

Effect Of Yoga On The Psychological Wellbeing Of Medical Students

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Abstract

Objective: Medical students appear to be one group that is most sensitive to psycho-spiritual imbalance during their undergraduate studies, particularly during their first year. The purpose of this study was to demonstrate the impact of a yoga-based intervention on the psychological well-being of female homoeopathic medical students.

Design: This study used 76 female homoeopathic medical students in a two-group pre-post randomised waitlist control design.

Materials and Methods: The yoga group received a specially tailored yoga module for sixty minutes every day for three months, whereas the control group received no intervention. Happiness, sleep, spiritual wellbeing, mindfulness, well-Being, and perseverative Thinking were all assessed at baseline and three months later.

Results: In summary, all measures indicated statistically significant differences between the yoga and control groups, with the exception of dissonance scores in spiritual wellbeing, core negative thinking in perseverative thinking, and sleep quality.

Discussions: These preliminary findings indicate that incorporating yoga-based interventions into medical education is viable and enhance psychological wellbeing.

Conclusions: The use of Yoga as a preventative or remedial measure in the health maintenance of medical students can be explored further.

Keywords: medical students, spiritual, happiness, wellbeing, mindfulness

INTRODUCTION

Among all training programmes, medical education is considered to be the most rigorous, both in terms of academics and in terms of emotional strain. Due to the rigorous nature of the program, medical students in particular may face a myriad of health and psychological issues that affect their quality of life. Wellbeing of medical students has potential impact to the

quality of medical treatment delivered to patients. Hence it is critical to address the mental health and wellbeing of the medical student (Wang et al., 2019).

Experts began investigating the mental health of medical graduates in the 1980s (Champion & Westbrook, 1984). The first and fourth years of medical school were found to be the most stressful in terms of anxiety and

depression(Baldassin et al., 2008; Sarkar et al., 2017; Silva et al., 2017). One out of every three students pursuing the medical school complains from anxiety, which is above than prevalence estimates of anxiety in the general population. The global overall prevalence of anxiety among medical students was 33.8 percent (Quek et al., 2019). The findings of Lameu et al., who conducted psychological examinations on medical graduates, were as follows: the overwhelming majority of them exhibited severe psychobiological morbidity, with no significant improvement over time (Lameu et al., 2015). Along with increased oxidative stress and a pro-inflammatory state, mental stress is related to increased prevalence of infection as well as cardiovascular disease, obesity, diabetes, and hyperlipidemia(Srivastava & Batra, 2014).

Stress is unavoidable throughout medical education and practise(L N Dyrbye et al., 2006). The stressful environment of medical education contributes to unfavourable emotions that are associated to both psychological and physical disorders in medical students(Liselotte N Dyrbye et al., 2005). The stressful situation can have an impact on the quality of medical care provided by them(Bíró et al., 2010). Yoga is gaining popularity as a preventive and therapeutic strategy of health maintenance and rehabilitation. Yoga has been demonstrated to effectively mitigate a wide range of non-communicable diseases and mental health issues(Dwivedi & Tyagi, 2016; Maddux et al., 2018; Stephens, 2017). Yoga has been reported to boost all facets of a person's well-being, including sleep(Balasubramaniam et al., 2013; Hariprasad et al., 2013). Further, yoga has been proved to be effective in managing stress-related demanding situation(Brems, 2015; Granath et al., 2006). Furthermore, yoga based research evidences are promising for boosting the psychological well-being(Irving et al., 2009; Shapiro et al., 1998).

Emotional well-being, avoiding repeated negative thinking, resilience to stress, and self-satisfaction all factor towards one's overall

psychological well-being. Sleep quality is also an important factor in maintaining good mental health. The most recent positive psychology trend has focused on domains such as mindfulness, spirituality, and happiness as mediating factors for psychological well-being. Hence, the current study was designed with medical students to evaluate their psychological wellbeing following yoga based intervention. We have hypothesized that the yoga module developed on the basis of literature review and validated by panel of experts in the field, could prove to be effective in modulating the psychological wellbeing of medical students.

MATERIALS & METHODS

Design and Participants

The nature of the study was two-group pre-post randomized waitlist control design. Participants were recruited from Dhondumama Sathe Homoeopathic Medical College, Pune, Maharashtra, India. A total of 76 female homoeopathic medical students were enrolled in the study. 38 were randomly assigned to the yoga group, whereas 38 were assigned to the wait-list control group by using online random number generator. Seven subjects dropped out of the trial, leaving 35 medical students in the yoga group and 34 medical students in the wait-list control group to complete all assessments after three months. The participants were students of first year aged between 18 to 20 years. In order to be included in the trial, the criteria were: (i) Females (ii) First Year Medical Graduates (iii) Age Between 18-21 years (iv)Having a normal health status (absence of any major physical or mental ailment). Participants who were unable to undergo yoga practices were excluded from the study. The medical graduates included in the study took part in it voluntarily with no incentives being given to them. Signed informed consent of all participants was obtained after the study protocol was explained to them.

Instruments

The socio-demographic data was collected from the subjects. Also, the following scales were used to measure psychological well-being:

Short Depression–Happiness Scale (SDHS): SDHS is a statistical bipolar 6-item self-reported questionnaire measuring depression and happiness. Cronbach's alpha is stated to be between 0.70 and 0.92, indicating that SDHS has strong internal consistency reliability as well as good test–retest reliability (Joseph et al., 2004).

Sleep scale from the medical outcomes study (MOS): It is a patient reported, non-disease specific, 12 item scale measuring subjective experiences of sleep across several different domains including those across different sleep-related diseases or syndromes. Out of the 12 items, 10 are scored on a six point response scale, one item uses the Likert scale and one is an open ended question measuring sleep quantity (Allen et al., 2009).

The Freiburg Mindfulness Inventory (FMI): The FMI is a valid, reliable and useful questionnaire for measuring mindfulness. The 14 item version covers all aspects of mindfulness with an internal consistency of Cronbach alpha = .93 (Walach et al., 2006). The total score of the questionnaire is the sum of the individual items where higher the scores, the greater the extent of mindfulness (Buchheld et al., 2001).

Warwick-Edinburgh Mental Well-Being Scale (SWEMWBS): WEMWBS is a positively worded 14 item scale which includes subjective well-being and psychological functioning. The scale is scored on a likert scale from 1-5 with the minimum score 14 and 70 being the maximum with a higher score reflecting a higher level of mental well-being (Stewart-Brown, S., Tennant, A., Tennant, R., Platt, S., Parkinson, J., & Weich, 2009; Tennant et al., 2007).

Spiritual well-being questionnaire (SWBQ):

The SWBQ is based on a broader and more empirically based conceptualization of spiritual well-being based comprising on 4 domains the domains of personal, communal, environmental and transcendental well-being. It has high internal consistent (Cronbach's $\alpha = 0.92$), reliability and strong construct validity, making it a reliable and valid measuring tool for spiritual well-being (Gomez & Fisher, 2003).

Perseverative Thinking Questionnaire (PTQ):

The PTQ is a 15-item content independent measure of repetitive negativity thinking (RNT). It basically comprises of 3 factors core characteristics of RNT [repetitiveness, intrusiveness, and difficulties to disengage] and two associated features [unproductiveness of RNT and RNT capturing mental capacity]. This questionnaire has shown to be a useful, reliable and validated measure of RNT facilitating research into this cognitive process (Ehring et al., 2011).

INTERVENTION

Pre tests were conducted and the sample was assigned into 2 groups. The details are as follows:

Yoga Group: Comprising of 38 participants, the yoga group had undergone a specifically designed yoga module for sixty minutes daily for 3 months, except during weekends and on holidays. During this intervention duration, they were taught and practised yoga under the investigator in the morning. The yoga module was supported by classical texts and research evidence. A total of 32 practices were included in the yoga module, and each practice was discussed with a panel of 10 experienced yoga experts. The participants were encouraged to do only what felt appropriate for them and to rest whenever necessary. The room was dimly lit with soft ambient music being played during the yoga session. The clothing was appropriately chosen for the comfort of yoga practice. The session basically included starting prayer, loosening exercises, Surya Namaskar,

Asanas, OM chanting, Pranayama, lectures and relaxation which varied from week to week. Detailed description of the yoga practices are attached in the appendix.

Waitlist Control Group: Comprising of equal number of subjects, these participants did not participate in any kind of training and were free to pursue in their day to day activities as per schedule for 3 months. The participants of control group were provided with yoga training after completion of experimental period.

At the end of 3 months, the posttest on selected psychological tests was conducted for all the subjects of two groups.

DATA EXTRACTION

We extracted the recorded data from questionnaire sheets to an excel and the data entry was rechecked for any typo errors. The following variables were analyzed: mindfulness, general wellbeing, and spiritual-wellbeing, dissonance scores derived from spiritual wellbeing, perseverative thinking, happiness, and sleep. All the analyses were performed using R statistical software, version

4.0.2 (R Core Team, 2020). We initially performed descriptive statistics and screened the data by performing outlier analysis, missing value analysis, and analysis to assess baseline matching. The variable wellbeing in the post assessment of yoga group had one extremely low value ($z = -4.55$), which was removed. No 4value was substituted instead of that. There was also no missing value apart from this in the whole dataset. The baseline matching assessed using independent samples t-test showed that baseline is not matching for the variables pre-perceived unproductiveness, pre-mental capacity, and Presomnolence, which means these variables had significantly different means before the intervention. We performed one-way ANCOVA with baseline as covariates to address the baseline differences. To assess between group differences, we used independent samples t-test and Cohen's d as a measure of effect size if the variables were normally distributed, or else we used Wilcoxon's sum rank test and Cliff's delta as a measure of effect size.

RESULTS

Table 1 shows the group wise descriptive statistics of demographic and other outcome variables

Variable	Pre				Post			
	Yoga (n=35)		Control (n=34)		Yoga (n=35)		Control (n=34)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	18.66	0.73	18.59	0.7				
Height	159.49	5.56	161.13	3.72	159.56	5.65	161.31	3.84
Weight	48.83	7.05	54.88	9.44	47.96	6.95	55.07	9.46
Systolic BP	111.4	8.44	118.12	6.51	110.37	6.61	120.59	6.25
Diastolic BP	77.09	7.8	78.12	4.85	75.69	4.81	80	5.64
Mindfulness	38.14	4.87	37.79	4.54	43.71	3.39	36.32	5.18
Wellbeing	48.43	6.22	51.74	7.53	55.8	6.11	50.94	8.59
Spiritual Wellbeing - Personal-A	4	0.62	4.03	0.59	4.37	0.45	3.89	0.71
Spiritual Wellbeing - Personal-B	3.68	0.58	3.58	0.55	4.25	0.39	3.69	0.59
Spiritual Wellbeing - Communal-A	4.01	0.67	3.89	0.57	4.3	0.47	3.83	0.51
Spiritual Wellbeing - Communal-B	3.63	0.63	3.65	0.51	4.18	0.43	3.72	0.47

Spiritual Wellbeing - Environment-A	3.79	0.7	3.74	0.47	4.07	0.47	3.64	0.51
Spiritual Wellbeing - Environment-B	3.58	0.66	3.51	0.6	4.01	0.51	3.52	0.51
Spiritual Wellbeing - Trans-A	3.66	0.9	3.41	0.91	3.78	0.75	3.29	0.77
Spiritual Wellbeing - Trans-B	3.32	0.82	3.2	0.81	4.05	0.49	3.42	0.9
Spiritual Dissonance - Personal	0.32	0.7	0.45	0.59	0.12	0.36	0.2	0.38
Spiritual Dissonance - Communal	0.38	0.52	0.24	0.41	0.12	0.24	0.11	0.26
Spiritual Dissonance - Environment	0.21	0.57	0.23	0.6	0.06	0.25	0.12	0.29
Spiritual Dissonance - Trans	0.34	0.78	0.21	0.58	0.27	0.68	0.12	0.32
Preseverative Thinking - Core	23.77	6.72	20.62	7.37	18.29	5.74	20.15	7.46
Preseverative Thinking - Unproductive	6.63	2.33	4.88	2.2	4.97	1.84	5.24	2.47
Preseverative Thinking - Mental Capacity	6.89	2.84	5.53	2.44	4.4	2.48	5.74	2.29
Happiness	11.8	2.92	12.29	2.9	15.23	2.67	12	2.96
Sleep - Disturbance	27.86	20.63	21.8	15.93	13.61	12.38	24.82	20.32
Sleep - Somnolence	39.05	22	27.25	14.9	25.33	17.4	28.04	16.48
Sleep - Snoring	7.43	15.4	11.18	17.19	2.29	6.46	16.47	25.81
Sleep - Awakening	25.14	29.24	13.53	19.52	5.71	15.77	20	22.02
Sleep - Adequacy	58.57	23.78	62.65	24.9	45.43	23.68	60.29	24.43
Sleep - Quality	6.68	0.93	7.04	1.01	6.84	0.92	6.94	1.2

The variables mindfulness and wellbeing were normally distributed, and hence independent samples t-tests were performed to evaluate the between group effects. Mindfulness scores had significantly improved after the intervention compared to the control group, $t(67) = 7.03$, $p < .001$, $d = 1.69$, producing a large Cohen's d effect size. Wellbeing was also statistically

different, $t(67) = 2.71$, $p = .008$, $d = 0.65$, with a moderate effect size. The other variables, which included spiritual wellbeing, and spiritual dissonance as its derived variables, perseverative thinking, happiness, and sleep were all not normally distributed and non-parametric tests were used. The results are presented in the table 2.

Table 2: Non parametric Wilcoxon's sum rank test between yoga and control groups

Variable	W Statistics	p-value	Effect size (Cliff's delta)
PostPersonalAM	848.5	0.002	0.43
PostPersonalBM	944	< .001	0.59
PostCommunalAM	887	< .001	0.49
PostCommunalBM	902.5	< .001	0.52
PostEnvironmAM	868.5	0.001	0.46
PostEnvironmBM	914.5	< .001	0.54
PostTransBM	835	0.004	0.4

PostTransAM	866	0.001	0.46
postDisPersonal	525.5	0.38	-0.12
postDisCommunal	622.5	0.72	0.05
postDisEnviron	464	0.081	-0.22
postDisTrans	620.5	0.724	0.04
Postscore	481.5	0.174	-0.19
PostHappiness	942	< .001	0.58
Postsleepdisturb	340.5	0.002	-0.43
Postsnoring	404	0.003	-0.32
Postsleepawakeing	311	< .001	-0.48
Postsleepadequacy	394.5	0.015	-0.34
Postqualityofsleep	550	0.573	-0.08

ANCOVA Analysis for baseline non-matching variables:

A One-way ANCOVA was conducted to determine any statistical difference between yoga and control groups on mental unproductivity, mental capacity of the perseverative cognition domain, and somnolence of sleep domain, controlling for their respective baseline variables. Type III sums of squares were used for the analysis. The assumption of normality was checked using Q-Q plot of residuals, and the equivalence of variances was checked using Levene's test. Both the assumptions were satisfied for all the three variables for which the baselines were not matching.

There was a significant effect of group on perceived unproductivity after controlling for baseline unproductivity, $F(1, 66) = 7.795$, $p = .007$. The Tukey corrected post hoc test showed a significant difference between yoga and control groups, $t(67) = -2.792$, $p = .007$, $d = -0.583$. The adjusted marginal means were 4.477 for yoga group, and 5.744 for control group, which shows that yoga group had lower levels of perceived unproductivity compared to control group.

There was a significant effect of group on perceived mental capacity after controlling for baseline mental capacity, $F(1, 66) = 18.762$, $p < .001$. The Tukey corrected post hoc test showed a significant difference between yoga and

control groups, $t(67) = -4.331$, $p < .001$, $d = -0.868$. The adjusted marginal means were 4.038 for yoga group, and 6.108 for control group, which shows that yoga group had lower scores on perceived mental capacity compared to control group, which is a positive outcome.

There was a significant effect of group on somnolence after controlling for baseline somnolence, $F(1, 66) = 7.382$, $p = .008$. The Tukey corrected post hoc test showed a significant difference between yoga and control groups, $t(67) = -2.717$, $p = .008$, $d = -0.545$. The adjusted marginal means were 22.114 for yoga group, and 31.353 for control group, which shows that yoga group had lower levels of somnolence compared to control group.

As a summary, except for dissonance scores in spiritual wellbeing, core negative thinking in the perseverative thinking, and quality of sleep, all other variables had statistically significant differences between yoga and control groups and the changes were favourable to yoga, with moderate to high effect sizes.

DISCUSSION

The current study had focussed on depression and happiness, mindfulness, mental & spiritual well-being, sleep, and perseverative thinking in healthy female homoeopathic medical students. The students who received the intervention demonstrated significantly greater improvement in happiness, psychological

wellbeing, mindfulness, and spiritual well-being compared with their peers who underwent normal day to day routine. Additionally, several sleep and perseverative thinking domains showed considerable improvement. These findings are in line with recent studies which suggest the efficacy of yoga over non-yoga performers (Diamond, 2012; Ross et al., 2013; Saoji, 2016). Previous studies (Bansal et al., 2013; Simard & Henry, 2009) have demonstrated considerable improvements in mental health, overall health, stress reduction, and depressive symptoms among medical students, and the current findings support those findings.

Mindfulness in medical graduates was shown to improve significantly and this is of greater importance from the student as well as the educator's point of view due to the fact that improved mindfulness carries a broad spectrum of benefits like enhanced cognition, focus and executive attention (Tang et al., 2007; Zeidan et al., 2010). A possible mechanism of action as to how yoga may lead to mindfulness development could be due to the enhanced sensory awareness leading to focussed attention that comes with movement and learning new skills all of which stimulate the cognitive processes related to meditative awareness. With the overall emphasis of a non-judgmental attitude toward thoughts and experiences through yoga practices aided in better psychological flexibility bringing the concept of mindfulness to the practitioner (Dick et al., 2014).

Yoga practices were shown to bring an effect upon the well-being on students. Factors like the mind-body connection inherent in yogic practices, the transformative and stabilizing effect of the practices, and the enhanced sense of physical and emotional awareness could have played key role to their overall self-esteem and sense of self. This has been shown in earlier studies (Kidd & Eatough, 2017).

Spiritual well-being has been tied along with mindfulness in previous study done by Park et

al linking them with perceived stress (Park et al., 2021). In our study too, spiritual well-being amongst the homoeopathic undergraduates had exhibited significant improvement. The non-competitive focus on personal development cultivated by yoga could impact the psycho-spiritual achievements such as compassionate understanding, or acceptance, along with mindful awareness (Evans et al., 2009).

Repetitive Negative thinking as assessed by the perseverative thinking questionnaire was found to have a positive outcome on practitioners of yoga. Studies have shown to link RNT with stress and yoga studies have shown to bring a positive change to this perceived state of stress. Rumination, and trusting bodily experiences and not distracting from sensations of discomfort could have resulted in creating the impact upon the mental capacity and mental unproductively in the yoga group compared to the control group (Vollbehr et al., 2021). However, core negative thinking in the perseverative thinking did not show significant improvement. This could've been probably attributed to the decreased intervention duration and the difficulty of the students to grasp the yogic concept (Rajesh et al., 2014) pertaining to RNT.

The sleep domains, the yoga intervention group shown significant improved as compared to the control condition. Our findings are in line with earlier research linking a yoga-based intervention to better sleep by having participants feel a reduction in sleep-interfering cognitive activities (eg, worry) (Winbush et al., 2007). Sleep quality has not showed an effect among the sleep domains, which could be due to the instrument's low sensitivity.

Despite the fact that great effort was put into designing a quality study and substantial results were discovered, there are certain limitations to this study that should be addressed. As a result of the fact that the tests were conducted through the use of a questionnaire that was subjectively in nature, the results of the study should be considered exploratory observations instead of

a substantiated viewpoint. Despite the fact that they were randomly assigned, the participants were aware of the intervention they were receiving. It is possible that this influenced the self-rating scales. Incorporating an active comparable group, such as physical activity or aerobics, would have allowed researchers to account for the impacts of the placebo and/or the exercise elements of the yoga practise. A randomised control experiment with a large random sample with both genders may produce stronger causal associations.

This is the first study that we are aware of that demonstrates the possible benefits of yoga-based interventions on the psycho-spiritual well-being of female homoeopathic medical students. Medical students appear to be particularly susceptible to psychosocial problems. There should be a concerted effort to educate medical students about psychological vulnerabilities as well as practical techniques for maintaining one's own well-being. Yoga is a low-cost, low-risk approach that could be incorporated into medical school in the beginning.

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