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The Relationship of Childhood Adversity on Burnout and Depression Among BSN Students

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ABSTRACT

Background: Research evidence strongly suggests that Adverse Childhood Experiences (ACEs) predispose individuals to development of an increased sensitivity to stress and negative physical and mental health outcomes in adulthood.
Purpose: To determine if there was a relationship between the number of ACEs reported by first semester BSN students and their reported level of Burnout and Depression.
Methods: 211 students enrolled in the first semester of upper division courses of their BSN program completed self-report questionnaires which measured the number of ACEs, the level of Depression and the level of Burnout.
Results: The number of reported ACEs by participants had a significant relationship on the levels of burnout and severity of depressive symptoms. Female students with a higher number of ACEs were more likely to report higher levels of Burnout A (Emotional Exhaustion) and Burnout B (Depersonalization), and higher depression severity scores compared to males.
Conclusion: Nursing programs should educate faculty concerning the frequency and range of adverse experiences that students may have had prior to admission to the nursing program, and the possible relationship with Burnout and Depression. Faculty can provide early information on counseling and support services.

Introduction

Growing research evidence strongly suggests that Adverse Childhood Experiences (ACEs) increase the sensitivity to psychosocial stress later in life and possibly across the life span (McLaughlin et al., 2010; Shapero et al., 2014). ACE is a term coined to encompass the chronic, unpredictable and stress-inducing events that some individuals face during childhood and include the stress caused by poverty, abuse or neglect, parental substance abuse or mental illness, and exposure to violence (Felitti et al., 1998; Johnson, Riley, Granger, & Riis, 2013). The increased sensitivity to stress induced by ACEs has been characterized by a tendency to perceive neutral events as threatening and stressful as well as magnified physiological responses to psychosocial stressors. ACEs have been identified as being determinants for an increased susceptibility to a wide range of adverse physical and mental health outcomes. For example, individuals who have experienced ACEs during their childhood demonstrate an increased incidence of cardiovascular disease, diabetes, and depression during adulthood (CDC, 2014; Chapman et al., 2004; Felitti et al., 1998; Korkeila et al., 2010; Monnat & Chandler, 2015).

Several studies have documented factors impacting the stress level of nursing students during their nursing program. General themes noted within these studies included stress that arose from clinical aspects, academic aspects, and personal aspects associated with the nursing curriculum (Jimenez, Navia-Osorio, & Diaz, 2010; Prymachuk & Richard, 2007; Sheu, Lin, & Hwang, 2002). A study by Gibbons (2010) studied the psychological and physiological impact of stress on nursing students, and found that as nursing student's stress levels increased, reports of Burnout A, (emotional exhaustion) and Burnout B, (depersonalization), also increased and report the development of burnout. Another study conducted by Rella, Winwood, and Lushington (2009), found that up to 20% of graduates were reporting signs of serious maladaptive fatigue/stress and depression. The prevention and treatment of burnout and depression among nursing students poses an important challenge for nursing education, since these conditions can persist or worsen after graduation and they can contribute to increased rates of nurse attrition, higher healthcare costs, and ultimately lower quality of healthcare (ANA, 2014; Gibbons, 2010; Holdren, Paul III, & Coustasse, 2015).

Several studies attribute the development of burnout and depression

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among nursing students to the stress induced by the demanding requirements of nursing programs. However, there is a current gap in the research literature concerning the role that ACEs might play in the development of burnout and depression among nursing students. More research is needed to determine if ACEs increase the susceptibility to burnout and depression among nursing students. This is timely and critical since there is an expected national nursing shortage within the next decade, due to the increased rates of retirement among nurses in the baby boomer generation (Buerhaus, Skinner, Auerbach, & Staiger, 2017). Understating the susceptibilities of nursing students to the effects of stress and the subsequent impact of stress is vital to nursing school administrators in order to better prepare a new generation of nurses for the demands of the nursing profession.

Background

Adverse Childhood Experiences Induce Stress Sensitivity

Several studies have documented the negative consequences that ACEs produce in the developing brain. When the brain of a developing child is chronically stressed by ACEs, it releases higher levels of cortisol, which leads to shrinkage of the hippocampus, an area of the brain responsible for processing emotion, memory and managing stress (Sheridan, Fox, Zeanah, McLaughlin, & Nelson, 2012; McLaughlin et al., 2010).

Recent magnetic resonance imaging (MRI) studies also suggest that the number of ACEs reported is negatively associated with the amount of gray matter across several areas of the brain (Sheridan et al., 2012). Some of these key areas include the prefrontal cortex, an area related to decision-making and self-regulatory skills, and the amygdala, or fear-processing center. Children whose brains have been changed by ACEs are more likely to become adults who over-react to even minor stressors (McLaughlin et al., 2010; Sheridan et al., 2012).

A national study by the CDC (2014) on the effect of ACEs on individuals, found that a 'graded dose-response' relationship exists between ACEs and negative health and well-being outcomes across the life course. Dose response describes the change in an outcome (e.g. Alcoholism) associated with differing levels of exposure (or doses) to a stressor (e.g. ACEs). Other studies on ACEs have found that negative health outcomes produced by ACEs include an increased susceptibility to stress that led to an increased development of psychiatric illness such as depressive disorders and post-traumatic stress disorder (PTSD) (Chapman et al., 2004; Cabrera, Hoge, Bliese, Castro, & Messer, 2007; LeardMann, Smith, & Ryan, 2010; Maunder, Peladeau, Savage, & Lancee, 2010; Enoch, 2011; Edmondson, Kronish, Shaffer, Falzon, & Burg, 2013; CDC, 2014; Shapero et al., 2014; Plieger, Melchers, Montag, Meermann, & Reuter, 2015).

Stress, Burnout and Depression

Sources of stress in nursing students listed in the literature include factors such as a heavy academic workload, information overload, rigorous exams, learning complex skills, long and irregular working hours, and caring for patients in the clinical setting (Jimenez et al., 2010; Lenburg, 2008). High levels of prolonged stress experienced by students during nursing school have been linked to an increase in the development of burnout syndrome and depression (Altiok & Ustun, 2013; Gibbons, 2010; Li, Cao, Cao, & Liu, 2014; Shankar & Park, 2016).

Burnout syndrome has been extensively studied in the research literature primarily among nurses who are already members of the healthcare workforce (Abualrub, 2004; Drake, Luna, Georges, & Steege, 2012; Khamisa, Oldenburg, Peltzer, & Ilic, 2015; McVicar, 2004). Burnout syndrome is defined as a state of emotional, mental, and physical exhaustion caused by excessive and prolonged stress. Multiple studies have documented the adverse physical and mental health outcomes of nurses who report high levels of burnout in the work setting, including depression, poor work performance, demoralization and leaving the nursing profession (Abualrub, 2004; Drake et al., 2012; Khamisa et al., 2015; McVicar, 2004). Depressive symptoms have also been extensively studied among nurses in the healthcare workforce. Nurses have been found to experience depression at twice the rate (18%) of the average American (9%) (RWJF report, 2012). Depression is associated with higher rates of chronic disease, increased health care utilization and impaired functioning. Depression can be long-lasting or recurrent, substantially impairing an individual's ability to function at work or school or cope with daily life (CDC, 2014; Dos Santos et al., 2015; Poghosyan, Clarke, Finlayson, & Aiken, 2010).

However, there are scarce research studies that have focused on the risk factors and origin and development of burnout syndrome or depression among nursing students in the U.S. Most of the studies available have been conducted in countries outside the U.S. There is also no research evidence that confirms whether students who are more susceptible to developing burnout and depression are those who have experienced a higher number of ACEs in their life time.

Studies focusing on Burnout syndrome in nursing students reported that nursing students experience burnout comparable to working nurses, and confirmed the existence of the three dimensions of burnout from the Maslach Burnout Inventory (Beck, 1995; Maslach, Jackson, Leiter, Schaufeli, & Schwab, 1996; Maslach & Leiter, 2016). These three dimensions include emotional exhaustion, (described as the feelings of being exhausted in response to the intense demands of their studies); cynicism, (perceived as the development of a skeptical and distanced attitude from their studies); and low professional efficacy, (marked by the perception of being ineffective as students) (Schaufeli, Martínez, Pinto, Salanova, & Bakker, 2002; Tomaschewski-Barlem et al., 2014; Yavuz & Dogan, 2014).

Studies focusing on depression in nursing students reported that the majority of nursing students (> 50%) experienced some level of depression (mild, moderate or severe) as defined by the PHQ9 instrument, during their nursing program, with an approximate average of 8% of students reporting moderate to severe depression. The factors associated with depression by participants included age, academic year in the nursing program, and the student's satisfaction with the nursing program and physical and mental health factors (Papazisis, Tsiga, Papanikolaou, Vlasiadis, & Sapountzi-Krepia, 2008; Rathnayake & Ekanayaka, 2016).

Purpose of the Study

The objectives for this study included: (a) assessing the number of ACEs reported by junior students enrolled in the first semester of upper division courses in their BSN program; (b) measuring the level of depression and burnout among these participants; and (c) determining the relationship of the number of ACEs on the levels of depression and burnout reported by these nursing students.

Research questions for this study included:

a. Is there a relationship between the number of reported ACEs and the level of Burnout among first semester, upper division BSN students?
b. Is there a relationship between the number of reported ACEs and the level of depressive symptoms among first semester, upper division BSN students?

Materials and methods

Measures

This study was part of a larger prospective cohort study, and participants were required to complete a series of self-report questionnaires. The questionnaires completed by participants for this study included the ACE questionnaire, The PHQ9 questionnaire, the Maslach Burnout Inventory, and a demographic questionnaire. All

questionnaires were completed in an online format, which were accessed through the study's website, using a secure password protected account. Participants were instructed to complete the self-report questionnaires within a specified time period of 4 weeks during the first semester of their upper division BSN program, and were told that the questionnaires would be completed anonymously online, and only aggregate data would be reported. In addition, participants could complete different questionnaires online at different times, as long as they completed all questionnaires within the specified 4-week time period. Data from incomplete questionnaires were excluded from this analysis. Data were summarized in aggregate and validity and reliability of these questionnaires is described below.

Childhood Adversity

Childhood maltreatment and neglect, household dysfunction and abusive parenting were assessed with the ACE questionnaire (Felitti et al., 1998). Participants reported whether they experienced adverse experiences prior to the age of 18 by answering Yes or No. A total ACE score was calculated as the sum of dichotomized "yes" and "no" responses across ten categories of adverse experiences: childhood household mental illness, household substance abuse (alcoholic or drug abuse), incarcerated family member, parental divorce, witnessing domestic violence (slap, hit kick, punch, beat), physical abuse (parent/adult hit, beat, kick, physically hurt) sexual abuse (sexual touching or forced sex by adult/person 5 years older than self), and emotional abuse (parent/adult insult, swear at, put down). Each Yes response counted as a score of '1'. An ACE score of four or more is considered the threshold marking high ACE exposure, which has been linked to a significantly increased likelihood of developing adverse adult health outcomes (Felitti et al., 1998). The ACE questionnaire takes approximately 20 min to complete on average. Reliability estimates for the ACE questionnaire in other studies have ranged between 0.61 and 0.78 (Dube et al., 2003; Felitti et al., 1998). The factor structure of the ACE questionnaire has been validated, and results suggested a 3-factor solution (Ford et al., 2014). Reliability estimates obtained for the ACE questionnaire in this study was 0.70.

Patient Health (PHQ9) Questionnaire

Depression was measured with the PHQ-9 questionnaire, which consists of the actual nine criteria on which the diagnosis of DSM-IV depressive disorders is based on, and can be answered in < 10 min. The PHQ9 scores each of the 9 DSM-IV criteria as "0" (not at all) to "3" (nearly every day). Results of the PHQ-9 were scored as follows: a score of 5–9 was considered minimal depression; 10–15 was considered mild major depression; 15–19 was considered moderate major depression; and greater than or equal to 20 was considered severe major depression. The purpose of using the PHQ9 in this study was not to diagnose clinical depression in participants, (since the PHQ9 questionnaire was administered as an anonymous survey and no follow-up could take place). Rather, the results of the PHQ9 were used to determine the prevalence and range of depressive symptoms in each cohort of participants. The PHQ-9 has demonstrated good sensitivity (73%) and specificity (98%) when used to diagnose major depression in adult populations (Spitzer, Kroenke, & Williams, 1999). Reliability estimates for the PHQ9 in other studies have ranged between 0.86 and 0.89. The PHQ9 questionnaire was found to be a valid and reliable measure of depression severity in other studies (Kroenke, Spitzer, & Williams, 2001). Reliability estimates obtained for the PHQ9 questionnaire in this study was 0.87.

Maslach Burnout Inventory

Burnout was assessed with Maslach's Burnout Inventory (MBI) (Maslach et al., 1996). This questionnaire consists of 22 items, and includes three subscales: (a) Emotional exhaustion; (b) Depersonalization; and (c) Personal accomplishment. The emotional exhaustion subscale assesses feelings of being emotionally overextended and exhausted by one's work and was indexed by the "Burnout A" score. Depersonalization assesses cynicism, which is an unfeeling and impersonal response toward recipients of one's service, care treatment or instruction and was indexed by the "Burnout B" score. Personal accomplishment refers to perceived efficacy, which can be described as feelings of competence and successful achievement in one's work and was indexed by the "Burnout C" score. The MBI takes between 10 and 15 min to complete, and is scored using a 7 level frequency scale from "never = 0" to "daily = 6". Each subscale of the MBI measures its own unique dimension of burnout. There are score ranges that define Low, Moderate and High levels of each component/scale based on the 0–6 scoring. The MBI has been validated among university students where it resulted in reliability estimates ranging from 0.83–0.87. Reliability estimates obtained for the different subscales of the MBI for this study were as follows: "Burnout A; 0.92", "Burnout B: 0.77", and "Burnout C: 0.95".

Demographic Questionnaire

A demographic questionnaire was administered to participants that requested general information about their gender, race, ethnicity and age.

Study Design

This study was part of a larger prospective cohort study carried out at The University of Texas at El Paso Bachelor of Science in Nursing degree program entitled *"Nursing Engagement and Wellness Study"*. Cross-sectional data were obtained and analyzed from a sub-set of self-report questionnaires collected at baseline. Participants who were in their Junior year, and enrolled in the first out of 4 semesters of upper division BSN courses, were included to obtain a baseline measurement of the self-report questionnaires. Continuation of this prospective study will include the administration of the same self-report questionnaires to the participants included in this study, during the last semester of their BSN program, and one year after graduation from their BSN program, in order to determine if any significant changes took place.

Inclusion Criteria

Junior level nursing students who had been admitted into the upper dividion nursing courses of the BSN program at the University of Texas at El Paso, and were between 18 and 55 years of age were eligible to participate in this study. Students who dropped out of the nursing program or who transferred to another university were excluded from the study. The protocol used in this study was approved by the Institutional Review Board at The University of Texas at El Paso.

Recruitment and Informed Consent

A convenience sample of 211 nursing students was recruited into this study. Junior level nursing students enrolled in the first out of 4 semesters of upper division BSN courses were recruited during three consecutive semesters, including fall 2016, and during spring and summer terms of 2017. The rationale for selecting students enrolled in the first semester of their upper division nursing courses was to establish a baseline of the different measures administered to participants as they were starting upper division courses involving a clinical component. The same measures will be administered to the same participants at the end of their BSN program and one year after graduation to determine any significant changes.

Participants recruited into this study from the 'fall 2016' term were referenced as 'cohort 1'. Participants recruited during the 'spring 2017'

term, were referenced as 'cohort 2', and students recruited during the 'summer 2017' term were referenced as 'cohort 3'. Recruitment was performed through a standard announcement distributed via email, posters, flyers and university media outlets. The PI and research assistants visited the classes of students enrolled in their first semester of upper division BSN courses during 3 consecutive semesters, and explained the details of the study. Students were given the option of signing up for the study during the information sessions, or by emailing or calling the research assistants to sign up to participate. Students were told that participation in the study was completely voluntary, and there would be no effect on a student's grade if they decided not to participate. This statement was also included on the Informed consent form, which was obtained from all participants during the information sessions or electronically through the study's website.

Analysis

Total scores from the ACE, MBI and PHQ9 along with descriptive statistics were calculated and summarized by gender, race and ethnicity. Mixed effects modeling was used to assess the relationship of childhood adversity on burnout and depression severity while controlling for gender, ethnicity and age, and to determine if significant interactions between these variables existed as well. All statistical analyses were performed in R (version 3.3.3) and mixed models were built using the 'lme' package (version 3.-131) (R Core Team, 2013).

Results

Demographics

Of the total 211 participants recruited into this study, 72% of them were females and 28% males, with an average age of 24.7. Participants were predominantly Hispanic (89%), and 11% reported being from other racial/ethnic groups, with minimal variation observed across cohorts (see Table 1).

Childhood Adversity

Of the 211 participants, 179 completed the ACE questionnaire (see Table 2). This questionnaire was scored with each "Yes" response counted as a score of "1". An ACE score of four or more is considered the threshold marking high ACE exposure, which has been linked to a significantly increased likelihood of developing adverse adult health outcomes (Felitti et al., 1998). After classifying participants based on their ACE score, it was observed that 72% of participants reported at least one ACE and that 23% reported an ACE score equal or > 4. This number varied between 29% for cohort 1, and 16% for cohort 3.

Among the total sample of participants, variation was observed in the frequency and types of adverse events experienced during childhood (see Fig. 1).

The most frequent childhood adverse experiences reported were divorced parents (32.7%) and substance abuse within the household (31.3%), followed by physical abuse (24.6%). The least frequent adversities were neglect (6.6%) and abuse by mother (10.9%). There were no statistically significant differences in ACE scores reported by males compared to females in each cohort of this study.

Table 1
Demographic characteristics of participants in participating cohorts.

General info	Cohort 1	Cohort 2	Cohort 3	Total
n	40	85	86	211
Male	18%	28%	31%	28%
Female	82%	72%	69%	72%
Hispanic or Latino	92%	86%	90%	89%
Not Hispanic or Latino	8%	14%	10%	11%
Age (mean)	25.85	24.45	24.35	24.67
Age (Std. Dev.)	6.749	5.096	6.262	5.915

Table 2
Childhood adversity percentages among participating cohorts.

ACE score	Cohort 1	Cohort 2	Cohort 3	Total
n	31	85	63	179
0	26%	29%	29%	28%
1	35%	26%	17%	25%
2	0%	13%	22%	14%
3	10%	8%	16%	11%
4	10%	11%	6%	9%
5	10%	7%	5%	7%
6	6%	2%	3%	3%
7	0%	0%	2%	1%
8	3%	2%	0%	2%
9	0%	1%	0%	1%
10	0%	0%	0%	0%
ACE Score (> 4)	29%	24%	16%	23%

Burnout

Of the 211 participants, 159 completed the MBI questionnaire (see Table 3). Out of those who completed the MBI, 22% reported Moderate to High-level burnout on subscale A, which measures Exhaustion. There were 24% of participants that scored moderate to high level burnout under subscale B, which measures Depersonalization, and 37% that scored moderate to high level burnout under subscale C, which measures Personal Achievement.

Depression Severity

Out of the 211 participants, 164 completed the PHQ9 questionnaire (see Table 4). The majority of participants that completed the PHQ9 (62%), reported no symptoms of depression, and an additional 25% reported minimal depression. Minor depression was reported by 8% of participants, while 3% reported major-moderate depression and 2% reported major severe depression.

Mixed Effects Modeling

The mixed effects modeling approach was utilized in this study to allow for evaluation of fixed effects (e.g., childhood adversity and gender) on outcome variables (e.g., depression and burnout) while accounting for the random effects (the different cohorts). More specifically, this approach allowed the consideration of every cohort as a random sample collected from a broader population of nursing students, and in this regard account for some of the variability induced by the temporally distributed data collection approach. The statistical analyses were performed in R (version 3.5.0) with mixed models built using the 'nlme' package (version 3.1-137).

Results from mixed effects modeling revealed that ACE scores were significantly positively associated Burnout A, which measures Exhaustion ($p < 0.001$), (see Table 5). This association had a strong gender effect (< 0.05), where females with higher ACE scores were more likely to report higher Burnout A, as compared to males.

Regression models also showed that ACE scores were significant positively associated with depression on the PHQ9 questionnaire ($p < 0.01$), such that students with higher ACE scores were more likely to report higher PHQ9 scores. Burnout A was also significantly associated with depression severity ($p < 0.01$), (see Table 6). A significant ($p < 0.01$) gender effect for this association was also observed, where female students with higher Burnout A were more likely to report higher PHQ9 scores. Burnout B was also significantly associated with depression severity ($p < 0.01$), (see Table 7). There was also a significant ($p < 0.04$) gender effect, where females with higher Burnout B

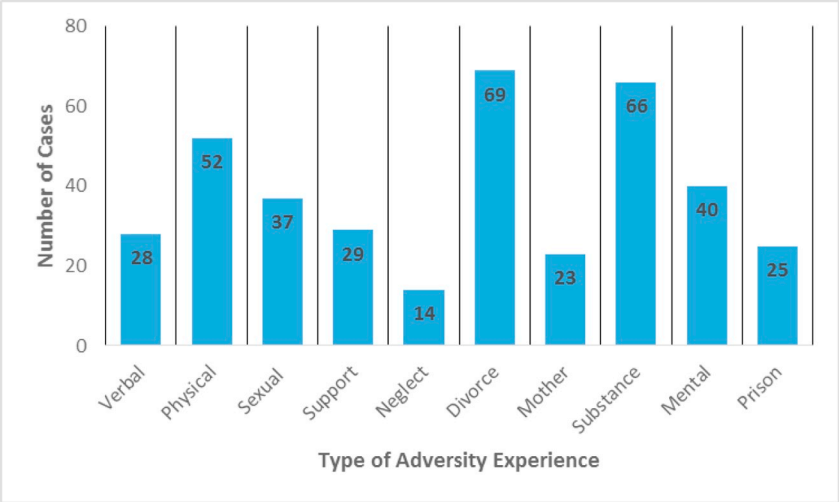

Fig. 1. Reported events by type of adversity experience for all 3 cohorts.

Table 3
Burnout Percentages among participating cohorts.

Burnout %		Cohort 1	Cohort 2	Cohort 3	Total
n		22	84	53	159
BO_Section A burnout score	Low-level burnout	77%	77%	79%	78%
	Moderate burnout	18%	19%	17%	18%
	High-level burnout	5%	4%	4%	4%
BO_Section B depersonalization score	Low-level burnout	77%	76%	75%	76%
	Moderate burnout	23%	18%	13%	17%
	High-level burnout	0%	6%	11%	7%
BO_Section C personal achievement score	High-level burnout	9%	15%	32%	20%
	Moderate burnout	0%	23%	15%	17%
	Low-level burnout	91%	62%	53%	63%

Table 4
Depression Severity percentages among participating cohorts.

	Cohort 1	Cohort 2	Cohort 3	Total
PHQ9 results				
n	23	84	57	164
No symptoms	57%	54%	75%	62%
Minimal symptoms	26%	29%	19%	25%
Minor depression	17%	8%	4%	8%
Major depression moderate	0%	5%	2%	3%
Major Depression_Severe	0%	5%	0%	2%

Table 5
ACE scores and Burnout A: (Exhaustion).

Predictors	Estimates	CI	*p*
(Intercept)	10.44	6.86–14.02	< **0.001**
Gender1	−1.03	−5.22–3.17	0.629
ACE	−0.60	−1.82–0.62	0.331
Gender1:ACE	1.32	−0.14–2.78	0.076
Observations	211		
R^2/adjusted R^2	0.024/0.009		

Table 6
ACE scores and depression severity.

Predictors	Depression		
	Estimates	CI	*p*
(Intercept)	3.89	2.13–5.65	< **0.001**
Gender1	0.74	−1.31–2.78	0.478
ACE	1.04	0.42–1.66	**0.001**
Gender1:ACE	−0.19	−0.90–0.53	0.606
Observations	211		
R^2/adjusted R^2	0.125/0.114		

Table 7
Burnout B (Depersonalization) and depression severity.

Predictors	Estimates	CI	*p*
(Intercept)	4.40	2.74–6.07	< 0.001
Gender1	−1.57	−3.52–0.39	0.116
ACE	−0.33	−0.89–0.24	0.260
Gender1:ACE	0.80	0.12–1.48	0.022
Observations	211		
R^2/adjusted R^2	0.035/0.021		

were more likely to report higher PHQ9 scores.

Discussion

Of the 211 participants, 72% reported having experienced at least one ACE. This number was higher than the rate reported by the CDC's national Behavioral Risk Factor Surveillance System ACE data, which was collected between 2009 and 2014. Also, 23% reported having experienced 4 or more ACEs during their lifetime, and this number was also significantly higher than the percentages reported in the CDC's national study, which revealed that only 16.2% of women and 12.4% of men reported having experienced 4 or more ACEs. The fact that almost one quarter of participants in this study experienced 4 or more ACEs during childhood is concerning because this group of students can be considered more vulnerable to being more sensitive to stress, and at risk

for developing negative physical and mental health outcomes. An explanation for these findings could be that this study included a high percentage of Hispanic participants (89%), and minority groups have been found to have an increased percentage of ACEs (CDC, 2014). This could be a significant finding for nursing school administrators who have a high percentage of minority students enrolled in their nursing program. Administrators need to consider the possible effects of ACEs in minority nursing students and the implementation of methods to support these students.

There were also significant differences found in the most frequent types of ACEs reported by participants in this study compared to those reported in the national CDC study. The most frequent ACE reported by participants in this study was divorce by parents, which was (32.7%). This differed from the CDC study, which reported ACE related to divorce as only 23.1% for women and 22.5% for men. This finding may be significant to the education of nursing students on specific counseling services available to children of divorced parents.

The participants in this study listed substance abuse within the household (31.3%) as the second most frequent ACE. This finding was slightly higher than the national CDC average, which listed ACEs related to substance abuse as 27.2% for women and 22.9% for men. The findings from this study were also significant, because of the CDC's national study which found that there is a dose-response relationship with ACEs. Participants in this study who reported 4 or more ACEs during childhood will be more predisposed to a 'dose response' negative physical or mental health outcome. For example, if participants experienced 4 or more ACEs relative to alcohol and substance abuse during childhood, they will be more prone to developing a negative outcome relative to alcoholism and/or drug abuse (CDC, 2014). These findings are also significant in the education of students on specific support services that may be available to students concerning substance abuse.

Participants in this study also reported physical abuse as the third most common ACE experienced (24.6%). This was significantly higher than results from the national CDC study which reported 15.8% for women and 15.9% for men. More education of students can be implemented on support services relative to physical abuse.

The majority (89%) of participants in this study were Hispanic, and reported a higher percentage of ACEs than the national average. This supports findings in the research literature that there are definite disparities in the number of ACEs reported by different ethnic/racial groups in the U.S. For example, the study by Slopen et al. (2016), found that across all racial and ethnic groups, black and Hispanic children were exposed to more adversities compared with white non-Hispanic children. This finding is significant for nursing programs and for the future of the nursing workforce, since there are increasing numbers of Hispanic students who are entering the nursing profession, who may be at higher risk for the development of stress, burnout and depression.

There were 22% of participants in this study who reported having moderate to high levels of burnout 'A' on the Masclach Burnout Inventory, which measures 'exhaustion'. These results differed from those obtained in the study by Rella et al. (2009) which found that first year nursing students reported only 15% of moderate to high levels of 'exhaustion'. This higher percentage of 'exhaustion' reported by the participants in this study, (who were incoming BSN students), is significant because these students had not yet been exposed to the stressors of the nursing program, or been exposed to taking care of patients in the clinical setting. A moderate to high score under the burnout 'A' scale demonstrated that almost one quarter of participants in this study were already reporting exhaustion.

Results from this study also revealed that 24% of participants reported moderate to high levels of burnout 'B', which measures 'depersonalization'. These results were similar to those reported in the study by Gibbons (2010), which found that as student's stress levels increased, their levels of depersonalization increased. In this study, stress level was related to the number of ACE's reported by participants. Participants who reported a higher number of ACEs demonstrated a higher level of 'depersonalization'. This should raise the awareness of nursing faculty to observe their students for signs of depersonalization in the clinical setting, and to implement educational strategies to address depersonalization and the negative effects it can have on quality patient care.

There were 37% of participants in this study that reported moderate to high levels of burnout 'C', which measures perceived efficacy and feelings of competence and successful achievement in one's work. These results were also similar to those found by several studies in the literature (Gibbons, 2010; Hoseinabadi-farahani, Kasirlou, & Inanlou, 2016; Marquez da Silva et al., 2014), which found that as student's stress levels increased, personal achievement decreased. This finding is significant, since it demonstrates that over one third of incoming nursing students in this study had feelings of low professional efficacy and feelings of incompetence. Nursing programs could use these findings to modify the teaching methods within their curriculum to increase feelings of professional efficacy in nursing students, as well as to implement programs to help with stress reduction and time management.

There were 5% of participants in this study that reported moderate to severe depression on the PHQ9 questionnaire. This percentage was lower than the average percentage of depression reported by the CDC (7.6%) in Americans 12 years of age or older, and lower than other studies focusing on depression in college students. However, this finding was significant because it can alert nursing faculty to recognize students experiencing severe depression, so that early referral to counseling and support services can be implemented. Nursing programs also need to implement the early education of students to recognize the symptoms of depression and burnout and to familiarize them with where to seek support. As mentioned in the article by Eisenberg, Golberstein, and Gollust (2007), many college students do not know how to recognize the symptoms of depression, and do not know where to go to seek help.

Strengths and Limitations

Strengths of this study included finding several significant relationships between the number of reported ACEs and the level and prevalence of Burnout and Depression among BSN students. These results support findings in the research literature relative to the negative effect of ACEs on mental health outcomes in adulthood. Another strength of this study is that it may raise the awareness of administrators of nursing programs and nursing faculty to the possible relationship of ACEs on levels of Burnout and Depression in their students. Nursing programs can use this information to implement measures to support students during their nursing program in order to try to prevent the progression of Burnout and Depression in their nursing students.

Limitations of this study include that it may not be generalizable to the general population of BSN nursing students, because the majority of participants recruited into this study were of Hispanic origin (89%) and female. Replication of this study that includes a larger sample of junior level, first semester upper division BSN students, inclusion of more diverse racial/ethnic groups and the inclusion of more male participants is needed to confirm the generalizability of these results.

Another limitation of this study is that participants were allowed to complete the self-report questionnaires at different times within a 4-week time period during the first semester of their BSN program. Allowing participants 4 weeks to complete the questionnaires could have been a confounding variable in the interpretation of results. However, since this study was part of a larger prospective cohort study, the participants in this study will be assessed for Burnout and Depression using the same self-report questionnaires at the end of their BSN program, as well as one-year post graduation. This will provide follow up information on whether Burnout and Depression increased during the nursing program, and one-year post graduation. This

limitation did not apply to completion of the ACE questionnaire, since participants were reporting adverse events from their childhood, which would not be influenced by the 4-week time period.

More research is also needed to determine the specific types of physical and mental disorders that were found to be associated with different types of ACEs reported by participants in this study. Obtaining this information can assist nursing programs to tailor the appropriate support services based on the types of ACEs reported and the types of physical and mental symptoms reported by participants.

Additional research which explores the relationship between the number of ACE's experienced by participants in this study and their stress level and physical and mental health outcomes throughout the nursing program is needed. More research is also needed to determine the relationship between the number of ACEs reported and student's academic performance during the nursing program.

Implications for Nursing Education

Results from this study support educating nursing faculty concerning the frequency and range of ACEs experienced by students prior to admission to the nursing program which may influence student's health and well-being during their program of study. Faculty need to be aware of the prevalence of burnout and depression among nursing students and be prepared to assist students in accessing support services. Nursing faculty can invite university counselors to visit their classrooms to help students recognize the symptoms of depression and burnout, in order to familiarize them with services available to help them, since many students may not know how to recognize symptoms of depression and burnout or where to go to seek help.

Because the findings in this study found a high percentage of nursing students who reported feelings of low perceived efficacy and feelings of low competence, these findings signal the need for nursing programs to implement modifications in the curriculum to build in methods to increase self-efficacy and feelings of competence among incoming nursing students.

Conclusions

This study confirmed the findings in the research literature concerning the negative impact of adverse childhood experiences on the mental health outcomes of individuals. The higher the number of ACEs reported by participants in this study, the higher the levels of burnout and depression severity reported by participants. Further research will be conducted as part of this longitudinal cohort study to determine if the levels of Burnout and Depression reported by participants in this study increased at the end of their nursing program and one year post graduation.

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References

Abualrub, R. F. (2004). Job stress, job performance and social support among hospital nurses. *Journal of Nursing Scholarship, 36*(1), 73–78.

Altiok, H. O., & Ustun, B. (2013). The stress sources of nursing students. *Education and Science, 13*(2), 760–766.

ANA-American Nurses Association (2014). Position statement: Addressing nurse fatigue to promote safety and health: Joint responsibilities of registered nurses and employers to reduce risks. Retrieved from http://www.nursingworld.org/NurseFatigue.

Beck, C. T. (1995). Burnout in undergraduate nursing students. *Nurse Educator, 20*(4), 19–23.

Buerhaus, P. I., Skinner, L. E., Auerbach, D. I., & Staiger, D. O. (2017). Four challenges facing the nursing workforce in the United States. *Journal of Nursing Regulation, 8*(2), 40–46.

Cabrera, O. A., Hoge, C. W., Bliese, P. D., Castro, C. A., & Messer, S. C. (2007). Childhood adversity and combat as predictors of depression and post-traumatic stress in deployed troops. *American Journal of Preventive Medicine, 33*, 77–82. https://doi.org/10.1016/j.amepre.2007.03.019.

Centers for Disease Control and Prevention (2014, December). Depression in the U.S. household population, 2009–2012. NCHS data brief no. 172. https://www.cdc.gov/nchs/fastats/depression.htm.

Chapman, D. P., Whitfield, C. L., Felliti, V. J., Dube, S. R., Edwards, V. J., & Anda, R. F. (2004). Adverse childhood experiences and the risk of depressive disorders in adulthood. *Journal of Affective Disorders, 82*(2), 217–225.

Dos Santos, D., Silva, D., Tavares, N., Alexandre, A., Freitas, Breda, M., ... Neto, V. (2015). Depression and suicide risk among nursing professionals: An integrative review. *Journal of School of Nursing,* 1023–1031. https://doi.org/10.1590/S0080-623420150000600020.

Drake, D. A., Luna, M., Georges, J. M., & Steege, L. M. (2012). Hospital nurse force theory: A perspective of nurse fatigue and patient harm. *Advances in Nursing Science, 35*(4), 305–314. https://doi.org/10.1097/ANS.0b013e318271d104.

Dube, S. R., Felliti, V. J., Dong, M., Chapman, D. P., Giles, W., & Anda, R. F. (2003). Childhood abuse neglect and household dysfunction and the risk of illicit drug use: The adverse childhood experiences study. *Pediatrics, 111*, 564–572.

Edmondson, D., Kronish, I. M., Shaffer, J. A., Falzon, L., & Burg, M. M. (2013). Posttraumatic stress disorder and risk for coronary heart disease—A meta-analytic review. *American Heart Journal, 166*(5), 806–814.

Eisenberg, D., Golberstein, E., & Gollust, S. E. (2007). Help-seeking and access to mental health care in a university student population. *Medical Care, 45*(7), 594–601. https://doi.org/10.1097/MLR.0b013e31803bb4c1 (PubMed PMID: 17571007).

Enoch, M. A. (2011). The role of early life stress as a predictor for alcohol and drug dependence. *Psychopharmacology (Berlin), 214*(1), 17–31. https://doi.org/10.1007/s00213-010-1916-6.

Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., ... Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The adverse childhood experiences (ACE) study. *American Journal of Preventive Medicine, 14*(4), 245–258.

Ford, D. C., Merrick, M. T., Parks, S. E., Breiding, M. J., Gilbert, L. K., Edwards, V. J., ... Thompson, W. W. (2014). Examination of the factorial structure of adverse childhood experiences and recommendations for three subscale scores. *Psychology of Violence, 4*(4), 432–444. https://doi.org/10.1037/a0037723.

Gibbons, C. (2010). Stress, coping and burn-out in nursing students. *International Journal of Nursing Studies, 47*(10), 1299–1309. https://doi.org/10.1016/j.ijnurstu.2010.02.015.

Holdren, P., Paul, D. P., III, & Coustasse, A. (2015). Burnout syndrome in hospital nurses. .

Hoseinabadi-farahani, M. J., Kasirlou, L., & Inanlou, F. (2016). Academic burnout: A descriptive-analytical study of dimensions and contributing factors in nursing students. *Austin Journal of Nursing & Health Care, 3*(2), 1033.

Jimenez, C., Navia-Osorio, P. M., & Diaz, C. V. (2010). Stress and health in novice and experienced nursing students. *Journal of Advanced Nursing, 66*(22), 442–455. https://doi.org/10.1111/j.1365-2648.2009.05183.x.

Johnson, S. B., Riley, A. W., Granger, D. A., & Riis, J. (2013). The science of early life toxic stress for pediatric practice and advocacy. *Pediatrics, 131*(2), 319–327. https://doi.org/10.1542/peds.2012-0469.

Khamisa, N., Oldenburg, B., Peltzer, K., & Ilic, D. (2015). Work related stress, burnout, job satisfaction and general health of nurses. *International Journal of Environmental Research and Public Health, 12*, 652–666.

Korkeila, J., Vahtera, J., Korkeila, K., Kivimaki, M., Koskenvuo, K., & Kosekenvuo, M. (2010). Childhood adversities as predictors of incident coronary heart disease and cerebrovascular disease. *Heart, 96*, 298–303. https://doi.org/10.1136/hrt.2009.188250.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ9, validity of a brief depression severity measure. *Journal of General Internal Medicine, 16*, 606–613.

LeardMann, C., Smith, B., & Ryan, M. (2010). Do adverse childhood experiences increase the risk of postdeployment posttraumatic stress disorder in US Marines? *BMC Public Health, 10*(1), 437. https://doi.org/10.1186/1471-2458-10-437.

Lenburg, C. B. (2008). The influence of contemporary trends and issues on nursing education. In B. Cherry, & S. R. Jacob (Eds.). *Contemporary nursing: Issues, trends, & management* (pp. 43–70). (4th ed.). St. Louis, MO: Mosby.

Li, Y., Cao, F., Cao, D., & Liu, J. (2014). Nursing student's post-traumatic growth, emotional intelligence and psychological resilience. *Journal of Psychiatric and Mental Health Nursing, 22*(5), 326–332.

Marquez da Silva, R., Goulart, C. T., Dias Lopez, L. F., Serrano, P. M., Siqueira Costa, A. L., & Azevedo Guido, L. (2014). Hardy personality and burnout syndrome among nursing students in three Brazilian universities—An analytic study. *BMC Nursing, 13*(9), https://doi.org/10.1186/1472-6955-13-9.

Maslach, C., Jackson, S. E., Leiter, M. P., Schaufeli, W. B., & Schwab, R. L. (1996). *The Maslach's burnout inventory manual* (3rd ed). Yalo Alte CA: Consulting Psychologists Press.

Maslach, C., & Leiter, M. (2016). Understanding the burnout experience: Recent research and its implications for psychiatry. *World Psychiatry, 15*(2), 103–111.

Maunder, R. G., Peladeau, N., Savage, D., & Lancee, W. J. (2010). The prevalence of childhood adversity among healthcare workers and its relationship to adult life stress events, distress and impairment. *Child Abuse & Neglect, 34*(2), 114–123. https://doi.org/10.1016/j.chiabu.2009.04.008.

McLaughlin, K. A., Kubzansky, L. D., Dunn, E. C., Waldinger, R., Vaillant, G., & Koenen, K. C. (2010). Childhood social environment, emotional reactivity to stress, and mood and anxiety disorders across the life course. *Depression and Anxiety, 27*(12), 1087–1094. https://doi.org/10.1002/da.20762.

McVicar, A. (2004). Workplace stress in nursing: A literature review. *Journal of Advanced*

Nursing, 44(6), 633–642. https://doi.org/10.1046/j.0309-2402.2003.02853.x.
Monnat, S. M., & Chandler, R. F. (2015). Long-term physical consequences of adverse childhood experiences. *The Sociological Quarterly, 56*(4), 723–752.
Papazisis, G., Tsiga, E., Papanikolaou, N., Vlasiadis, I., & Sapountzi-Krepia, D. (2008). Psychological distress, anxiety and depression among nursing students in Greece. *International Journal of Caring Sciences, 1*(1), 42–46.
Plieger, T., Melchers, M., Montag, C., Meermann, R., & Reuter, M. (2015). Life stress as a potential risk factor for depression and burnout. *Burnout Research, 2*, 19–24.
Poghosyan, L., Clarke, S., Finlayson, M., & Aiken, L. H. (2010). Nurse burnout and quality of care: A cross-national investigation in six countries. *Research in Nursing & Health, 33*(4), 288–298. https://doi.org/10.1002/nur.20383.
Prymachuk, S., & Richard, D. (2007). Mental health nursing students differ from other nursing students: Some observations from a study on stress and coping. *International Journal of Mental Health Nursing, 16*, 390–402.
R Core Team (2013). *R: A language and environment for statistical computing.* Vienna, Austria: R Foundation for Statistical Computing3-900051-07-0http://www.R-project.org/.
Rathnayake, S., & Ekanayaka, J. (2016). Depression, anxiety and stress among undergraduate nursing students in a public University in Sri Lanka. *International Journal of Caring Sciences, 9*(3), 1020–1032.
Rella, S., Winwood, P. C., & Lushington, K. (2009). When does nursing burnout begin? An investigation of the fatigue experience of Australian nursing students. *Journal of Nursing Management, 17*(7), 886–897.
Robert Wood Johnson Foundation report (2012). *Interdisciplinary nursing quality research initiative*.
Schaufeli, W. B., Martínez, I. M., Pinto, A. M., Salanova, M., & Bakker, A. B. (2002). Burnout and engagement in university students. A cross-national study. *Journal of Cross-Cultural Psychology, 33*(5), 464–481.
Shankar, N. L., & Park, C. L. (2016). Effects of student's stress on physical and mental health and academic success. *International Journal of School and Educational Psychology, 4*(1), 5–9.
Shapero, B. G., Black, S. K., Liu, R. T., Klugman, J., Bender, R. E., Abramson, L. Y., & Alloy, L. B. (2014). Stressful life events and depression symptoms: The effect of childhood emotional abuse on stress reactivity. *Journal of Clinical Psychology, 70*(3), 209–223.
Sheridan, M. A., Fox, N. A., Zeanah, C. H., McLaughlin, K. A., & Nelson, C. A. (2012). Variation in neural development as a result of exposure to institutionalization early in childhood. *Proceedings of the National Academy of Sciences of the United States of America, 109*(32), 12927–12932. https://doi.org/10.1073/pnas.1200041109.
Sheu, S., Lin, H., & Hwang, S. (2002). Perceived stress and physio-psycho-social status of nursing students during their initial period of clinical practice: The effect of coping behaviors. *International Journal of Nursing Studies, 39*(2), 165–175.
Slopen, N., Shonkoff, J. P., Albert, M. A., Yosikawa, H., Jacobs, A., Stoltz, R., & Williams, D. R. (2016). Racial disparities in child adversity in the U.S.: Interactions with family immigration history and income. *American Journal of Preventive Medicine, 50*(1), 47–56.
Spitzer, R. L., Kroenke, K., & Williams, J. B. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. *Journal of the American Medical Association, 282*(18), 1737–1744.
Tomaschewski-Barlem, J., Lunardi, V., Lerch Lunardi, G., Devos Barlem, E., Silva da Silveira, R., & Silveira Vidal, D. (2014). Burnout syndrome among undergraduate nursing students at a public university. *Revista Latino-Americana de Enfermagem, 22*(6), 934–941.
Yavuz, G., & Dogan, N. (2014). Maslach burnout inventory-student survey (MBI-SS): A validity study. *Procedia - Social and Behavioral Sciences, 116*, 2453–2457. https://doi.org/10.1016/j.sbspro.2014.01.590.