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Original Article

Complementary/alternative medicine section

Effect of Yoga on Psychological Functioning of Nursing Students: A Randomized Wait List Control Trial

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ABSTRACT

Introduction: Nursing students experience considerable amount of stress to meet their professional demands. Yoga is an effective practice to reduce stress and improve psychological well being. However, improvement in psychological well being aids in stress management.

Aim: To evaluate the effectiveness of eight week yoga intervention on psychological functioning of nursing students.

Materials and Methods: This was a randomised Wait List Control (WLC) trial, we recruited total 100 students from Kempegowda Institute of Nursing, Bengaluru, Karnataka, India and randomized them into two groups (yoga=50 and WLC=50 students). The following instruments were used to collect the data, Freiburg Mindfulness Inventory (FMI), Self-Compassion Scale- Short Form (SCS-SF), Connor–Davidson Resilience Scale (CD-RISC), Satisfaction with Life Scale (SWLS), Jefferson Scale of Empathy HPS-Version (JSE-HPS), and Perceived Stress Scale (PSS). Data was analysed using Repeated Measures Analysis of Variance (RM-ANOVA) followed by post-hoc Bonferroni correction for all psychological variables.

Results: The results of our study report that eight week yoga intervention was significantly effective in improving self compassion and mindfulness among nursing students in experimental group than compared to WLC group. Even though there were improvements in resilience, satisfaction in life and perceived stress, results were not statistically significant.

Conclusion: Overall, results of the present study have demonstrated impact of eight week yoga intervention on the psychological functioning of nursing students. Yoga intervention can be inculcated in the nursing education to meet demands of the profession.

Keywords: Mindfulness, Nursing education, Perceived stress, Resilience, Self compassion

INTRODUCTION

As per a systematic review conducted till 2010, reported sources of stress in nursing students are related to their academic activities and clinical practice [1]. However, perceived stress was associated more with the clinical practice than the academic demands, resulting in more psychological symptoms [2] and also gastrointestinal symptoms [3]. Considerably, nursing students have more stress and anxiety than other students [4], especially more in female students [5]. So, there is a need for physical activity and stress management in nursing students to maintain their health [6].

In our study, the following psychological variables; mindfulness, self-compassion, empathy, resilience, and satisfaction with life were included. Mindfulness is being aware of the present moment to one's own experiences [7]. Being mindful aids in stress management [8]. According to Neff, self compassion is being warm and caring at times of hardship, being kind to self, accepting suffering or unpleasant experiences as it is and being non judgmental [9].

Moving ahead, empathy is an essential professional quality a student nurse should possess to provide quality health care to the patients. In this study, empathy on cognitive dimension was measured. Empathy can be defined as, "a predominantly cognitive attribute that involves understanding of the patient's experiences, concerns, and perspectives with a capability to communicate this understanding and an intention to help [10]". In Congruent with the professional requirement, many studies have reported that nursing students have higher levels of empathy than other undergraduate students [11-13]. Nevertheless, female nursing students are more empathetic than male students [12,13]. Also, higher level of empathy and resilience was reported in older nursing students [14].

According to the American Psychological Association, resilience can be defined as, "the process of adapting well in the face of adversity, trauma, tragedy, threats or even significant sources of stress [15]". Substantially, resilience aids in the retention of students in the academic program [16], and in their academic success [17] and, this helps them to cope effectively with adversities in the clinical setting [18]. Satisfaction with life is a subjective judgment about his or her life [19]. However, nursing students have reported higher level of life satisfaction [5] than compared to other students [20].

Indeed, physical fitness is associated with perceived physical and psychological health. Nursing students have reported poor to moderate levels of physical fitness and this needs to be addressed through appropriate intervention [21,22]. Yoga is an effective practice to reduce stress [23] and improve psychological well being [24,25]. Hence, the present study was designed to evaluate the effectiveness of eight week yoga intervention to reduce perceived stress and to enhance psychological well being among nursing students.

MATERIALS AND METHODS

The present study was a randomized WLC trial. Total of 100 students {1st and 2nd year General Nursing and Midwifery (GNM) and 1st to 3rd year BSc Nursing} were recruited from Kempegowda Institute of Nursing, Bengaluru, Karnataka, India. In this study, female students aged between 17-30 years and who were willing to learn yoga were included. However, students who were diagnosed with severe neurological or psychiatric illness, those students receiving treatment for hormonal imbalance, recently underwent surgical intervention, and regularly practicing yoga was excluded. The

research study was carried out between May 2015 to July 2015. After screening, students were randomly allocated into two groups. Yoga group received yoga intervention for eight week {five days/ week, one hour/day} and the WLC group continued their routine work for the first eight week. After the completion of study, yoga intervention was given to WLC group also.

Sample Size

A priori computation of sample size using G* Power version 3.1.9.2, revealed 64 participants were required with an effect size 0.347 [26] at an alpha value of 0.05 and with an actual power of 0.80.

Ethical Approval

Approval of Institutional Ethics Committee was obtained for this study {RES/IEC-SVYASA/59/2015} and informed consent was obtained from all the students who were recruited for the research study.

Intervention

The yoga intervention was based on integrated approach to yoga therapy as designed by S-VYASA [27]. Details of yoga intervention are described in the [Table/Fig-1].

Sl. No.	Intervention	Approximate time for the practice	Schedule
1	Basic Instructions	15 minutes	First day
2	Breathing practices- Hands in and out breathing, Hand stretch breathing, Ankle stretch breathing, Leg raising (Alternative and both legs). breathing, Tiger breathing, Rabbit (*Shashanka*) breathing	10 minutes	Daily-first week to 8th week
3	Loosening practices- Twisting, Side bending, Forward and backward bending Jogging	10 minutes	Daily-first week to 8th week
4	Sun salutation (*Suryanamaskara*)	10-12 minutes	Daily-first week to 8th week
5	Asanas (postures) Standing posture- Half wheel posture (*Ardhacakrasana*) Foot palm posture (*Padahastasana*) Half waist rotation posture (*Ardhakaticakrasana*) Tree posture (*Vrkshasana*) Triangle posture (*Trikonasana*) Sitting posture- Diamond posture (*Vajrasana*) Rabbit posture (*Shashankasana*) Spinal twist posture (*Vakrasana/ Ardhamatsendrasana*) Camel posture (*Ustrasana*) Posterior stretch (*Paschimottanasana*) Supine asana Fish posture (*Matsyasana*) Shoulder stand posture (Sarvangasana) Prone asana Cobra posture (*Bhujangasana*) Grasshopper posture (*Shalabhasana*) Bow posture (*Dhanurasana*)	10-15 minutes	Daily-first week to 8th week
6	Quick Relaxation Technique (QRT)	3 minutes	Daily-first week to 8th week
7	Pranayama- Kapalabhati Nadishodana pranayama Bhramari chanting	8-10 minutes	Daily-From 2nd week
8	Yogic games (Krida yoga)	8-10 minutes	Alternative days
9	Meditation	5 minutes	Once in a month
10	Lecture session	10 minutes	Once in a month

[Table/Fig-1]: List of yoga practices in the yoga module.

Assessments

Data were collected using sociodemographic sheet and five self reported questionnaires.

Sociodemographic sheet included name, age, religion, level of education, and address.

FMI: The FMI is a self report questionnaire to measure mindfulness. This scale consists of 14 items and is very sensitive to change in mindfulness. Each item has a 4-point Likert rating from 1 (Rarely) to 4 (Almost always). The total score will range between14 to 56, high score represents high mindfulness. This scale has a sound psychometric properties and reported Cronbach's alpha is 0.86 [28].

CD-RISC 10: This is a brief, self report questionnaire to measure resilience. In this study, 10 items scale was used. Response to each item will be from 0 (not true at all) to 4 (true nearly all the time). The range of total score is from 0 to 40. High score corresponds to high resilience. This scale has a robust psychometric properties [29], with Cronbach's alpha=0.85 [30].

SCS-SF: This is a self report questionnaire to measure self-compassion. In this study, we have used 12 items scale. Response for each item will be between 1 (Almost never) to 5 (Almost always). Scores can range from 12 to 60; one who scores high has high level of self compassion. The SCS–SF is a reliable and valid tool to assess self compassion with reported Cronbach's alpha is ≥0.86. This scale has a close correlation with the long form of SCS r ≥0.97 for all samples [31].

SWLS: This is a short 5-item questionnaire to measure global cognitive judgments of satisfaction with one's life. This scale requires about one minute to complete the test. Each item must be scored on a 7-point Likert rating between 1 (Strongly Disagree) to 7 (Strongly Agree). This scale has a good psychometric properties and can be widely used among wide range of age groups with average alpha coefficient 0.85 [19]. Satisfaction with life scale also focuses on emotional well being or underlying psychopathology of an individual as the evaluation is based on his own criteria [32].

JSE-HPS: This is a 20 item scale designed to measure empathy (cognitive). Each item should be scored on a 7-point Likert rating between 1 (Strongly Disagree) to 7 (Strongly Agree). The total score will range between 20 to 140. High score corresponds to high level of empathy. This scale has reported robust psychometric properties with Cronbach's alpha 0.78 and 0.93 among nursing students of southeastern part of USA [33].

PSS: This is a self reported questionnaire to assess perception of stress in one's day-to-day life. This is a 10-item questionnaire. Each item should be rated on 5-point Likert scale 0 (Never) to 4 (Very Often). High score represents high level of perceived stress. This scale has reported adequate psychometric properties [34,35].

STATISTICAL ANALYSIS

Data were analysed using SPSS 16.0 version. RM-ANOVA followed by post-hoc Bonferroni correction was performed for all psychological variables with the level of significance at $p<0.05$.

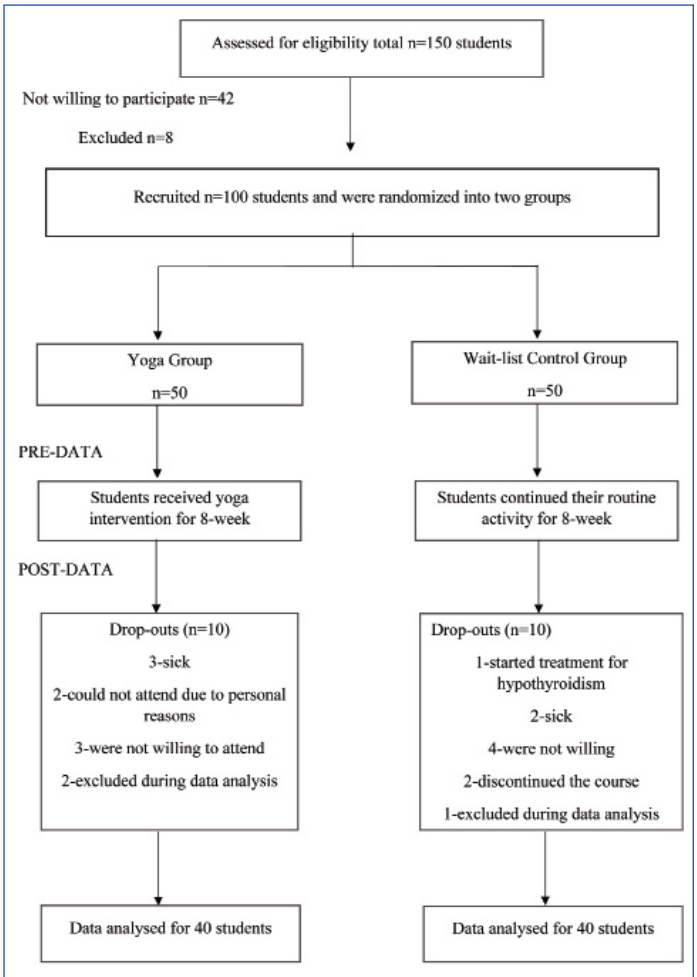
RESULTS

The trial profile of the study is depicted in the [Table/Fig-2]. For this study, 100 students were recruited, 50 participants in each group and there were 10 dropouts in each group. Finally, for analysis there were 80 students left.

The age of all participants in the yoga group was 19.65±1.48 and in the WLC group was 19.35±1.03. Characteristics of the participants are reported in the [Table/Fig-3]. It is apparent from this table that majority of the students belong to Hindu religion and their mother tongue was kannada. In this study, all the participants were females, single and were residing in the college hostel.

Proceeding further, data was analysed using Repeated Measure of Analysis of Variance (RM-ANOVA). Results are reported in the

[Table/Fig-4]. Meanwhile, normality test (Shapiro-Wilk) ensured that there is no significant difference between yoga and WLC groups at baseline for all the variables. This is evident from the [Table/Fig-4] that eight week yoga intervention significantly improved mindfulness and self compassion among nursing students in yoga group than compared to WLC group. Even though, we could not elicit statistical significance the following improvements were witnessed among participants of yoga group in contrast to WLC group. There was improvement in resilience and perceived stress in yoga group but not in WLC group. However, there was improvement in satisfaction with life among both the groups. Contrary to our expectation, decrease in the empathy was reported in both the groups, but significant decrease was noticed in WLC group.



[Table/Fig-2]: Trial profile.

Characteristics of the participants	N (%)	
	Yoga group (40)	WLC group (40)
Class/batch		
1st year GNM	17 (42.5%)	10 (25%)
2nd year GNM	6 (15%)	10 (25%)
1st year BSc	5 (12.5%)	7 (17.5%)
2nd year BSc	5 (12.5%)	7 (17.5%)
3rd year BSc	7 (17.5%)	6 (15%)
Religion		
Hindu	29 (72.5%)	26 (65%)
Christian	9 (22.5%)	14 (35%)
Muslim	2 (5%)	-
Mother tongue		
Hindi	-	1 (2.5%)
Kannada	26 (65%)	23 (57.5%)
Others	14 (35%)	16 (40%)

[Table/Fig-3]: Characteristics of the participants.

For self compassion, within group comparison (ANOVA) did not show significant improvement, $F(1,78) = 1.894$, $p = 0.173$. Whereas, interaction between time x group reported significant improvement, $F(1,78) = 4.506$, $p = 0.037$. Results of post-hoc analysis with Bonferroni adjustment reported significant improvement within the yoga group ($p = 0.016$), but there was no significant improvement within the WLC group ($p = 0.599$).

Within group comparison (ANOVA) did not show significant increase in satisfaction with life, $F(1, 78) = 1.768$, $p = 0.187$. Likewise, in interaction between time x group also there was no significant

Psychological Variables	Group	Pre M ± SD	Post M± SD	% change	Within group		Between group		Group x Time
					Diff	p-value	pre vs pre	post vs post	
Self-compassion	Yoga	3.03± 0.46	3.19± 0.28	5%	0.16	0.016*	0.18	0.01	0.037*
	WLC	3.22± 0.46	3.18± 0.40	-1%	-0.04	0.599			
Satisfaction with life	Yoga	21.60± 5.02	22.40± 5.29	4%	0.80	0.232	0.75	0.40	0.711
	WLC	22.35± 5.07	22.80± 4.78	2%	0.45	0.500			
Mindfulness	Yoga	37.09± 3.74	39.46± 4.97	6%	2.37	0.005*	1.18	2.68	0.001**
	WLC	38.28± 4.92	36.78± 5.64	-4%	-1.5	0.073			
Resilience	Yoga	23.20± 5.83	23.68± 5.92	2%	0.48	0.633	1.13	0.73	0.196
	WLC	24.33± 6.05	22.95± 5.47	-6%	-1.38	0.176			
Empathy	Yoga	97.50± 13.02	93.37± 14.50	-4%	-4.13	0.074	3.45	3.87	0.895
	WLC	94.05± 12.89	89.50± 11.60	-5%	-4.55	0.049*			
Stress	Yoga	20.80± 4.10	19.33± 3.69	7%	1.47	0.059	0.80	1.22	0.066
	WLC	20.00± 4.11	20.55± 3.34	-3%	-0.55	0.474			

Table/Fig-4: Results of RM-ANOVA for all the psychological variables in the yoga group (n=40) and the WLC group (n=40).
*significant at the 0.05 level
**significant at the 0.01 level

improvement, F (1, 78) = 0.139, p = 0.711. In post-hoc analysis with Bonferroni correction did not show significant increase within the yoga group (p = 0.232) and the WLC group (p = 0.500).

Similarly, within group comparison (ANOVA) for mindfulness did not report significant improvement, F (1, 78) =0.547, p = 0.462. But, for interaction between time x group showed significant improvement, F (1, 78) = 10.945, p<0.001. Results of post-hoc analysis with Bonferroni adjustment reported significant increase within the yoga group (p = 0.005), but there was no significant improvement in the WLC group (p = 0.073).

For resilience, within group comparison (ANOVA), F (1, 78) = 0.393, p = 0.533 and interaction between time x group did not report significant improvement, F (1, 78) = 1.700, p = 0.196. In post-hoc analysis with Bonferroni correction also did not show significant increase within the yoga group (p = 0.633) and the WLC group (*p* = 0.176).

Conversely, in within group comparison [ANOVA] significant decrease in empathy was reported, F (1, 78) = 7.265, p = 0.009. However, interaction between time x group did not report significant improvement, F (1, 78) = 0.017, p = 0.895. Post-hoc analysis with Bonferroni adjustment did not find significant increase within yoga group (p = 0.074), but significant decrease in empathy within the WLC group (p = 0.049) was reported.

Results of within group comparison (ANOVA) did not demonstrate significant decrease in perceived stress, F (1, 78) = 0.720, p = 0.399. Similarly, time x group interaction also did not report significant decrease, F (1, 78) = 3.482, p = 0.066. Findings of post-hoc analysis with Bonferroni adjustment did not report significant reduction in stress within the yoga group (p =0.059) and within the WLC group (p = 0.474).

DISCUSSION

The results of our study have reported that eight week yoga intervention was significantly effective in improving self compassion and mindfulness among nursing students in yoga group than compared to WLC group. The following studies are in line with our results. Yoga practitioners showed significant improvement in mindfulness [36-38]. Eight week yoga intervention significantly improved mindfulness among healthy population in experimental group than compared to WLC group [39]. Eleven week yoga intervention (one hour per week) among medical students significantly increased self-compassion but, improvement in empathy and perceived stress were not statistically significant [40]. Self compassion is considered as the potential mechanism through which yoga intervention reduces perceived stress [26,41]. Even, in our study there was a decrease in perceived stress among participants of yoga group than WLC group, but results were not statistically significant. Many studies have reported that, yoga is effective in the management of stress [23,38,40,42-49].

This result was contrary to our expectation, as there was a decrease in empathy in the both groups. But in WLC group, there was a significant decrease in empathy. Previous studies also reported similar findings, that there was decline in empathy among nursing students [50,51]. As our intervention was for eight week, this time duration may be short to witness decline in empathy. Reason for this result remains unclear.

Subsequently, there was improvement in satisfaction with life in the both groups, but our results could not elicit statistical significance. There is a significant association between satisfaction with life and participation in physical activity [52]. During the phase of intervention students of both the groups were participating in cultural and sports activities. This may the reason for improvement in satisfaction with life in both the groups. Earlier studies were in accord with our result. In a RCT, six week yoga intervention one hour/week improved life satisfaction and resilience to stress among university staff [53]. In our study, also there was improvement in resilience in yoga group but not in WLC group.

During the phase of yoga intervention students had to attend their internal assessment tests, complete their annual academic requirements and many students were participating in annual cultural and sports competition. This may be the reason for mixed results in our study.

LIMITATION

The scope of this study is limited in terms of assessment tools as self reported questionnaires were used for data collection. However, duration of intervention could have been for longer than eight week with readings taken at multiple timelines and follow up report of the study. This study could have been implemented in the beginning of the academic program, to evaluate the effect of yoga on the psychological functioning of nursing students.

CONCLUSION

Results of our study have demonstrated, eight week yoga intervention significantly improved mindfulness and self-compassion among participants in yoga group than compared to WLC group. Both mindfulness and self compassion plays vital role in combating stress. As nursing students are exposed to high levels of stress compared to other students. It is essential to inculcate yoga intervention in the nursing education to meet demands of the profession.

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