Original Article

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Website:
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DOI:
10.4103/jehp.jehp_463_20

Yoga and perceived stress, self-compassion, and quality of life in undergraduate nursing students

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Abstract:

BACKGROUND: Student nurses' experience of stress while enrolled in educational programs is well-documented; however, complementary and alternative therapies to alleviate or prevent nursing program-related stressors are not. The purpose of this study was to explore the effect of a yoga intervention on stress, self-compassion, and quality of life in undergraduate nursing students.

METHODS: Seventy-three undergraduate nursing students participated in this two-group, quasi-experimental, repeated-measures, study. Students self-selected participation in a one-hour yoga class, offered each week for 12 weeks, and completed Stress, Self-Compassion, and QOL scales at baseline, week 6, and week 12. Information on intervention participation and yoga practice outside the intervention was also solicited. Descriptive statistics and mixed-model analysis of variance were used to analyze the data.

RESULTS: There were no statistically significant differences between groups over time on perceived stress or QOL. There were statistically significant differences between groups on self-kindness ($F3, 69 = 3.86$, $P = 0.013$).

CONCLUSIONS: Further research on the effects of yoga for stress reduction in nursing students using randomized controlled trials is recommended.

Keywords:

Nursing students, quality of life, self-compassion, stress, yoga

Introduction

Stress in nursing students has been well documented globally. Studies have shown that nursing students experience stress, anxiety, and sleep disturbances while in academic programs, and that they also experience more stress-related illnesses, and are diagnosed and treated more often for anxiety, than non-nursing students are.[1] Nursing students have also been shown to have higher rates of psychological stress compared to other students, and many experience clinical levels of anxiety and depression.[2] Stress in nursing students has been shown to be related to academic stress and mental health issues as well as work impairment and job strain.[3,4] Other studies show that nursing students are often reluctant to seek help for their distress, and that fear of having their condition exposed, and worry about how others will perceive them, are identified as barriers to seeking help.[2,5] Some nursing programs have integrated self-care interventions into curricula with promising results. Nursing students report engaging in self-care activities related to diet, exercise, prayer and meditation, sleep, and complementary and alternative medicine practices.[6-8]

Yoga, as a mind/body practice, has both physical and mental health benefits. Various schools of yoga exist, using a variety of perspectives and methods, but most combine

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Received: 06-05-2020
Accepted: 23-05-2020
Published: 30-10-2020

How to cite this article: Kinchen E, Loerzel V, Portoghese T. Yoga and perceived stress, self-compassion, and quality of life in undergraduate nursing students. J Edu Health Promot 2020;9:292.

physical postures (asanas), breathing (pranayama), meditation, and relaxation.[9] Research related to the use of yoga in students and health-care professionals is limited but promising; however, among studies that explore the use of yoga to reduce stress in health-care providers, most have had small samples, which may limit their generalizability.[10-13]

The current study is important because finding ways to reduce stress in nursing students and promote healthy behaviors could improve overall health, as well as work and school performance, and may help students develop coping skills that can be used in many life situations. Therefore, the purpose of this study was to explore the effects of a yoga intervention on stress, self-compassion, and quality of life (QOL) in undergraduate nursing students. Integrating yoga in nursing curricula may enable educators to take advantage of a low-cost intervention to help students cope with academic, life, and work stressors.

Methods

This study used a two-group, quasi-experimental, repeated measures longitudinal design. Data were collected at three time points over a 12-week period (at baseline, week 6, and week 12).

Participants and setting

A convenience sample of second semester upper division students in a large university undergraduate nursing program in the U. S. participated in the study. This group of students was targeted because the second semester of the junior year is typically the most stressful for students in the program. Participation was voluntary; however, students were offered two extra credit points for every survey they completed. These points were divided among the three courses they were enrolled in (Adult 1, Families, and Pharmacology). Students were also offered an alternate opportunity for extra credit at each time point if they did not want to participate in the study. No extra credit could be used to earn a passing grade in a course.

After approval by the university Institutional Review Board (IRB), students were informed about the study through an E-mail announcement in the beginning of the semester and invited to participate. Survey responses were kept confidential, and no personally-identifiable information was recorded or used in data collection, analysis, or reporting. Randomization was not employed in the study. It was deemed inappropriate to compel students who were not amenable to yoga to participate in the intervention, as this would increase the potential for attrition. Students self-selected into the intervention by attending a yoga class held each Monday afternoon during the 12-week study period.

The yoga instructor was a 500-Hour Registered Yoga Teacher with 14 years' experience, who holds a 200-hour Registered Yoga Teacher Kundalini certification. Kundalini yoga involves pranayam (breathwork), kriyas (sets of yoga postures), mudras, eye-focus, body locks, and meditation.[14] For student convenience, the yoga intervention was scheduled at the end of the school day (3 pm) and lasted approximately one hour. The class consisted of postures (asanas), breath-work (pranayama), and meditation. Participants were encouraged to modify the positions to match their skill level and reduce the risk of injury. Although varying degrees of physical challenge were offered for positions, yoga postures were consistent throughout the intervention. Variety was also offered in both the breathing techniques and meditation options. By the end of the first 6 weeks, participants were introduced to three different breathing techniques (Alternating Nostril Breathing, Three Part Breath, and Bee Breath) and three different meditation techniques (Progressive Relaxation, Kirtan Kriya, and Tattva Balance and Beyond).

Instruments

Measures included participant demographic characteristics, the Perceived Stress Scale-14 (PSS), the Self-Compassion Scale (SCS), the World Health Organization QOL-BREF scale (WHOQOL-BREF), and two investigator-developed questions related to participation in the intervention, participation in yoga not related to the study ("other yoga"), and reasons for not attending the yoga intervention (intervention group). Demographic information included age, gender, and ethnicity.

The PSS was used to assess the degree to which students perceived their lives as stressful. Stress is defined in the PSS as "the degree to which respondents find their lives unpredictable, uncontrollable, and overloading".[15] Fourteen items address a person's stress within the last month, using a Likert-type scale ranging from 0 (never) to 4 (very often), with higher total scores indicating higher levels of stress. The PSS has been used in diverse populations and has demonstrated good reliability with a Cronbach's alpha of between 0.74 and 0.86 in general and student populations.[15]

The SCS is a 26-item measure of self-compassion in six subscales: Self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification. Self-compassion is theoretically defined as "being open to and moved by one's own suffering, experiencing feelings of caring and kindness toward oneself, taking an understanding, nonjudgmental attitude toward one's inadequacies and failures, and recognizing that one's own experience is part of the common human experience".[16] Respondents used a Likert-type scale,

ranging from 1 (almost never) to 5 (almost always) to indicate their agreement with instrument items, with higher scores indicating more of an attribute. Items in the self-judgement, isolation, and over-identification subscales were reverse scored, and there is no overall score calculated for the SCS; rather, individual subscale mean scores are reported, in accordance with Neff's[17] recommendations. This instrument has shown strong reliability (Cronbach's α 0.75–0.92) with use in a number of populations, including health-care professionals.[18]

The WHOQOL-BREF is a 26-item survey that evaluates quality of life (QOL) in four subscales: Physical health, psychological, social relationships, and environment. Overall QOL and satisfaction with health are also evaluated in the WHOQOL-BREF via single items. The WHO,[19] para 2 defines QOL as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns". A Likert-type scale ranging from 1 (very poor) to 5 (very good) is used for all items, with higher scores indicating better QOL. This survey has been used in diverse populations and has good reliability with Cronbach's α of 0.68–0.82.[20,21]

Investigator-developed questions about the yoga intervention were: (1) "How many times did you attend the yoga intervention?" (2) "How many times did you practice yoga at home or attend a different yoga class?" and free-text intervention group responses to (3) "If you did not attend the yoga intervention, please tell us why".

Data analysis

Participant characteristics were analyzed using descriptive statistics (frequencies) and instrument responses were reported as mean scores. Mixed-model analysis of variance was used to examine within- and between-group differences over time, with acceptable $P = 0.05$ (95% confidence interval). Intellectus Statistics™ software was used to analyze the data.

Results

Seventy-three participants completed the surveys at all three time points and were included in analysis, with 38 students participating in the intervention group and 35 in the control group. Based on responses to questions regarding participation in the yoga intervention and in other yoga practice, and in order to account for the possible influence of practicing yoga outside of the intervention, participants were divided into four groups for analysis: "intervention only," "intervention and other yoga," "other yoga only," and "no yoga." The "intervention only" group (n = 15) participated only in the intervention at all three time points. The "intervention and other yoga" group (n = 23) participated in the intervention but also engaged in yoga practice outside the intervention. The "other yoga only" group (n = 9) participated only in yoga practice outside the intervention, with no participation in the intervention. The "no yoga" group (n = 26) neither participated in the intervention nor practiced yoga outside the intervention. Group demographics are presented in Table 1.

Participants in all groups had similar characteristics and were roughly equivalent: predominantly female, aged 19–21, and Caucasian. There were 75 participants in the first yoga intervention session, but attendance declined in subsequent sessions to 38 participants, constituting a 50% attrition rate.

Perceived Stress

Perceived stress at baseline was moderately high for all groups with mean total scores ranging from 38.80 to 42.33.

There were no statistically significant differences in perceived stress between groups at any time point.

There were statistically significant within-group differences in the "intervention only" group: their mean perceived stress scores increased from 38.80 to 43.27 by the end of the study (P = 0.024). The "intervention and other yoga" group had the lowest stress scores at week 6 (41.87) and week 12 (41.48), but these were not statistically significant. Cronbach's alpha for the PSS in this study was 0.81. Mean scores for perceived stress are presented in Table 2.

Self-compassion

Self-compassion was measured in six subscales: self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification.

In the self-kindness subscale, the main effect between groups was significant (F3, 69 = 3.86, P = 0.013). At baseline and at week 12, those who participated in the intervention and also practiced other yoga had significantly higher self-kindness scores than those in other groups. Indeed, the "intervention and other yoga" group had the highest mean self-kindness scores at any time point.

For all self-compassion subscales, there were no statistically significant within-group differences noted. However, the "intervention and other yoga" group had the highest subscale scores at baseline and week 12, indicating that they had the most self-compassion overall for all groups. In the "positive" subscales (self-kindness, common humanity, and mindfulness), the "intervention and other yoga" group also reported consistently higher

Table 1: Group demographics

Demographics	Group			No yoga, *n* (%)	Percentage sample
	Intervention only, *n* (%)	Intervention and other yoga, *n* (%)	Other yoga only, *n* (%)		
Age					
19-21	12 (80)	15 (65)	7 (78)	17 (66)	70
22-27	2 (13)	8 (35)	2 (22)	5 (19)	23
30-48	1 (7)	0 (0)	0 (0)	4 (15)	7
Total	15 (100)	23 (100)	9 (100)	26 (100)	100
Gender					
Female	12 (80)	20 (87)	8 (89)	26 (100)	90
Male	3 (20)	3 (13)	1 (11)	0 (0)	10
Total	15 (100)	23 (100)	9 (100)	26 (100)	100
Ethnicity					
African American	0 (0)	0 (0)	0 (0)	2 (8)	3
Caucasian	11 (73)	19 (83)	7 (78)	20 (77)	78
Asian	3 (20)	4 (17)	0	0	10
Hawaiian/pacific	0	0	0	1 (4)	1
Hispanic	1 (7)	0	2 (22)	3 (11)	8
Total	15 (100)	23 (100)	9 (100)	26 (100)	100

Table 2: Perceived stress mean scores

Group	Mean (SD)		*P*	Week 12, Mean (SD)	*P*
	Baseline	Week 6			
Intervention only	38.80 (5.92)	43.27 (6.20)	0.24*	43.27 (6.01)	0.23*
Intervention and other yoga	39.13 (6.86)	41.87 (7.41)	>0.05	41.48 (7.65)	>0.05
Other yoga only	42.33 (5.43)	44.89 (7.06)	>0.05	43.89 (6.31)	>0.05
No yoga	40.62 (6.42)	42.58 (8.08)	>0.05	42.19 (7.38)	>0.05

*Statistical significance. SD=Standard deviation

mean scores across all time periods, and the "other yoga only" group had the lowest mean scores for the (negative) "over-identification" subscale at any time point.

Cronbach's alpha coefficient for the SCS in this study was 0.94, with subscale reliability ranging from 0.76 to 0.88. Self-compassion means scores are presented in Table 3.

Overall quality of life and satisfaction with health

Overall QOL mean scores were moderately high at baseline for all groups (4.12–4.52). However, scores declined over time for all groups except for the "other yoga only" group, which remained the same at week 12.

Overall, QOL was highest in the "intervention and other yoga" (4.26) group at all-time points, but there were no statistically significant differences between or within groups over time for Overall QOL. Table 4 presents "Overall QOL" mean scores.

Satisfactions with health mean scores at baseline were moderate (3.46–4.00). The "other yoga only" group had the highest mean satisfaction with health scores at all time points and the "intervention and other yoga" group had the lowest mean scores by the end of the study (3.17). There were no statistically significant between or within-group differences at any time point, as indicated in Table 5.

World Health Organization quality of life subscales

For the WHOQOL subscales, highest mean scores for physical health, psychological health, social relationships, and environment were noted in either the "Intervention only" or "intervention and other yoga" group at any time point.

There were no statistically significant differences between groups at any time point on physical health, psychological health, social relationships, or environment.

Physical health scores either remained the same or trended downward in all groups, with decreases in physical health being statistically significant only in the "intervention and other yoga" group from baseline to week 6 ($P = 0.006$) and from baseline to week 12 ($P = 0.015$).

Social relationship mean scores increased between baseline and weeks 6 and 12 for the "Other yoga only" group, and environment mean scores increased from baseline to week 12 for the "intervention only" group, although these findings were not statistically significant.

There were no noteworthy or statistically significant findings for the psychological health subscale over time, for any group. Cronbach's alpha for the

Table 3: Self-compassion mean scores

Group	Mean (SD)		
	Baseline	Week 6	Week 12
Self-kindness			
Intervention only	2.67 (0.95)	2.92 (1.00)	2.67 (0.83)
Intervention and Other Yoga	**3.44** (0.62)*	**3.30** (0.73)	**3.37** (0.80)
Other Yoga only	2.51 (0.86)*	2.62 (0.60)	2.43 (0.98)*
No Yoga	2.88 (0.88)	2.88 (0.89)	2.81 (0.81)
Self-judgment			
Intervention only	2.87 (0.90)	2.88 (1.06)	2.88 (0.77)
Intervention and Other Yoga	**3.23** (0.90)	**3.15** (0.86)	**3.10** (0.93)
Other Yoga Only	2.53 (0.90)	2.71 (0.83)	2.73 (1.05)
No Yoga	2.83 (0.99)	2.66 (0.70)	2.82 (0.89)
Common humanity			
Intervention only	2.75 (0.86)	2.93 (0.84)	3.05 (0.55)
Intervention and Other Yoga	**3.58** (0.62)	**3.35** (0.58)	**3.27** (0.80)
Other Yoga Only	3.08 (0.99)	3.25 (0.77)	2.83 (0.94)
No Yoga	3.07 (0.80)	3.08 (0.71)	2.90 (0.83)
Isolation			
Intervention only	2.92 (0.86)	2.98 (0.97)	3.13 (0.80)
Intervention and Other Yoga	**3.17** (0.87)	2.99 (0.79)	**3.15** (1.02)
Other Yoga Only	3.14 (1.15)	**3.25** (0.74)	2.97 (0.89)
No Yoga	3.02 (1.06)	2.87 (0.99)	2.92 (1.07)
Mindfulness			
Intervention only	3.25 (0.97)	3.37 (0.89)	3.27 (0.83)
Intervention and Other Yoga	**3.64** (0.60)	**3.53** (0.63)	**3.56** (0.62)
Other Yoga Only	3.03 (0.69)	3.08 (0.40)	2.92 (0.64)
No Yoga	3.23 (0.77)	3.11 (0.75)	3.09 (0.82)
Over-Identification			
Intervention Only	2.93 (1.00)	**3.00** (0.83)	3.20 (0.79)
Intervention and Other Yoga	**3.00** (0.93)	2.98 (0.84)	**3.21** (0.81)
Other Yoga Only	2.67 (0.73)	2.69 (0.76)	2.81 (0.95)
No Yoga	2.83 (1.10)	2.82 (0.95)	2.88 (0.94)

*Indicates significant between-group differences (P<0.03). Bold indicates the highest mean score at each time point. SD=Standard deviation

Table 4: Overall quality of life

Group	Mean (SD)		
	Baseline	Week 6	Week 12
Intervention only	4.47 (0.92)	4.20 (0.77)	4.20 (0.77)
Intervention and other yoga	4.52 (0.51)	4.30 (0.47)	4.26 (0.69)
Other yoga only	4.12 (0.64)	3.88 (0.83)	4.12 (0.99)
No yoga	4.24 (0.60)	4.16 (0.62)	4.08 (0.70)

SD=Standard deviation

Table 5: Satisfaction with health mean scores

Group	Mean (SD)		
	Baseline	Week 6	Week 12
Intervention only	3.60 (1.35)	3.53 (1.06)	3.67 (1.05)
Intervention and Other Yoga	3.70 (0.93)	3.70 (0.93)	3.17 (1.11)
Other Yoga Only	4.00 (0.71)	3.78 (0.97)	3.89 (1.27)
No Yoga	3.46 (1.03)	3.50 (0.99)	3.42 (1.17)

SD=Standard deviation

WHOQOL-BREF scale as a whole was 0.87, indicating good reliability. Cronbach's *alpha* coefficients for subscales were 0.73 (physical), 0.74 (psychological), and 0.65 (social) [Table 6].

Reasons for not attending the yoga intervention

Those who attended the first yoga intervention but did not participate in subsequent sessions were asked to provide the reasons why they stopped participating. The most common reasons for not continuing to attend the yoga intervention included being too busy, stress related to school, having to study, needing to go home, work conflicts, needing to obtain clinical assignments, preferring other types of exercise and yoga, and not liking yoga or experiencing a lack of comfort or energy with the intervention.

Discussion

This study aimed to deliver an intervention that would lower stress and provide coping skills for nursing students. However, results show that there were statistically significant increases in perceived stress over time (P = 0.024), and physical health (QOL) scores decreased significantly from baseline to week 6 (P = 0.006) and from baseline to week 12 (P = 0.015). These results indicate that nursing students experienced stress, continued to perceive their lives as stressful regardless of yoga practice, and that stress increased while physical QOL and satisfaction with health decreased over the course of the study. This is contrary to numerous other studies which have shown that yoga-based and mindfulness interventions can decrease stress in college-age students and nursing/health profession students.[10,22-25]

It is possible that scheduling the intervention at the end of a class day was too overwhelming for students who had been on campus all day. Many students expressed that personal and academic obligations prevented them from attending the yoga sessions, and ironically, while the yoga intervention was designed to reduce stress, students cited increased stress related to academic expectations as a reason for not continuing to attend the yoga sessions.

It is also possible that students attended the yoga sessions with the expectation that the intervention would provide a more physically challenging experience, or those not familiar with yoga before the intervention may have anticipated that the intervention would provide a "quick fix" for stress. The class was slow-paced and primarily integrated breathing techniques and meditation, which may have contributed to the intervention not meeting student expectations, as students identified discomfort or lack of energy following intervention participation. The literature shows that students often engage in physical activity or exercise to reduce or manage stress and many students related having opted for their regular exercise routine instead of participating in the yoga intervention.[6,7] In light of the possibility that these

Table 6: World Health Organization Quality of Life-BREF scale Subscale Mean Scores

Group	Baseline	Week 6	Week 12
Physical Health			
Intervention Only	4.17 (0.50)	**4.12** (0.41)	**4.14** (0.49)
Intervention and Other Yoga	**4.31** (0.34)	4.04 (0.55)*	4.03 (0.47)**
Other Yoga Only	4.08 (0.55)	3.87 (0.50)	3.81 (0.48)
No Yoga	4.02 (0.57)	3.91 (0.63)	3.85 (0.72)
Psychological Health			
Intervention Only	3.73 (0.58)	3.61 (0.83)	**3.69** (0.74)
Intervention and Other Yoga	**3.88** (0.48)	**3.77** (0.61)	3.67 (0.63)
Other Yoga Only	3.46 (0.72)	3.50 (0.68)	3.41 (0.55)
No Yoga	3.68 (0.48)	3.59 (0.58)	3.53 (0.70)
Social relationships			
Intervention Only	3.87 (0.70)	3.71 (0.82)	3.73 (0.64)
Intervention and Other Yoga	**4.03** (0.70)	**4.00** (0.65)	3.94 (0.72)
Other Yoga Only	3.85 (0.47)	3.96 (0.39)	**3.96** (0.48)
No Yoga	3.74 (0.78)	3.53 (0.82)	3.50 (0.90)
Environment			
Intervention only	3.86 (0.58)	3.85 (0.62)	3.98 (0.53)
Intervention and Other Yoga	**4.09** (0.42)	**3.94** (0.50)	**3.99** (0.57)
Other Yoga Only	3.86 (0.45)	3.86 (0.56)	3.67 (0.51)
No Yoga	3.94 (0.54)	3.79 (0.52)	3.81 (0.63)

*P=0.006, **P=0.015

circumstances may have confounded the study results, it may be beneficial to include information about the various types of yoga, and the potential benefits of its practice *over time*, in future longitudinal studies involving a yoga intervention.

Studies have also shown that yoga can increase self-compassion,[22,25] but an increase in self-compassion was only statistically significant in this study in the "intervention and other yoga" group. In light of this circumstance, results related to the yoga intervention in this study are somewhat disappointing.

However, many students expressed that they experienced increased stress as the semester progressed, as a result of weekly examinations and increasing academic and clinical expectations, thus introducing historical bias into the study. In addition, previous studies that have shown benefit used a randomized control design, while this study was quasi-experimental in design. Students were able to self-select into the intervention, so further study is warranted in exploring the effects of yoga practices, using randomized controlled studies with larger, more diverse student samples.

Important findings from this study were that students who practiced the most yoga (those who participated in the intervention and practiced "other yoga") reported less stress, better QOL, and greater self-compassion compared to others, and had significantly higher self-kindness scores at the end of the study than those who only practiced yoga outside the intervention.

Limitations

Limitations in this study included sampling characteristics, lack of randomization to groups, high attrition rate, and lack of consistent participation in the intervention over time. Participants were predominantly female, Caucasian and in their mid-20s, and while these demographics may mirror those of nursing students in general, the lack of diversity in the sample may limit generalizability of results. Self-selection into the intervention group may have affected rigor in the study, as many of those who chose to participate in the yoga intervention also practiced yoga outside of the study (n = 23), and this circumstance may have affected changes in the dependent variables over time.

Conclusions

That students experience stress while in academic programs is well-documented, and nursing students are especially vulnerable to the detrimental effects of academic pressures. In addition, nursing students have been shown to be reluctant to seek help for school-related distress, so exploring how nursing students engage in self-help activities is particularly important for this population.

This study builds on findings from previous research about the benefits of yoga practice for nursing students by using a quantitative, longitudinal design. And while results in the intervention group were not as favorable as was expected, study data reveal that the groups that practiced yoga in any context had lower perceived stress, better QOL and overall health, and more self-compassion than those who did not. These findings underscore the promise that complementary and alternative practices may hold for helping students cope with the challenges inherent in academic environments, particularly those encountered in nursing programs.

As nursing students negotiate academic environments, providing the knowledge and skills necessary to implement self-care activities may be instrumental in graduating nurses who value and promote stress reduction and coping skills for themselves and the patients they care for.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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