The International Journal of
INDIAN PSYCHOLOGY

Research Paper

Effectiveness of Mindfulness Meditation in Controlling Examination Anxiety of Secondary School Students

Jithesh T. V.[1], Renjith Kumar P.[2], Arjunan N. K.[3]*

ABSTRACT

This quasi-experimental study aims to find out the effectiveness of mindfulness meditation on controlling examination anxiety in secondary school students of Kerala. Pretest-posttest control group design was employed wherein four intact divisions of ninth grade students were taken randomly as one control group (n = 39) and three experimental groups (n = 116). Pre-testing and post-testing of examination anxiety was done by using the Examination Anxiety Scale for Secondary School Students developed by the investigators. The treatment groups were exposed to eight 90 minutes sessions of Brief Mindfulness-Based Stress Reduction Programme. One-way ANCOVA was performed to compare the control group and experimental group with respect to their post-test scores of examination anxiety after partialling out the effect of pre-test scores. The analysis revealed that mindfulness meditation is effective in reducing examination anxiety of secondary school students significantly. While the mindfulness treatment was equally effective for both the gender groups, significant difference was found to exists among students in different levels of academic achievement regarding the success of mindfulness meditation in alleviating examination anxiety.

Examination anxiety is a disagreeable emotional condition characterized by subjective feelings of tension, excessive worry, and nervousness before or during an evaluative situation. Examination anxiety is a common experience among students of all ages. Its prevalence varies very much depending on the academic level of the learner, characteristics of the course of study and nature of the examination (Sharma, Singh, Saket, Kushwaha & Gahlot, 2023; Bordoloi, 2023; Patil & Aithala, 2017). Research suggests that between 20% to 40% of students experience significant test anxiety at some point in their academic careers (Pachaiappan, Tee, & Low, 2023; Rehman, Saeed, Shahzad, Janjua, Ajmal & Afshan, 2019). Putwain and Daly (2014) found that approximately 16-20% of students experience high levels of test anxiety, while another 18-20% experience moderate levels. The severity of examination anxiety can range from mild to severe (Memon, Omair, Barradah, Almegren, Almuqbil, Batarfi, Masuadi & Feroz, 2023). Zahra, Sajid, Alvi and

---

[1]Research Scholar, Faculty of Social Science & Humanities, Mansarovar Global University, Sehore
[2]Research Supervisor, Dept. of Psychology, Mansarovar Global University, Sehore
[3]Co-supervisior, Adi Sankara Training College, Kalady, Kerala
*Corresponding Author

Effectiveness of Mindfulness Meditation in Controlling Examination Anxiety of Secondary School Students

Muazzam (2022) reported that 17% students have low examination anxiety, 32% normal examination anxiety, 12% high normal examination anxiety, 28% moderately high, 10% have high examination anxiety, whereas 1% have extremely high examination anxiety. Examination anxiety tends to peak during key educational transitions, such as moving from elementary to middle school, middle to high school, and high school to college (Sotardi & Brogt, 2018; Grills, Norton & Ollendick, 2010). Students also report high levels of test anxiety, particularly in high-stakes testing situations. In countries with high-stakes examination systems, such as those with rigorous college entrance exams, the prevalence of test anxiety can be particularly high (Jerrim, 2023; Segool, Carlson, Goforth, von der Embse & Barterian, 2013).

Examination anxiety is prevalent issues that not only lead to subpar academic performance but also contribute to psychological distress among students globally (Chakraborty, 2023; Aziz & Serafi, 2017). Examination anxiety has numerous detrimental effects, including but not limited to: decreased academic achievement (Gilavand, Moezzi & Gilavand, 2019), impaired working memory (Yang, Sun, Potts, Yu, Luo & Shanks, 2020), jumbled reasoning (Balwan & Kour, 2022), heightened likelihood of making errors (Spadafora, Murphy, Molnar & Zinga, 2020), diminished psychological well-being (Yatkin, Aral, Gunes & Tosun, 2023), and increased rates of dropping out, substance abuse, and suicide (Brenneisen, 2016). The presence of academic stress and examination anxiety is a significant source of worry for parents, teachers, administrators, school counsellors, and psychologists. In order to improve the academic achievement and mental health of teenagers in our schools, it is important to deal examination anxiety through appropriate psychological intervention which teachers can used in the classroom. While there are several evidence-based psychotherapeutic interventions that can help reduce examination anxiety, many of them are complex and time-consuming for instructors to use regularly in a classroom setting. Studies have shown that mindfulness-based therapies effectively decrease anxiety in various settings and among different groups of people (Morais, Pinheiro, Fonseca & Quintao, 2022; Bamber & Schneider, 2016). Contrary to this, researchers like few reviews found no valid evidence for the potential of mindfulness meditation in reducing anxiety (Ruiz-Iiguez, Santed-German, Burgos Julian, Diaz-Silveira and Carralero-Montero, 2019; Toneatto & Nguyen (2007). This situation necessitates further research evidence to substantiate the potential of mindfulness meditation to alleviate examination anxiety. In order to find a concise and straightforward psycho-pedagogic intervention that is easily implemented by teachers in a classroom setting, the researchers decided to investigate the efficacy of mindfulness meditation in alleviating examination anxiety among secondary school students.

Objective
1. To find out the effectiveness of mindfulness meditation in controlling examination anxiety of secondary school students.
2. To find out the differential influence of gender on effectiveness of mindfulness meditation in controlling examination anxiety.
3. To find out the differential influence of level of achievement on the effectiveness of mindfulness meditation in controlling examination anxiety.

Hypotheses
1. Mindfulness meditation is effective in controlling examination anxiety of secondary school students.

2. Gender has no significant differential influence on the effectiveness of mindfulness meditation in controlling examination anxiety of secondary school students.
3. Achievement level has no significant differential influence on the effectiveness of mindfulness meditation in controlling examination anxiety of secondary school students.

Methodology

Method: Quasi-experimental method was adopted for the study. Neither randomization of the subjects nor equating groups on the basis of examination anxiety or any other related variable was not possible prior to experimentation as intact class divisions were used for the study.

Research design: Pretest post-test control group design was employed for the present study.

Population: Adolescents in the age range 14-16 years, studying in Standard VIII, IX and X in secondary schools affiliated to Kerala Board of Public Examination, Govt. of Kerala (India), constitute the population of the study.

Participants: Four divisions of Standard IX students of a Government Higher Secondary School (N = 155) were selected for the study. The four divisions were randomly designated as one control division (n = 39; boys = 17, girls = 22) and three experimental divisions (n = 116; boys = 54; girls = 62). Comparatively bigger experimental group was maintained for getting adequate number of participants in the high, average and low achievement groups for studying the differential influence of achievement levels on the effectiveness of mindfulness meditation in controlling examination anxiety.

Instrumentation: The pre-intervention and post-intervention measure of examination anxiety was made with the help of the Examination Anxiety Scale for Secondary School Students (EXAS) developed by the investigators for the study. The EXAS is a 50 item Likert-type scale which covers Physical, Mental, Emotional and Beahvioural dimensions of the construct of examination anxiety. EXAS was found to have a concurrent validity of 0.76 and test-retest reliability of 0.83.

Data collected: The study utilized primary data on examination anxiety, collected by administering EXAS, and secondary data on academic achievement, the percentage equivalent of CGPA obtained in the last term-end examination was taken as measure of academic achievement. The participants were categorized into high, average and low levels of achievement based on the arithmetic mean (M) and standard deviation (σ) estimated by applying the M+σ principle.

Psychological intervention: The study utilised a modified version of the Mindfulness-Based Stress Reduction (MBSR) programme created by Kabat-Zinn (2003) to provide mindfulness meditation to participants. The modified version of MBSR named as the Brief Mindfulness-Based Stress Reduction Programme (BMBSRP) (Suresh & Pushkala, 2013), was implemented as a psycho-pedagogic intervention to induce behavioural changes aimed at managing examination anxiety and reducing academic stress. The BMBSRP included of eight 1½ hour sessions including various modalities including body scan meditation, sitting meditation, hatha yoga, walking meditation, and loving-kindness meditation. Participants were directed to engage in 20 - 25 minutes of structured meditation per day, for a total of 6

days per week. In addition to the informal practice of being attentive in everyday tasks, this formal mindfulness exercise was also undertaken.

Statistical techniques: The pre-test scores, post-test scores and gain scores (score obtained by subtracting post-test scores from pre-test scores) were subjected to descriptive statistical analysis. One-way ANCOVA was used to find out the effectiveness of mindfulness meditation by comping the post-test scores of the control group and the experimental group after partialling out the effect of corresponding pre-test scores. Independent sample t-test and one way ANOVA was used to find out the differential influence of gender and levels of achievement on the effectiveness of mindfulness meditation in controlling examination anxiety.

Analysis and Interpretation
The important descriptive statistical indices such as Mean (M), Median (Mdn), Standard deviation (σ), skewness (Sk), Kurtosis (Ku) and Standard error of mean (SE_M) estimated from the pre-test scores, post-test scores, and gain scores of examination anxiety for Control Group (CG) and Experimental Group (EG) are given in Table 1.

Table 1: Statistical indices pertaining to pre-test, post-test and gain scores of examination anxiety of control group and experimental group

Testing	Groups	N	Range	M	Mdn	σ	Sk	Ku	SE_M
Pre-test	CG	39	95	151.31	154.0	24.96	-0.156	-0.556	3.99
	EG	116	100	154.38	152.5	27.43	0.043	-1.177	2.55
Post-test	CG	39	98	150.95	154.0	24.94	-0.142	-0.627	3.99
	EG	116	93	147.81	146.0	26.61	0.035	-1.207	2.47
Gain Score	CG	39	8	-0.36	0.0	2.69	0.165	-1.589	0.43
	EG	116	11	-6.57	-7.0	2.46	0.301	-0.550	0.23

The results of the descriptive statistical analysis shows that all the distributions are normal as the skewness estimated lie between -½ and +½. The mean values estimated for the gain scores of both control group and experimental group are negative, which shows a fall in examination anxiety after experimentation. The control group and experimental group were compared regarding the pre-test scores of examination anxiety to see whether the groups differ significantly prior to experimental treatment. The result of the independent sample t-test conducted in this regard is given in Table 2.

Table 2: Comparison of control group and experimental group with respect to the pre-test scores of test anxiety

Groups	Statistical Indices				t	Sig
	N	M	SD	SE_M		
Control	39	151.31	24.96	3.99	0.618	NS
Experimental	116	154.38	27.43	2.55		

The t-value estimated is not significant, disclosing that the control group and experimental group are alike in regard to their examination anxiety prior to experimentation (t = 0.618; p>.05). The success of mindfulness meditation in reducing examination anxiety was find out by subjecting the post-test scores to analysis of covariance, after partialling out the effect of pre-test scores. The result of the one-way ANCOVA performed in this regard is given in Table 3.

Table 3: Result of the ANCOVA of the post-test scores of examination anxiety of control group and experimental group

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	135133.891a	2	67566.945	1.034E4	.000	.991
Intercept	2.203	1	2.203	.337	.562	.002
Pre-test	132043.822	1	132043.822	2.021E4	.000	.991
Group	1475.154	1	1475.154	225.829	.000	.558
Error	1169.258	179	6.532			
Total	4159917.000	182				
Corrected Total	136303.148	181				

a. R Squared = .991 (Adjusted R Squared = .991)

The F-ratio estimated is significant at 99.9% confidence interval showing that the experimental intervention has resulted in significant difference between control group and experimental group regarding the post-test scores of examination anxiety after controlling for the effect of respective pre-test scores (F = 225.829; p<.001). Inspection of the post-test mean scores estimated for the groups (vide Table 1) exposes that mindfulness meditation has caused significant reduction in the examination anxiety students in the treatment group.

The differential effect of gender on the effectiveness of mindfulness meditation in controlling examination anxiety was find out by comparing boys and girls in the experimental group regarding the gain scores. The result of the t-test done in this context is given in Table 4.

Table 4: Comparison of boys and girls in the experimental group regarding the gain scores of examination anxiety

Groups	Statistical Indices				t	Sig
	N	M	SD	SE$_M$		
Boys	54	-6.30	2.604	0.354	1.117	NS
Girls	62	-6.81	2.318	0.294		

The t-value calculated is not significant (t = 1.117; p>.05), revealing that boys and girls do not differ significantly in regard to the gain score of examination anxiety. In another words,

BMBSRP was equally effective for both the gender groups in controlling examination anxiety.

The differential effect of level of academic achievement on the success of mindfulness meditation in controlling examination anxiety was examined by comparing high, average and low achieving students regarding their gain scores of examination anxiety. The summary of the one-way ANOVA performed in this context is given in Table 5.

Table 5: Comparison of high, average and low achievers regarding the gain scores of examination anxiety (Summary of ANOVA)

AST	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	110.561	2	55.280		
Within Groups	583.887	113	5.167	10.698	.000
Total	694.448	115			

The F-ratio obtained is significant beyond 99.9% confidence interval (F = 10.698; p<.001) revealing that students in different achievement levels are benefitted differently when intervened with mindfulness meditation. Post-hoc test was subsequently administered to find out groups which demonstrated reduction in examination anxiety to a significant extent. The result of the Scheffe's post-hoc test is given in Table 6.

Table 6: Post hoc tests for comparison of examination anxiety of students in different achievement levels

(I) ACH	(J) Ach	(I-J) Mean Difference	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
LOW	Average	-1.995*	.537	.001	-3.33	-.66
	High	-3.000*	.679	.000	-4.68	-1.32
AVERAGE	Low	1.995*	.537	.001	.66	3.33
	High	-1.005	.565	.210	-2.41	.40
HIGH	Low	3.000*	.679	.000	1.32	4.68
	Average	1.005	.565	.210	-.40	2.41

* The mean difference is significant at the 0.05 level.

The result of post-hoc test brought out the following: (a) there is significant difference between low achievers and high achievers regarding the gain scores of examination anxiety (Mean difference = 1.995; p<.001), the psychological intervention was more successful with average achievers in reducing their examination anxiety; (b) high achievers differ significantly from low achievers regarding the efficacy of mindfulness meditation in alleviating examination anxiety (Mean difference = 3.000; p<.001), the BMBSRP is more effective with high achievers; and (c) average achievers and high achievers are almost alike as regards the effectiveness of mindfulness meditation in controlling examination anxiety (Mean difference = 1.005; p>.05).

CONCLUSION

The results of the analyses show that the Brief Mindfulness-Based Stress Reduction Programme is effective in controlling examination anxiety in secondary school students ($F = 225.829$; $p<.001$), (vide Table 3). The hypothesis-1 *(mindfulness meditation is effective in controlling examination anxiety of secondary school students)* is, therefore, accepted. There is no gender difference in the success of mindfulness meditation in controlling examination anxiety ($t = 0.618$; $p>.05$), (vide Table 4). Boys and girls are benefited from the BMBSRP intervention almost equally. The hypothesis-2 *(gender has no significant differential influence on the effectiveness of mindfulness meditation in controlling examination anxiety of secondary school students)* is, consequently, accepted. The high, average and low achieving students differ significantly regarding the effectiveness of BMBSRP in controlling examination anxiety ($F = 10.698$; $p<.001$), (vide Table 5). The intervention is more effective with average achievers compared to that in low achievers (Mean difference = 1.995; $p<.001$). Likewise, high achievers excelled low achievers in the success of mindfulness meditation in regulating examination anxiety (Mean difference = 3.000; $p<.001$). The hypothesis-3 (achievement level has no significant differential influence on the effectiveness of mindfulness meditation in controlling examination anxiety of secondary school students) is, subsequently, rejected.

REFERENCES

Aziz, N., & Serafi, A. (2017). Increasing levels of test anxiety and psychological distress with advancing years of medical education. *British Journal of Medical and Health Research, 4(3),* 40-52. https://bjmhr.com/download.php?filename=bjmhr_admin/uploads/publish_pdf/184__1490510250-403005.pdf&split=32&art_map_id=184

Balwan, W. K., & Kour, S. (2022). Test anxiety research: Twenty first century in retrospect. *Journal of Advances in Education and Philosophy, 6(5),* 306-310. https://doi.org/10.36348/jaep.2022. v06i05.008

Bamber, M. D., & Schneider, J. K. (2016). Mindfulness-based meditation to decrease stress and anxiety in college students: A narrative synthesis of the research. *Educational Research Review, 18,* 1-32. https://doi.org/10.1016/j.edurev.2015.12.004.

Bordoloi, D. (2023). Prevalence of examination anxiety among secondary school students in Nagaon, Assam. *Rivista Italiana di Filosofia Analitica Junior, 14(2),* 286-291. https://www.rifanalitica.it/index.php/journal/article/download/231/187

Brenneisen, M. F., Souza, S. I., Silveira, P. S. P., Itaqui L. M. H., de Souza, A., Campos, E. P., de Abreu, B. A., Hoffman I. I., Magalhães, C. R., Lima, M. C., Almeida, R., Spinardi, M., & Tempski, P. (2016). Factors associated to depression and anxiety in medical students: A multicenter study. BMC Medical Education, 16(1), 282. https://pubmed.ncbi.nlm.nih.gov/27784316/

Chakraborty, A. (2023). Exploring the root causes of examination anxiety: effective solutions and recommendations. *International Journal of Science and Research, 12,* 1096-1102. https://doi.org/10.21275/SR23220002911.

Gilavand, A., Moezzi, M., & Gilavand, S. (2019). Test anxiety in dental students: A study at the Ahvaz Jundishapur University of medical sciences, Iran. *Journal of Research in Medical and Dental Science, 7(1),* 108-113. https://www.jrmds.in/articles/test-anxiety-in-dental-students-a-study-at-the-ahvaz-jundishapur-university-of-medical-sciences-iran-5666.html#ai

Grills, A., Norton, P., & Ollendick, T. (2010). A longitudinal examination of factors predicting anxiety during the transition to middle school. Anxiety, Stress, and Coping, 23, 493-513. https://doi.org/10.1080/ 10615800903494127.

Jerrim, J. (2023). Test anxiety: Is it associated with performance in high-stakes examinations? *Oxford Review of Education*, *49*(3), 321–341. https://doi.org/10.1080/03054985.2022.2079616

Memon, I., Omair, A., Barradah, O., Almegren, N., Almuqbil, M., Batarfi, O., Masuadi, E., & Feroz, Z. (2023). Measurement of exam anxiety levels among medical students and their association with the influencing factors. *Cureus, 15,* https://doi.org/10.7759/cureus.41417.

Morais, P., Pinheiro, A., Fonseca, M., & Quintão, C. (2022). The mindfulness meditation effect on states of anxiety, depression, stress and quality of life. *15th International Joint Conference on Biomedical Engineering Systems and Technologies.* https://doi.org/10.13140/RG.2.2.29467.54568.

Pachaiappan, S., Tee, M. Y., & Low, W. Y. (2023). Test anxiety: Prevalence and factors associated with test anxiety among form four school students in Malaysia. *Journal of International and Comparative Education, 12(1),* 13-25. https://files.eric.ed.gov/fulltext/EJ1390745.pdf

Patil, S. G., & Aithala, M. R. (2017). Exam anxiety: Its prevalence and causative factors among Indian medical students. *National Journal of Physiology, Pharmacy and Pharmacology, 7(12),* 1323- 1328. https://www.njppp.com/fulltext/28-1494329368.pdf

Putwain, D., & Daly, A. L. (2014). Test anxiety prevalence and gender differences in a sample of English secondary school students. *Educational Studies, 40(5),* 554–570. https://doi.org/10.1080/03055698.2014.953914

Rehman, F., Saeed, I., Shahzad, H., Janjua, A. R., Ajmal, Z., & Afshan, S. (2019). Prevalence of examination anxiety among female medical students of private medical college in Lahore. *Pakistan Journal of Medical & Health Sciences, 13(2),* 287-289. https://pjmhsonline.com/2019/april_june/pdf/287.pdf

Ruiz-Iniguez, R., Santed-Germán, M., Burgos Julian, F., Diaz-Silveira, C., & Carralero-Montero, A. (2019). Effectiveness of mindfulness-based interventions on anxiety for children and adolescents: A systematic review and meta-analysis. Early Intervention in Psychiatry, 14, https://doi.org/ 10.1111/eip.12849.

Segool, N. K., Carlson, J. S., Goforth, A. N., von der Embse, N., & Barterian, J. A. (2013). Heightened test anxiety among young children: Elementary school students' anxious responses to high-stakes testing. *Psychology in the Schools, 50*(5), 489-499. https://doi.org/10.1002/pits.21689

Sharma, A., Singh, S. P., Saket, S., Kushwaha, P., & Gahlot, A. (2023). Exam anxiety and its associated risk factors among Indian medical undergraduates. *National Journal* of *Community Medicine,* 14(6), 348-356. https://doi.org/10.55489/njcm.140620232774

Sotardi, V., & Brogt, E. (2018). Understanding assessment anxiety during the transition to university. Willington: Aotearoa.

Spadafora, N., Murphy, E. L., Molnar, D. S., & Zinga, D. (2020). Test anxiety in first-generation students: An examination of the role of psychological needs. *Journal of Teaching and Learning, 14(2),* 33-49. https://doi.org/10.22329/jtl.v14i2.6202

Toneatto, T., & Nguyen, L. (2007). Does mindfulness meditation improve anxiety and mood symptoms? A review of the controlled research. *Canadian Journal of Psychiatry, 52(4),* 260-266. https://journals.sagepub.com/doi/pdf/10.1177/070674370705200409

Yang, C., Sun, B., Potts, R., Yu, R., Luo, L., & Shanks, D. (2020). Do working memory capacity and test anxiety modulate the beneficial effects of testing on new learning?

Journal of Experimental Psychology, 26(4), 724-738. https://doi.org/10.1037/xap00 00278.

Yatkin, E., Aral, N., Gunes, L., & Tosun, S. (2023). Mental well-being and test anxiety among students preparing for the university admission exam during the pandemic. Frontiers in Psychology, 14. https://doi.org/10.3389/fpsyg.2023.1184788.

Zahra, A., Sajid, M., Alvi, S., & Muazzam, P. (2022). Exam anxiety among university students. *Journal of Management Practices, Humanities and Social Sciences*, *6*(4), 19-29. https://doi.org/10.33152/jmphss-6.4.3

Conflict of Interest
The author(s) declared no conflict of interest.