students more or less prone to burnout. While much information has been gleaned from these studies regarding factors at play in the process of developing burnout, little is still known about effective strategies to reduce its incidence among nursing students.

Some studies have suggested that positive coping methods can improve nursing students' functioning. One such positive coping method that warrants further study in this population is walking. The mental health benefits of walking are well documented, and could be of particular therapeutic advantage for nursing students experiencing high levels of stress. In addition to being a low-cost and easily accessible form of exercise, walking can be adapted to further reduce stress and promote wellbeing. Manipulation of the walking environment to include proximity to green space, along with utilization of techniques such as mindfulness practice, cognitive engagement strategies, and mentoring can maximize the mental health benefits of walking, potentially improving adherence to a walking program. More research is needed to confirm a walking program's effects on burnout incidence in nursing students. Integration of research and real-world observation with the values, concerns, and choices of nursing students will be critical to the success of future interventions to reduce burnout in this population.

Burnout continues to be a detriment to the nursing profession, contributing to decreased job satisfaction and quality of life for nursing professionals, as well as increased patient morbidity and mortality, and increased healthcare costs. The incidence of burnout is far-reaching, affecting not only practicing nurses, but also nursing students. Burnout in nursing students can lead to attrition from nursing programs, and makes for an unfavorable start to a nursing career. At a time when competent, capable nurses are needed more than ever, it is fitting that investments be made in the mental health and wellbeing of nursing students.

Areas for Future Research

Opportunities for improvement exist regarding research on burnout prevention in nursing students through implementation of a walking intervention. There is a need for studies that address all aspects of the research question proposed in this paper, rather than only isolated parts of it. Additionally, more randomized controlled trials regarding these topics would be a valuable asset to the existing literature, as many of the articles included in the literature review are descriptive studies. Future research in this area could also be enhanced by adherence to best practices in the research process, including the use of risk indexes, power analysis, intent-to-treat analysis, instrument testing for reliability and validity, and proper training for research associates. Finally, improvements in the research designs and sampling processes of future studies could reduce bias and contribute to higher quality studies for this important area of nursing research.

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