RESEARCH PAPER

Evidence-Based Resilience Intervention for Nursing Students: a Randomized Controlled Pilot Trial

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Abstract

Nursing students report chronic stress, and burnout is common. One factor related to lower burnout is resilience, though little research has studied resilience interventions in nursing students. This study had two objectives: 1) to examine the effects of a pilot resilience intervention, and 2) to investigate student attitudes about the intervention. This was a randomized controlled trial that took place from January 2017 – June 2017 at a Midwest university in the United States. First-year nursing students ($N = 27$) were randomly assigned to the intervention ($N = 14$) or control ($N = 13$) group. The intervention group participated in a five-week resilience intervention. Both groups completed three online surveys (before, immediately after the intervention, and three months later). Using Wilcoxon signed-rank tests to compare pre- and post-intervention scores, neither group reported significant changes in resilience or the burnout facet of cynicism. The burnout facets of exhaustion and professional efficacy significantly decreased in the intervention group, but not the control group. Participants reported satisfaction with the intervention, though most wanted more hands-on activities. This resilience intervention may be valuable for reducing burnout in nursing students, but interventions should first conduct a needs assessment.

Academic, personal, and clinical stressors are common among nursing students (Cleary et al. 2012; Jimenez et al. 2010; Pryjmachuk and Richards 2007). This is important because these stressors can lead to negative outcomes like burnout and attrition (Doggrell and Schaffer 2016; Pryjmachuk et al. 2009). Resilience is essential for nursing students because they face chronic stress conditions that require them to adapt (Reyes et al. 2015). One stress management approach gaining popularity in healthcare

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is the resilience intervention (Pines et al. 2014; Potter et al. 2013). This article reports on a pilot study evaluating the efficacy of an evidence-based resilience intervention in increasing resilience and reducing burnout based on the "Pushing Through" model of nursing student resilience developed by Reyes et al. (2015).

1 Background

Resilience is defined as the knowledge, skills, and abilities that enable a person to bounce back after experiencing significant stress (Connor and Davidson 2003). Generally speaking, burnout is defined as a lack of engagement with one's job (e.g., exhaustion, cynicism, and diminished confidence in one's performance; Schaufeli et al. 1996). Given that resilience is related to burnout in high-intensity nursing specialties (Rushton et al. 2015), fostering resilience is one way to help nursing students manage their stress through positive adaptive coping techniques (Reeve et al. 2013; Sanderson and Brewer 2017).

A recent model of nursing student resilience was developed using a constructivist and grounded theory design (Reyes et al. 2015). According to this "Pushing Through" model of resilience, there are three phases that exemplify how resilience is experienced: first, 'stepping into', or embracing, the adversity. Second, 'staying the course', or being aware they must continue pursuing their goals. Last, 'acknowledging' that they have learned from their adversity and felt ready to meet another challenge. Students also experienced temporary setbacks such as 'disengaging' from school because they felt overwhelmed. This model acts as a lens to explain how resilience can be fostered over time despite periods of adversity. Given evidence that resilience is related to burnout in nursing students (Ríos-Risquez et al. 2016), there is preliminary support for promoting resilience in nursing students before they enter their careers.

Furthermore, resilience is valuable across healthcare professions because it is related to important outcomes such as job satisfaction, turnover intentions, and burnout (Cooke et al. 2013; Hudgins 2016; Lanz and Bruk-Lee 2017; Matos et al. 2010; Rees et al. 2016). Interventions aimed at fostering resilience have been identified as important for both employee and organizational wellbeing (see Robertson, Cooper, Sarkar, & Curran, 2015 for review). Thus, resilience interventions could be especially valuable for young nurses who are less likely to use positive coping strategies (McGarry et al. 2013) and are higher risk for poor retention (Clendon and Walker 2012). This is especially valuable because nursing is predicted to experience high job growth in the U.S. by 2026 (U.S. Department of Labor, Bureau of Labor Statistics 2017), though there will be a worldwide nurse shortage through 2025 (U.S. Department of Health and Human Services 2014).

In health education, resilience interventions have been conceptualized as a combination of personal and contextual resources and strategies (Sanderson and Brewer 2017). Resilience interventions are varied in length, content, and medium. Because of the lack of uniformity among interventions, this study takes an evidence-based approach for developing an intervention specific to nursing students. Previous interventions have found positive effects for physicians and nurses (Potter et al. 2013; Sood et al. 2011), but few have focused on nursing students (Reyes et al. 2015). Finally, few healthcare interventions have actually measured resilience using the CD-RISC, a suitable measure for assessing participants' responses to an intervention (Connor and Davidson 2003).

Hypothesis 1 (H1): Resilience will be higher in the intervention group than the control group after the intervention.

Hypothesis 2a-c (H2a-c): In the intervention group, (a) exhaustion and (b) cynicism will decrease after the intervention; (c) professional efficacy will increase after the intervention.

Hypothesis 3 (H3): Participants will report satisfaction with the intervention.

2 Methods

2.1 Design

This study was designed using intervention guidelines from Melnyk and Morrison-Beedy (Melnyk and Morrison-Beedy 2012; see Fig. 1). This was a pretest-posttest randomized controlled trial; participants were randomly assigned to the intervention or control group using the random function in Microsoft Excel 2015. All participants were aware of the study's purpose and their group assignment. This was necessary because intervention participants needed to know if they should attend the intervention sessions.

2.2 Participants

There were 27 first-year nursing students (traditional BSN) at a Midwest university in the United States who participated (see Table 1). Participants' ages ranged from 20 to 27 ($M = 21.48$, $SD = 1.31$), and the majority were female (88.9%).

2.3 Materials

All scales used in this study have been found to be valid and reliable. The brief 10-item Connor-Davidson Resilience Scale (CD-RISC 10; Connor and Davidson 2003) measured resilience ($\alpha = 0.78$; this alpha was averaged across all three time points). Items like "I am able to adapt when changes occur" were all ranked on a 5-point scale; higher scores indicate higher levels of resilience.

The 16-item Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli, Leiter, Maslach, & Jackson, 1996) measured three subscales: exhaustion ($\alpha = 0.87$; these alphas were averaged across all three time points), cynicism ($\alpha = 0.81$), and professional efficacy ($\alpha = 0.88$). Participants did not yet have experience with patient interactions, so the MBI-GS was chosen because it has been adapted for students as a generic measure of burnout with one's work, rather than relationships with patients. High scores on exhaustion and cynicism and low scores on professional efficacy indicate high burnout.

A 14-item measure of participant satisfaction was adapted from Grove and Ostroff (1991). Items like "Overall, how would you rate this program?" indicated their overall satisfaction with the intervention, as well as the quality of individual sessions (e.g., "Please give your frank opinion of each session's contribution to the workshop.") Higher scores indicate higher levels of satisfaction. Three open-ended questions asked participants about what was valuable about the intervention, suggestions, and additional comments that would be helpful for future sessions.
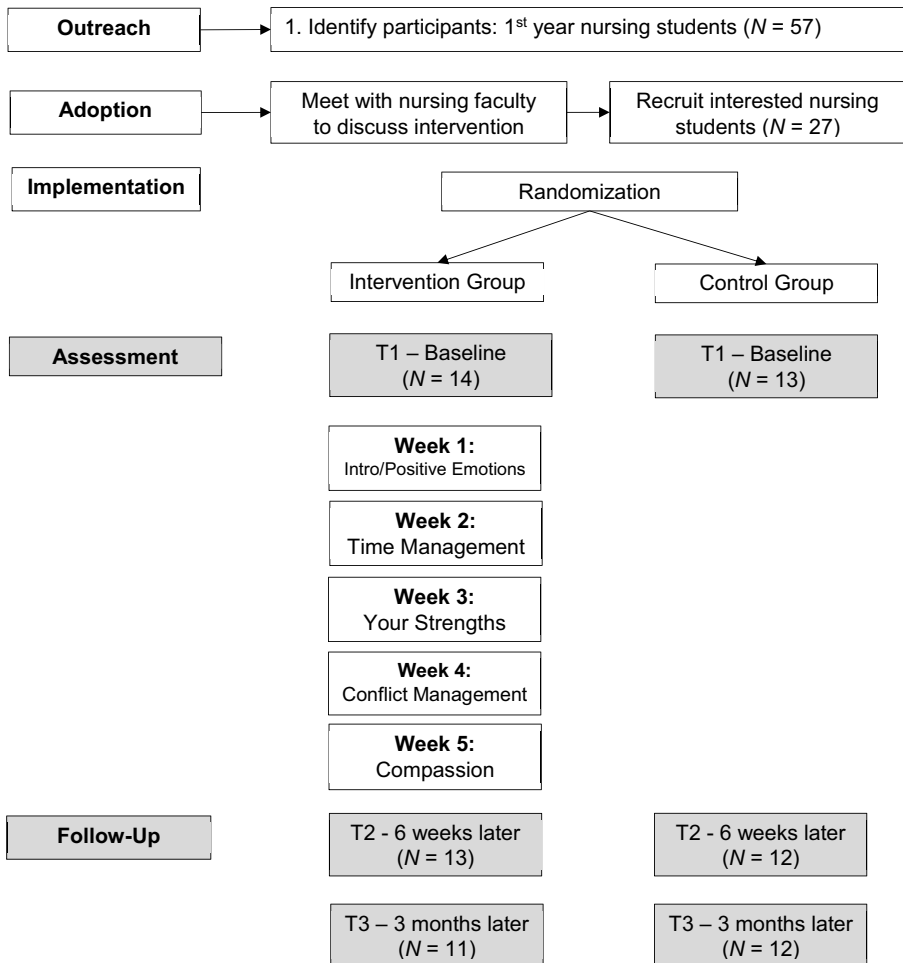
Fig. 1 Trial design flow

2.4 Procedure

After meeting with nursing faculty and the assistant dean of the college to assess the needs of their students, it was determined that first-year students who were still in the classroom would be preferable due to scheduling considerations. Because second-year students are dispersed for clinical hours and are not necessarily on campus, first-year students' schedules have more availability to meet on Friday afternoons (one of the few "free" times in their class schedule). Further, faculty indicated that this intervention would be more helpful with first-year students who had less experience in coping with the stress of nursing school. Faculty also made specific requests for training on conflict management, communication, and time management. Ethical approval was received by the university (IRB #112916–1) and medical center's (IRB #839–16-XI) institutional review boards as an expedited protocol. The researcher was not affiliated with the nursing school and no confidential information was shared with nursing faculty about the students.

Table 1 Participant Characteristics

	Intervention (N = 14) Mean (SD)	Control (N = 13) Mean (SD)
Age	21.57 (1.74)	21.38 (.65)
	N	**N**
Gender		
Female	14	10
Male	0	3
Race		
Asian	0	1
Hispanic, Latino, or Spanish	1	1
Other	1	1
White	12	10

Participants were recruited from a first-year nursing class ($N = 57$) at a university in the Midwest in January 2017. After the recruitment process (two emails, a class announcement, and recruitment flyers), 27 interested participants were randomly assigned to the intervention or control group (47% participation rate). At Time 1 (T1), all participants were emailed with a Qualtrics link to complete the online survey. Informed consent was obtained from all individual participants included in the study. After the T1 survey, intervention participants ($N = 14$) were required to attend a five-week intervention course from February – March 2017. The intervention sessions were approximately one hour long on Fridays at lunchtime, which was the only available time given students' course schedules. Every session included a lecture component, self-assessments, and/or activities for participants to complete in pairs or groups.

This intervention was based on the model developed by Reyes et al. (2015) and used five evidence-based techniques to educate nursing students about common stressors and how to increase their resilience. These techniques included a combination of personal and contextual resources and self-care strategies (Sanderson and Brewer 2017).

Week 1 was an introduction to resilience and promoting positive emotions. According to the Broaden and Build theory of positive psychology, positive emotions act as a resource to mitigate the negative effects of stress (Fredrickson and Joiner 2002). These positive emotions act as a precursor to resilience (Ong et al. 2006). Time management and communication were identified by the nursing faculty as critical needs (Altmiller 2011; Hershcovis 2011; Heslop et al. 2001; Pines et al. 2014). In Week 2, a specialist in academic success learning strategies presented on time management. Week 3 was a session on individual strengths to provide a well-rounded framework for resilience, rather than just focusing on the negative (Lester et al. 2011; Rath 2007). In Week 4, a licensed independent mental health practitioner presented on conflict management through effective communication. Given the high prevalence of burnout in nursing students (Gibbons 2010), Week 5 educated about identifying and mitigating burnout symptoms through peer support (Mathieu 2012).

Immediately following the intervention, both groups completed the Time 2 (T2) survey in March 2017; intervention participants also completed the satisfaction measure. In June 2017, both groups completed the Time 3 (T3) survey. For every completed survey, participants were compensated with a $10 Amazon gift card. Intervention participants also received the StrengthsFinder 2.0 book (Rath 2007), a gratitude journal to use throughout the intervention, and a bonus $20 Amazon gift card if they attended all five intervention sessions ($N = 9$; 64%).

3 Results

Statistical Package for the Social Sciences (SPSS v.25) was used. Missing data ranged from 0% (T1 $N = 0$ missing) to 7.4% (T2 $N = 2$ missing) to 14.8% (T3 $N = 4$ missing). One intervention participant dropped out after T1 due to a work conflict. No variables were skewed or kurtotic (no values $|>2|$). There were no univariate outliers with a z-score > 3.29. Given the small sample size, non-parametric Wilcoxon signed-rank tests were conducted (Whitley and Ball 2002). For Wilcoxon signed-rank tests, a visual examination of histograms indicated no severely non-symmetric distributions. There were no significant differences in T1 scores between the intervention and control group as assessed by Mann-Whitney U tests (all p values were $> .05$).

Means and standard deviations of all variables are listed in Table 2; see Table 3 for correlations. Hypothesis 1 was a manipulation check to examine if the intervention increased resilience in the intervention group (see Fig. 2). To examine H1 and H2, Wilcoxon signed-rank tests examined median differences in resilience between T1 and T2. Of the 13 intervention participants, 5 exhibited an improvement in resilience compared to 4 (of 12) control participants. However, there was no significant increase in resilience for the intervention group ($Mdn = 0.05$), $z = -.58$, one-tailed $p = .28$, small effect size ($r = .11$) or the control group ($Mdn = 0.30$), $z = -.61$, one-tailed $p = .27$, small effect size ($r = .12$). H1 was not supported. See Table 4 for the complete results of the Wilcoxon signed-rank analyses. Post-hoc analyses examined the long-term effects of the intervention on resilience from T2 to T3. Of the 11 intervention participants, 6 exhibited an improvement in resilience compared to 7 (of the 11) control participants. However, there was no significant change in resilience for the intervention group (one-tailed $p = .09$) or the control group (one-tailed $p = .09$), indicating that while there is improvement among some participants, it is not significant.

Hypothesis 2a predicted a reduction in the burnout facet of exhaustion in the intervention group from T1 to T2. Of the 13 intervention participants, 8 exhibited a reduction in exhaustion compared to 7 (of 12) control participants. There was a significant decrease in exhaustion for the intervention group (one-tailed $p = .05$, medium effect size $r = .33$), but not for the control group (one-tailed $p = .17$, small effect size $r = .19$). H2a was supported; intervention participants reported a significant decrease in the burnout facet of exhaustion immediately after the intervention. Post-hoc analyses examined the long-term effects of the intervention on exhaustion from T2 to T3. Of the 11 intervention participants, 7 exhibited a nonsignificant reduction in exhaustion compared to 4 (of 11) control participants. In other words, intervention participants maintained low levels of exhaustion through T3 and control participants experienced no significant change across all three time points.

Table 2 Means and Standard Deviations for Resilience Intervention Outcomes

	Resilience M (SD)	Exhaustion M (SD)	Cynicism M (SD)	Professional Efficacy M (SD)
Time 1				
Training	3.87 (.19)	21.09 (4.85)	14.64 (5.82)	35.55 (5.61)
Control	3.65 (.58)	23.55 (7.80)	14.64 (7.00)	36.09 (4.11)
Time 2				
Training	3.73 (.26)	18.36 (4.08)	13.82 (4.24)	32.55 (5.84)
Control	3.60 (.38)	21.18 (4.62)	14.36 (4.90)	36.18 (3.97)
Time 3				
Training	3.89 (.38)	17.27 (5.78)	14.00 (5.80)	33.91 (6.06)
Control	3.77 (.40)	21.36 (6.77)	14.45 (6.53)	35.09 (4.99)

Hypothesis 2b predicted a reduction in cynicism in the intervention group. Of the 13 intervention participants, 5 reported a reduction in cynicism compared to 6 (of 12) control participants. There was no significant decrease in cynicism for the intervention group (one-tailed $p = .33$), or control group (one-tailed $p = .31$). H2b was not supported. Post-hoc analyses examined the long-term effects of the intervention on cynicism from T2 to T3. Of the 11 intervention participants, 5 reported a reduction in cynicism compared to 7 (of 11) control participants. However, there was no significant change for either the intervention (one-tailed $p = .46$) or the control (one-tailed $p = .45$) groups. Both groups had similar levels of cynicism before and after the intervention.

Table 3 Correlations among Study Variables

	1	2	3	4	5	6	7	8	9	10	11
1. Resilience (T1)											
2. Resilience (T2)	.53**										
3. Resilience (T3)	.40	.45*									
4. Exhaustion (T1)	.07	−.05	−.40								
5. Exhaustion (T2)	.19	.08	−.54**	.61**							
6. Exhaustion (T3)	.22	−.003	−.39	.63**	.80**						
7. Cynicism (T1)	−.17	−.33	−.29	.57**	.33	.42*					
8. Cynicism (T2)	.04	−.25	−.28	.61**	.60**	.52*	.80**				
9. Cynicism (T3)	.23	−.09	−.37	.52*	.68**	.75**	.59**	.78**			
10. PE (T1)	.21	.36	.30	−.09	−.14	−.37	−.57**	−.32	−.34		
11. PE (T2)	.18	.11	.40	.09	−.03	.03	−.31	−.15	−.21	.56**	
12. PE (T3)	−.13	.11	.49*	−.42*	−.60**	−.50*	−.62**	−.63**	−.67**	.65**	.62**

Note: $N = 22$–27. * two-tailed $p \leq .05$. ** two-tailed $p < .01$. T1 = Time 1; T2 = Time 2; T3 = Time 3. PE = Professional efficacy
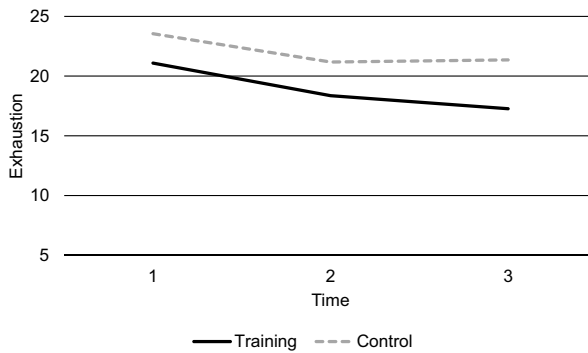
Fig. 2 Total scores on the burnout facet of exhaustion over time

Table 4 Wilcoxon Signed-rank Analyses

	Median difference	N	z	p	Effect size
Time 1 to Time 2					
Resilience					
Training	0.05	13	−0.58	.28	0.11
Control	0.30	12	−0.61	.27	0.12
Exhaustion					
Training	3.50	13	−1.70	.05	0.33
Control	3.00	12	−0.94	.17	0.19
Cynicism					
Training	1.50	13	−0.45	.33	0.09
Control	1.00	12	−0.49	.31	0.10
Professional Efficacy					
Training	7.50	13	−1.66	.05	0.32
Control	1.00	12	−0.36	.36	0.07
Time 2 to Time 3					
Resilience					
Training	0.00	11	−1.37	.09	0.28
Control	0.00	11	−1.34	.09	0.27
Exhaustion					
Training	0.00	11	−0.97	.17	0.20
Control	0.50	11	−0.31	.39	0.06
Cynicism					
Training	3.00	11	−0.09	.46	0.02
Control	0.00	11	−0.13	.45	0.03
Professional Efficacy					
Training	5.00	11	−1.32	.09	0.27
Control	0.50	11	−0.41	.34	0.08

Note. p = one-tailed p value

Hypothesis 2c predicted an increase in professional efficacy in the intervention group immediately after the intervention. Of the 13 intervention participants, 5 exhibited an increase in professional efficacy compared to 4 (of 12) control participants. There was a significant decrease in professional efficacy for the intervention group (one-tailed $p = .05$, medium effect size $r = .32$), but not the control group (one-tailed $p = .36$). H2c was not supported; the intervention group actually reported a decrease in professional efficacy after the intervention rather than an increase. Post-hoc analyses compared T2 to T3 professional efficacy. Of the 11 intervention participants, 6 exhibited an increase in professional efficacy compared to 4 (of 11) control participants. However, there was no significant change in professional efficacy from T2 to T3 for the intervention (one-tailed $p = .09$) or control (one-tailed $p = .34$) group.

Hypothesis 3 explored participants' reactions to the intervention. Overall, intervention participants rated the intervention as good or very good ($M = 3.54$, $SD = .78$). Reactions to the modules are listed in Table 5. Regarding the length, 11 participants felt the intervention length (5 weeks) was just right; one reported it was too long and one said it was too short. The most popular modules were on burnout and compassion fatigue and positive emotions; time management was also popular. According to one qualitative response, "I liked getting to map out my average day and estimate the time I spend doing each activity. That really put things into perspective of what takes up most of my time." H3 was supported.

4 Discussion

The purpose of this pilot study was to explore the positive effects of a resilience intervention on first-year nursing students. Overall, the intervention had mixed results and positive feedback. Resilience did not change significantly over time for either group. It is possible that an intervention intended to increase awareness and cognition regarding resilience may make participants more self-aware and thus more accurate in their self-report. This is consistent with a previous resilience intervention in deployed military personnel, and managing participant expectations may be critical to the success of the intervention (Carr et al. 2013).

Exhaustion significantly decreased from T1 to T2 in the intervention group, similar to Potter et al. (2013). The fact that exhaustion only declined in the intervention group indicates that other factors (e.g., learning how to cope with nursing school, exams, time of year) did not influence the participants otherwise both groups would have reported a decline in exhaustion. The intervention had no effect on cynicism, and a negative effect on professional efficacy. This has important implications for future resilience interventions. With its heavy focus on stressful scenarios that may arise throughout their careers (e.g., conflict with coworkers, patient deaths), it is possible that this intervention simply made participants more aware of their own ability to cope with stressful situations, thereby decreasing their perceived professional efficacy. However, resilience interventions appear to be effective at reducing exhaustion in the short-term. At the three-month follow-up, there were no significant changes in resilience or burnout, suggesting that maintenance may be important for these interventions (Padesky and Mooney 2012).

Overall, participant feedback was positive, and could be used by future interventions to tailor sessions to nursing students. Participants suggested having less lecture time

Table 5 Qualitative feedback about the intervention

What from this program was most valuable to you?	What suggestions do you have for improving this program?	Please add any additional comments, criticisms, or suggestions that you think might be helpful for the instructor to know before scheduling future programs.
Learning about my strengths and how to manage my time.		
Strengths session	More interaction, less lecture	
Time management	Not Friday's after class because by the end of the week people are leaving town and doing things for the weekend.	It was really good and I loved the gratitude journals.
Time management	Different meeting times	
I liked the compassion fatigues, because it helped me realize all the things I do have. Even though i don't have time for all those I have been trying to make more time for those things outside of my circle because then it will help re-energize me.	I don't have any suggestions, I thought it all went well	
The teaching about time management and compassion fatigue were my favorite and seemed most valuable for me.	I enjoyed this course, however would have loved less PowerPoint lecture time and more group interactions/role playing. I feel that this would have helped get people more involved with the teachings.	Thank you for the time you have given us nursing students.
Time management	Provide a session with coffee and food.	
I was given the tools to be able to look closer at myself and analyze different aspects of my personality.	None, it was great!	
Finding out my strengths	None	
I liked getting to map out my average day and estimate the time I spend doing each activity. That really put things into perspective of what takes up most of my time and maybe things I could spend less or more time doing.	I can't really think of any suggestions at this time. I thought the program did a good job at covering the topics they had planned and I felt I learned a few new tips.	

and more group interactions to get everyone involved with the material – and preferably not on Friday afternoons. Given that nursing students have a very complex curriculum (Benner et al. 2010) teaching self-care is valuable for developing well-rounded nurses who needs to cope with an ever-changing profession. Selecting nursing students who

are high in resilience from a pool of applicants is one alternative option, though it is unknown how well resilience predicts successful job outcomes (Britt et al. 2016).

Resilience interventions have used a haphazard approach at determining what topics and outcomes should be included. This method of "throwing things at the wall to see what sticks" has been moderately successful at improving subjective wellbeing, biopsychosocial outcomes, and performance outcomes (see Robertson et al. 2015 for review). This doesn't mean that occupational resilience interventions should take a standardized approach, however. The type of adversity that nursing students face is different from pediatric nurses, psychiatric nurses, police officers, construction workers, and astronauts. Thus, there is both risk and opportunity for practitioners and researchers wishing to develop interventions. A needs assessment (Goldstein and Ford 2002) is critical in determining which stressors are faced by the population before developing a tailored intervention.

4.1 Limitations

There are limitations to longitudinal research and interventions, such as the sample size, cost, and attrition (Menard 2002). Given the small sample sizes, it is possible that this study didn't have enough power to detect significant effects. However, given the small sample size in this study, non-parametric tests are considered a valid alternative for hypothesis testing (Whitley and Ball 2002). Further, similar interventions have been conducted with smaller sample sizes and without a control group (Potter et al. 2013; van der Riet et al. 2015). This study is therefore a unique contribution to the literature. Participants were recruited voluntarily, and it is possible that those who were interested in a resilience intervention were more burnt out than those who did not participate. Participants were randomly assigned to the intervention or control groups, which is one method of avoiding selection effects within experiments (i.e., both groups were equally resilient and burned out before the intervention). Further, there was only a 47% participation rate in this study. Previous research has found that response rates range from 35.7% – 52.7% depending on the sample (Baruch and Holtom 2008). However, this study provided advance notice and monetary compensation, both of which are effective ways to recruit participants and reduce attrition (Anseel et al. 2010; Robinson et al. 2015). Finally, this small sample of nursing students may not generalize to other programs in other states.

4.2 Future Research

It is important to be aware of time limitations for nursing students, whose schedules provide limited flexibility for extra blocks of time. Because participants reported wanting more hands-on activities, future resilience interventions should consider incorporating adversity (Clohessy et al. 2019). Providing nursing students with exposure to realistic scenarios in a simulation allows them to effectively practice their skills (Aebersold and Tschannen 2013; Robertson et al. 2015). For example participants could act out a scenario where a coworker is rude to them, and practice an appropriate response. Furthermore, outcomes like patient satisfaction (Kim et al. 2004) and patient outcomes should be explored. At an individual level, promoting resilience may produce better patient outcomes. Incorporating positive coping strategies and other resilience techniques may improve patient handoffs (Drach-Zahavy et al. 2015).

5 Conclusions

This was a pilot resilience intervention in nursing students. The intervention group reported lower post-exhaustion than the control group and had positive reactions to the intervention. Resilience interventions should consider ways to incorporate time management, effective conflict management, and adversity. However, a needs assessment of the sample is critical to conducting effective resilience interventions, as are simulations and other hands-on activities.

Compliance with Ethical Standards

Conflict of Interest   The author confirms that they have no conflict of interest.

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