

Effect of Pranayama and Meditation on Emotional Intelligence among Undergraduate Students: A Randomized Controlled Study

Research Article

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Abstract

Introduction: Emotional intelligence (EI) manages emotional disturbances, thereby making a substantive contribution to cognitive aptitude and mental health amelioration among university students. Mindfulness yoga enhances the positive connectivity between mind and emotion, thereby enhancing mental and emotional well-being. The objective of present study is to determine the effectiveness of *pranayama* and mindfulness (*vipassana*) meditation on EI among undergraduate (UG) students. **Methods:** One hundred fifty university students (aged 18-23 years) were employed for this randomised control trial. The students were randomly allocated into two groups: experimental (n=75) and control (n=75). The experimental group practiced daily 60 min intervention of *pranayama* and mindfulness (*vipassana*) meditation for 10 weeks. The control group carried out their daily routine activity. Data were analysed through SPSS 24.0, and the repeated measures ANOVA test followed by Bonferroni adjusted *post hoc* analyses were applied. The participants were assessed for emotional intelligence, anxiety, depression, and stress using standard measures. **Results:** The findings of the study showed that *pranayama* and mindfulness (*vipassana*) meditation practices enhance the level of EI ($p<0.001$) and manage mental health by decreasing the level of anxiety ($p<0.001$), depression ($p<0.001$) and stress ($p<0.001$) in UG students. These effects were observed within and between groups comparison following the 10 weeks intervention period. **Discussion:** The study findings emphasise the potential of *pranayama* and mindfulness (*vipassana*) meditation practices in positive effects on emotional coping behaviour and mental well-being in students. **Conclusion:** The study suggests that *pranayama* and mindfulness (*vipassana*) meditation can be useful to enhance EI and reduce anxiety, depression, and stress in UG students.

Keywords: *Pranayama*, Meditation, Emotional Intelligence, Anxiety, Depression, Stress.

Introduction

The phase of early adulthood is marked by highly fluctuating emotions(1). It is a period of growth, during which the emotional brain(2) and cognitive abilities undergo development(3). Psychological researches in psycho-emotional behavioural patterns have indicated that college students experience the most significant physical, mental and emotional changes as they transition from adolescence to adulthood(4,5). Conceptualization (6), distinctiveness (7) and predictive validity of emotional intelligence (EI) have been subjects of ongoing debate(8). Nevertheless, the EI construct encompasses a range of emotional abilities(9,10), including recognising emotional states within oneself and others(11), utilising emotions to guide thoughts and actions(12), comprehending how emotions impact behaviour(13) and regulating

emotions(14). These emotional abilities undoubtedly have a significant role in better social relationships and personal consequences, despite the contentious discussions surrounding the construct(15). If students enhance their EI, they can learn to understand their emotions(11), practice appropriate social behaviour(16) and use their intellectual abilities effectively(17). When students develop such emotional abilities, they can safeguard themselves from the destructive effects of emotional instability which drag them into feelings of frustration, anger, conflict and suicidal tendencies(18). Along with this EI also enables the students to effectively cope with the emotional state of other detrimental areas such as problematic use of smartphones(19), suffering from social media(20) and artificial intelligence-based gaming(21).

University students often find themselves vulnerable to mental health challenges(22), with higher instances of stress, anxiety and symptoms of depression compared to the broader population(23). Moreover, a prominent correlation exists between lower levels of EI and heightened stress levels among undergraduates(24). This underscores the crucial relationship between EI and the experience of stress, anxiety, and depression in this demographic(25). A significant proportion (37.8%) of suicides in India occur within the age group below 30

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years(26,27).Recently, survey research has revealed that most of the college-going students who attempt suicide are driven by uncertainties of personal relationships(28)- rumination(29)- life-threatening competition(30) and academic pressure(31). All these dimensions are an outcome of low-level EI. One of the major reasons for this critical situation is, that academic institutions are not encouraging or making responsible initiatives for students to guide them on how to deal with their emotional anguish(32).

Yoga practices enhance the positive connection between mind and body, aiding in the maintenance of mental and emotional health in individuals(33). Yogic techniques have shown a positive impact on emotional health-related quality of life by fostering spirituality(34), which can lead to improvements in emotional well-being and overall life satisfaction(35). Moreover, mindfulness yoga practices have been found to enhance the spirituality of healthy adults, fostering a deeper sense of connection and purpose in life(36). Additionally, *pranayama* and meditation have demonstrated their effectiveness in managing emotional health among students, helping them cope with stress, anxiety, depression and other emotional challenges commonly faced during the academic journey (37). Therefore, the objective of present study is to determine the effectiveness of *pranayama* and mindfulness (*vipassana*) meditation on EI among undergraduate students.

Methods

Subjects

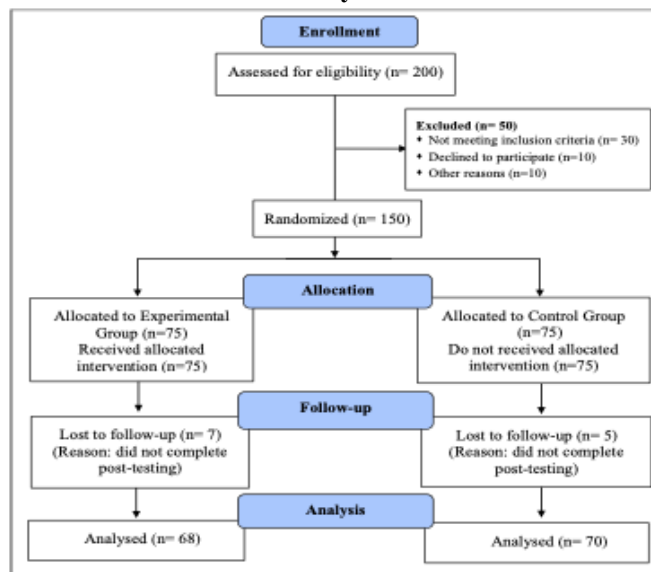
The present research was undertaken at H.N.B. Garhwal University in Uttarakhand, India. At the outset, an awareness camp was organised for UG students, wherein they were imparted knowledge about the potential therapeutic benefits of yoga with special emphasis on *pranayama* and mindfulness (*vipassana*) meditation. Furthermore, a brief introduction of the study was given to the participants, and they were informed that participation is entirely voluntary in nature. The information about the camp was spread through word of mouth, social media, and wall posters. A total of one hundred fifty willing participants of both genders (male: female=1:1) were finalised and allocated into experimental (n=75) and control groups (n=75) by using computer-generated random numbers. The sample size was not determined a priori. However, the *post hoc* power calculation was done using the ‘G’ power program(38,39). With a sample size of 75 in the experimental group, level of significance (α) = 0.05, Cohen’s $d = 1.96$ (determined from the changes in overall emotional intelligence following *pranayama* and mindfulness (*vipassana*) meditation practices), the present study had power = 1.00. During the study, 12 students dropped out for various reasons, resulting in a final sample of 138 for the analysis (experimental group: n=68; control group: n=70) who completed the entire study. Figure 1 shows the trial profile of the participants for study enrolment. The study was approved by the Board of Studies (BoS) committee and

signed informed consent was obtained from each participant.

Inclusion and Exclusion

The inclusion criteria were: (i) UG students aged between 18 to 23 years, (ii) no previous yoga experiences, (iii) both genders male and female. The Exclusion criteria were: (i) not interested to participate in the study, (ii) having on any kind of medication, (iii) with major physical or psychological issues, (iv) any severe nervous system-related disorder.

Figure 1: Flow diagram of randomised controlled trial for study enrolment



Design and procedure

This study employed a randomised controlled trial with a pre-post follow-up design. The enrolled participants were evenly distributed into two groups using a simple randomisation technique. Each participant was assigned a serial number ranging from 1 to 150, irrespective of their enrolment order. After this, 150 random numbers were created using an online randomiser. These 150 random numbers were written next to the serial numbers. Hence a random number was assigned to each participant. The random numbers were then written on identical slips of paper and folded the same way. A person with no other part in the trial, placed the slips of paper alternately in two boxes, one labelled ‘Y’ and the other ‘Z’. Persons in the ‘Y’ group were allocated to experimental group whereas persons in the ‘Z’ group were allocated to the control group. The experimental group engaged in daily *pranayama* and mindfulness (*vipassana*) meditation sessions each lasting 60 min, six days a week, for a total duration of 10-weeks. In contrast, the control group maintained their regular routines without any yoga intervention. Data assessments occurred at three stages: before the intervention (pre-data), immediately after the 10-weeks intervention period (post-data), and a follow-up assessment was conducted 60-days after post-data collection. It is worth noting that both groups continued their routine academic activities throughout the study.

Measure

In this study, the primary outcome measure was Emotional Intelligence assessed by “Emotional Intelligence Scale (EIS),” a psychometric tool developed by Subhash Sarkar and Samarth Sarkar in 2018(40). This self-report questionnaire is designed to evaluate individuals’ EI and demonstrates strong reliability, with coefficients of 0.80 for males and 0.83 for females, calculated using the Split-half (odd-even) method at a 0.01 significance level(41). The scale is tailored for individuals aged 17 to 25 and consists of 40 items utilizing a 5-point Likert scale. It assesses EI across five dimensions: self-awareness, self-regulation, motivation, empathy, and social skills. Scoring involves assigning ‘5 to 1’ for positive items and reverse scoring ‘1 to 5’ for negative items, resulting in a score ranging from 40 to 200.

The secondary outcome measures were anxiety, depression and stress assessed by “Anxiety, Depression and Stress Scale (ADSS)” a psychological assessment tool developed by Pallavi Bhatnagar, et al. 2011(42). The scale comprises 48 items, categorized into three distinct subscales: Anxiety (19 items), Depression (15 items), and Stress (14 items). Respondents score each item as ‘1’ for “Yes” and ‘0’ for “No.” The anxiety scale exhibited a reliability of 0.66 (Cronbach's alpha) and 0.79 (Spearman-Brown coefficient). The depression scale demonstrated a reliability of 0.68 (Cronbach's alpha) and 0.81 (Spearman-Brown coefficient). The stress scale had a reliability of 0.56 (Cronbach's alpha) and 0.71 (Spearman-Brown coefficient)(43). The investigator also collected baseline demographic data, including the information regarding age (computed from date of birth), body mass index (calculated from weight and height), blood pressure, and pulse rate (measured using a digital blood pressure monitor).

Intervention

The yogic intervention was administered under the supervision of a certified yoga instructor, and practiced daily for 60 min over a duration of 10 weeks. The regimen commenced with a 2-min prayer, followed by 30 min of *Pranayama* and 25 min of mindfulness (*vipassana*) meditation. The session ended with a 3-min closing prayer.

Pranayama (Breathing practices)

Pranayama is a yogic practice that involves controlled breathing techniques(44). The techniques of *pranayama* enhance the neurological functioning of the brain by improving the level of oxygen in the body(45). This proper origination enables the mind and body to function in an effective and harmonize way, which indeed brings equilibrium to the emotional states of the practitioner(46). The intervention was comprised of three main *pranayama* techniques, i.e., (i) *Nadishodhan*, (ii) *Bhastrika* and (iii) *Bhramari Pranayama*.

- ***Nadishodhan Pranayama*** (Alternate nostril breathing): Participants were instructed to sit in any comfortable meditative posture and then to make a nosetip position (*Nasagra mudra*) with their right hand. They were then guided to deeply inhale

through the left nostril (*puraka*) and hold their breath (*kumbhaka*) while engaging the chin lock (*Jalandhara Bandha*) for a proportional duration. Following this, participants exhaled (*rechaka*) slowly through the right nostril at the end of the breath retention and inhaled deeply through the same nostril. This procedure was repeated for 8 min, followed by 2 min of relaxation. Participants followed different ratios for this practice over a period of 60 days: 1:1:1 for the first 20 days, 1:2:2 for the next 20 days, and 1:4:2 for the last 20 days(47).

- ***Bhastrika Pranayama*** (Bellows breathing): The participants were directed to assume any comfortable seated *Asana* (posture) with closed eyes and a straight spine. They were then guided to perform *Bhastrika Pranayama*, involving rapid inhalation (*puraka*) and a forceful exhalation (*rechaka*) through both nostrils by maintaining a ratio of 1:1, while focusing on thoracic (chest) breathing(48). After completing 20 cycles of rapid inhale-exhale, participants were instructed to inhale deeply through the right nostril, hold the breath (*kumbhaka*), and then exhale through the left nostril in same manner(49). This *pranayama* practice continued for 8 min followed by 2 min of relaxation.

- ***Bhramari Pranayama*** (humming bee breath) Participants were instructed to assume a comfortable meditative posture and close their ears with both thumbs, while gently placing all fingers on their closed eyes. They were then directed to inhale (*puraka*) through both nostrils and while exhaling (*rechaka*), produce the humming bee sound(50). All subjects were asked to continuously practice for approximately 8 min, followed by a 2-min relaxation.

Mindfulness (*Vipassana*) Meditation

Vipassana is a widely practiced form of mindfulness meditation originating from the Buddhist *Theravada* tradition(51). It centers on the objective observation of physical sensations within the body and incorporates the focus on the natural breath to enhance concentration(52). The results indicate that extended practice of mindfulness (*vipassana*) meditation leads to heightened occipital gamma power, which is associated with long-term expertise in meditation and an improved level of sensory awareness(53). Participants who took part in the intervention were provided with all-inclusive information about mindfulness (*vipassana*) meditation. Participants were given instructions to follow various steps of meditation during the initial days: (i) sit in any comfortable meditative posture with eyes closed, (ii) focus on natural breath and what is being felt (*Anapana Sati*), (iii) maintain mindfulness during each breath, observing thoughts, feelings, and sensations without reacting or judging, (iv) move the attention from the head to feet systematically and then back again, observing sensations in each body part along the way, (v) observe the sensations in every part of the body, including warmth, coolness, pain, itching, touch, vibrations, and others.

Statistical Analysis

Data were analysed using the Statistical Package for Social Science (SPSS) Version 24.0. For each variable repeated measures analysis of variance (RM-ANOVA) were calculated. Each ANOVA had one within-subject factor with three levels (pre, post and follow-up states) and one between-subject factor with two levels: experiment group and control group. An interaction effect of groups×states was determined for each variable. The interaction effects between groups& states suggested the interdependence of the two. The level of significance was taken at 0.05. The Bonferroni adjusted *post hoc* analysis was carried out for the variables which showed a significant main effect of groups, states, or interaction of groups & states.

Results

Table 1 shows the demographic and baseline characteristics of the study participants. There were no statistically significant differences between groups at demographic baseline in age, gender (male/female), area (rural/urban), type of family (joint/single), blood pressure (systolic/diastolic), pulse rate, body mass index, emotional intelligence, anxiety, depression, and stress.

Table 1: Mean, standard deviation (SD), percentage (%), number (n) and p-value for demographic and baseline characteristics of both groups

Variables	Experimental Group (n=68)	Control Group (n=70)	p-value
Age, year, mean±SD	19.51 ± 1.15	19.86 ± 1.39	0.117
Male (sex), n (%)	28 (41.17)	40 (57.14)	0.016
Female (sex), n (%)	40 (58.82)	30 (42.85)	
Rural area, n(%)	33 (48.52)	39 (55.71)	0.402
Urban area, n(%)	35 (51.47)	31 (44.28)	
Joint family, n(%)	28 (41.17)	31 (44.28)	0.714
Single family, n(%)	40 (58.82)	39 (55.71)	
Systolic blood pressure (mmHg), mean±SD	121.4 ± 10.8	122.24 ± 12.1	0.775
Diastolic blood pressure (mmHg), mean±SD	74.87 ± 10.35	70.41 ± 7.71	0.005*
Pulse rate (BPM), mean±SD	81.69 ± 14.36	79.19 ± 10.93	0.250
Body mass index (kg/m ²), mean±SD	21.26 ± 3.77	20.57 ± 3.08	0.239
Emotional intelligence total score, mean±SD	128.47 ± 11.25	129.87 ± 13.6	0.511
Anxiety, mean±SD	6.01 ± 3.94	5.89 ± 2.9	0.827
Depression, mean±SD	4.66 ± 3.04	4.71 ± 2.41	0.910
Stress, mean±SD	7.35 ± 3.64	7.21 ± 2.08	0.783

Repeated Measures Analysis of Variance (RM-ANOVA)

There was a statistically significant main effect of groups, states and groups×states for all the variables: (i) self-awareness, (ii) self-regulation, (iii) motivation, (iv) empathy, (v) social skill, (vi) overall scores of the emotional intelligence (p<0.001, in all cases), (vii) anxiety (p= 0.008), (viii) depression (p<0.001) and (ix) stress (p<0.001). The F, degree of freedom, Huynh-Feldt epsilon and p-value for groups, states, and groups×states for different variables are provided in Table 2.

Table 2: The details of ANOVA result for the variables

Variables	Factors	F	Degree of freedom	Huynh-Feldt ε	p-value
Self-Awareness	Group	68.111	1,136	0.974	<0.001
	States	14.779	1,947,264.819	0.974	<0.001
	Group × States	26.716	1,136 × 1,947,264.819	0.974	<0.001
Self-Regulation	Group	19.657	1,136	0.927	<0.001
	States	72.626	1,854,252.209	0.927	<0.001
	Group × States	67.989	1,136 × 1,854,252.209	0.927	<0.001
Motivation	Group	80.41	1,136	0.91	<0.001
	States	27.206	1,820,247.471	0.91	<0.001
	Group × States	41.721	1,136 × 1,820,247.471	0.91	<0.001
Empathy	Group	121.241	1,136	0.921	<0.001
	States	27.695	1,842,250.524	0.921	<0.001
	Group × States	20.646	1,136 × 1,842,250.524	0.921	<0.001
Social Skill	Group	26.681	1,136	0.945	<0.001
	States	47.22	1,891,257.159	0.945	<0.001
	Group × States	22.68	1,136 × 1,891,257.159	0.945	<0.001
Overall Emotional Intelligence	Group	122.01	1,136	0.866	<0.001
	States	71.806	1,731,235.453	0.866	<0.001
	Group × States	72.574	1,136 × 1,731,235.453	0.866	<0.001
Anxiety	Group	7.22	1,136	0.931	0.008
	States	27.59	1,862,253.183	0.931	<0.001
	Group × States	21.026	1,136 × 1,862,253.183	0.931	<0.001
Depression	Group	14.08	1,136	1.000	<0.001
	States	36.021	1,999,271.923	1.000	<0.001
	Group × States	28.577	1,136 × 1,999,271.923	1.000	<0.001
Stress	Group	13.056	1,136	0.955	<0.001
	States	44.713	1,909,259.690	0.955	<0.001
	Group × States	38.986	1,136 × 1,909,259.690	0.955	<0.001

Post hoc analysis

Table 3 shows *post-hoc* findings and mean \pm standard deviation (SD) values of both groups for all the variables.

(I) Between Group Comparison

The experimental group showed a significantly higher (i) self-awareness at post state [$p < 0.001$, with 95% CI (Confidence Interval) of (7.154, 4.455)] and follow-up state [$p < 0.001$, with 95% CI of (5.518, 3.204)], (ii) self-regulation at post state [$p < 0.001$, with 95% CI of (7.577, 4.684)] and follow-up state [$p < 0.001$, with 95% CI of (4.899, 2.285)], (iii) motivation at post state [$p < 0.001$, with 95% CI of (10.056, 6.232)] and follow-up state [$p < 0.001$, with 95% CI of (7.019, 4.637)], (iv) empathy at post state [$p < 0.001$, with 95% CI of (9.028, 5.762)] and follow-up state [$p < 0.001$, with 95% CI of (6.965, 4.916)], (v) social skill at post state [$p < 0.001$, with 95% CI of (6.027, 3.042)] and follow-up state [$p < 0.001$, with 95% CI of (3.999, 1.896)], (vi) overall emotional intelligence score at post state [$p < 0.001$, with 95% CI of (37.645, 26.373)] and follow-up state ($p < 0.001$, with 95% CI of [26.258, 19.081]) as compared to the respective states of the control group.

The experimental group also showed a significantly lower (i) anxiety at post state [$p < 0.001$, with 95% CI of (-1.471, -3.194)] and follow-up state [$p < 0.01$, with 95% CI of (-0.496, -2.339)], (ii) depression at post state [$p < 0.001$, with 95% CI of (-1.875, -3.388)] and follow-up state [$p < 0.001$, with 95% CI of (-0.860, -2.802)], (iii) stress at post state [$p < 0.001$, with 95% CI of (-2.316, -4.149)] and follow-up state [$p < 0.01$, with 95% CI of (-0.645, -2.616)] as compared to the respective states of the control group.

(II) Within Group Comparison:

The experimental group showed a significant increase in (i) self-awareness at post state [$p < 0.001$, with 95% CI of (-3.325, -6.264)] and follow-up state [$p < 0.001$, with 95% CI of (-2.011, -4.548)], (ii) self-regulation at post state [$p < 0.001$, with 95% CI of (-7.327, -10.409)] and follow-up state [$p < 0.001$, with 95% CI of (-5.645, -8.384)], (iii) motivation at post state [$p < 0.001$, with 95% CI of (-5.821, -9.532)] and follow-up state [$p < 0.001$, with 95% CI of (-3.262, -5.973)], (iv) empathy at post state [$p < 0.001$, with 95% CI of (-4.177, -7.617)] and follow-up state [$p < 0.001$, with 95% CI of (-2.677, -5.294)], (v) social skill at post state [$p < 0.001$, with 95% CI of (-4.587, -7.619)] and follow-up state [$p < 0.001$, with 95% CI of (-3.880, -6.238)], (vi) overall emotional intelligence scores at post state [$p < 0.001$, with 95% CI of (-27.483, -39.193)] and follow-up state [$p < 0.001$, with 95% CI of (-19.827, -28.085)] as compared to the pre state.

The experimental group also showed a significant decrease in (i) anxiety at post state ($p < 0.001$, with 95% CI of [3.400, 1.894]) and follow-up state ($p < 0.001$, with 95% CI of [2.262, 0.974]), (ii) depression at post state ($p < 0.001$, with 95% CI of [3.374, 2.155]) and follow-up state ($p < 0.001$, with 95% CI of [2.387, 1.113]), (iii) stress score at post state ($p < 0.001$, with 95% CI of

[4.224, 2.747]) and follow-up state ($p < 0.001$, with 95% CI of [2.548, 1.275]) as compared to the pre state.

Table 3: The mean and standard deviation (SD) values for emotional intelligence, anxiety, depression, and stress score

Variables	Experimental Group (n=68)			Control Group (n=70)		
	Pre	Post	Follow-up	Pre	Post	Follow-up
Self-Awareness	26.37 \pm 3.27	31.16 \pm 3.93***	29.65 \pm 4.1***	26 \pm 3.46	25.36 \pm 4.09###	25.29 \pm 2.64###
Self-Regulation	21.21 \pm 3.87	30.07 \pm 4.16***	28.22 \pm 4.82***	24.03 \pm 4.1###	23.94 \pm 4.42###	24.63 \pm 2.67###
Motivation	27.87 \pm 3.68	35.54 \pm 6.08***	32.49 \pm 4.42***	28.1 \pm 3.58	27.4 \pm 5.26###	26.66 \pm 2.38###
Empathy	28.93 \pm 3.61	34.82 \pm 3.54***	32.91 \pm 3.42***	26.93 \pm 4.25##	27.43 \pm 5.84###	26.97 \pm 2.63###
Social Skill	24.1 \pm 3.52	30.21 \pm 3.91***	29.16 \pm 3.45***	24.81 \pm 3.52	25.67 \pm 4.89###	26.21 \pm 2.77###
Overall Emotional Intelligence	128.47 \pm 11.25	161.81 \pm 13.34***	152.43 \pm 13.13***	129.87 \pm 13.6	129.8 \pm 19.48##	129.76 \pm 7.52###
Anxiety	6.01 \pm 3.94	3.37 \pm 2.73***	4.4 \pm 3.18***	5.89 \pm 2.9	5.7 \pm 2.39###	5.81 \pm 2.23##
Depression	4.66 \pm 3.04	1.9 \pm 2.3***	2.91 \pm 3.43***	4.71 \pm 2.41	4.53 \pm 2.19###	4.74 \pm 2.22###
Stress	7.35 \pm 3.64	3.87 \pm 3.27***	5.44 \pm 3.68***	7.21 \pm 2.08	7.1 \pm 2.06###	7.07 \pm 1.94##

(*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$) Based on Bonferroni adjusted *post hoc* analysis when Post and Follow-up states were compared with respective Pre-value.

(### $p < 0.001$, ## $p < 0.01$, # $p < 0.05$) Based on Bonferroni adjusted *post hoc* analysis when Pre, Post and Follow-up states of the experimental group were compared with the respective states of the control group.

Discussion

In this research study, outcomes showed that the baseline and demographic data for all variables in both groups did not demonstrate significant differences ($p > 0.05$). Therefore, both groups can be considered homogeneous for this study. The results indicate that, for between and within group comparison, mindfulness yoga techniques i.e., *pranayama* and mindfulness (*vipassana*) meditation have a significant influence on emotional intelligence ($p < 0.001$), anxiety ($p < 0.001$), depression ($p < 0.001$) and stress ($p < 0.001$) among undergraduate students after a period of 10-weeks. The effect of *pranayama* and mindfulness (*vipassana*) meditation on the mean difference in emotional intelligence has been found to be highly significant. Thus, it can be concluded that the students who are practicing *pranayama* and mindfulness (*vipassana*) meditation can regulate their emotions more effectively. Similar tendencies have also been seen in earlier parallel studies, emotional and behavioural coping abilities have improved after approximately 30 days of mindfulness yoga practices(34,54). College students have also shown improvement in mental well-being and

emotional development after the practices of *pranayama* and meditation(55,56).*Pranayama* training has been demonstrated in studies to both stimulate and relax the autonomic nervous system (ANS)(57). The higher airflow through the right nostril was associated with stimulation of the sympathetic nervous system (SNS), whereas higher airflow through the left nostril was associated with stimulation of the parasympathetic nervous system (PNS)(58).The regulation of ANS by *pranayama* may have an impact on students' capacity to manage stress and maintain emotional stability.

Yoga breathing was originally developed to get prepared for meditation and more intricate spiritual practices, focusing on the management of one's mental and emotional state. According to the traditional yoga teachings, if breath continues to flow in and out of the body, the mind remains in a state of instability. However, when the breath is brought to a standstill, it exerts control over the mind, rendering it motionless. This achievement is what a yogi attains, a state of complete stillness of thoughts(*Hatha Pradipika Chapter II, Verse 2*),as described by ancient sages based on their own experiences.Mental activities and emotions are closely linked to the nervous system and can influence our breathing. Therefore, when we voluntarily manipulate our breathing, we are directly interacting with the life force that is intricately connected to the mind (nervous activity) and emotions(58).The primary objective of *pranayama* and mindfulness (*vipassana*) meditation is to gain control over the mind and emotions. In a state of mental stillness, there is no room for thought processes or emotional disturbances. Consequently, by mastering the mind, we gain mastery over various emotions, leading to control over temperament, moods, desires, and natural instincts of the mind, all achieved automatically. Yoga breathing is practiced nowadays for its health advantages. Even while these breathing techniques may not be hazardous to healthy people, being aware of their psychological impacts can help people of all ages and health backgrounds engage in productive and safe breathing exercises. According to this study, *pranayama* and mindfulness (*vipassana*) meditation boost mental activity while altering the breath and mental state, which can aid in the enhancement of EI(59). As a result, our analysis revealed that the undergraduate students who practiced *pranayama* and mindfulness (*vipassana*) meditation had higher emotional intelligence and lower levels of anxiety, depression, and stress.

Limitations and Suggestions

The current study asserts entitlements of emotional development and improved mental health in undergraduate students solely based on the measurement of psychological levels. Considering this, the study recommends that future research endeavors exploring the effects of *pranayama*, and mindfulness (*vipassana*) meditation on EI and mental health should consider the inclusion of physiological tools. This approach would allow for a more comprehensive assessment and potentially yield more robust results.

Conclusion

This study proposes that students who engage in mindfulness yoga practices may exhibit greater behavioural stability and healthier relationships within our society and academic environment. In conclusion, *pranayama*, and mindfulness (*vipassana*) meditation practices embrace the potential for promoting holistic emotional well-being and mental health among UG students. This study has revised the relationship between mindfulness yoga techniques and EI as well as the mental challenges that it comprises.

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