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The Role of Digital Wellness Solutions in Reducing Academic Stress: Evidence from College Students

Dr.P. Saritha kumara[1], Raisa.E. Salim[2]

[1]Head & Assistant professor, PG Department of commerce,
Sree Devi kumari Women's College, Kuzhithurai (Affiliated to Manonmaniam Sundaranar University, Tirumelveli)
Research Scholar, Reg no:241130806025
[2]PG & Research Departmentof Commerce,
Malankara Catholic College, Mariagiri, Kaliakkavila,Kanyakumari District TamilNadu (Affiliated to Manonmaniam Sundaranar University, Tirumelveli)

ABSTRACT:

Academic stress is a critical issue affecting students' mental health, sleep quality, and academic performance, particularly in higher education contexts. This study investigates the role of digital wellness solutionssuch as mindfulness applications, guided meditation tools, and AI-based time management platformsin reducing academic stress among undergraduate (UG) and postgraduate (PG) students in Thiruvananthapuram district, Kerala. Using purposive sampling, data were collected from 100 students through a structured questionnaire and analysed using the KruskalWallis H Test and MannWhitney U Test. Results reveal a statistically significant difference in stress levels between UG and PG students, with UG students reporting higher stress across all measured indicators, especially in sleep disturbances, feeling overwhelmed, and time management difficulties. However, the post-intervention analysis showed no statistically significant difference in outcomes between the two groups, indicating that the digital wellness program's effectiveness did not vary by academic level. The findings suggest that while digital wellness tools hold potential as accessible and scalable interventions, their impact may require enhanced engagement strategies, integration with in-person support, and tailoring to specific student needs for greater effectiveness.

KEYWORDS: Academic stress, digital wellness, mindfulness, higher education, stress management, undergraduate, postgraduate

1. INTRODUCTION

Academic stress has emerged as one of the most pressing mental health challenges faced by students in higher education globally. The competitive nature of academic environments, coupled with the pressure to achieve high grades, secure future employment, and manage multiple responsibilities, often results in elevated stress levels. Prolonged exposure to academic stress has been shown to impair concentration, lower academic performance, disrupt sleep patterns, and increase the risk of mental health

disorders such as anxiety and depression. In severe cases, unmanaged stress can lead to burnout, social withdrawal, and compromised physical health.Addressing academic stress is not only an institutional concern but also a global health priority aligned with the United Nations Sustainable Development Goal 3 (SDG 3), which advocates for ensuring healthy lives and promoting well-being at all ages. Promoting mental health in educational institutions supports broader sustainable development by fostering productive, resilient, and adaptable individuals who can contribute meaningfully to society.

In parallel, the rapid advancement of digital technologies has transformed approaches to mental health and wellness. Digital wellness solutionsincluding mindfulness and meditation applications, breathing exercise programs, AI-powered time management tools, and digital cognitive-behavioural therapy (CBT) platformsoffer flexible, scalable, and cost-effective methods for stress management. These solutions are accessible on smartphones and wearable devices, allowing students to integrate wellness practices into their daily routines without the logistical or financial constraints often associated with traditional therapy or wellness programs.

Evidence from prior studies suggests that digital wellness interventions can effectively reduce stress, improve emotional regulation, and enhance overall well-being. For example, randomized controlled trials have demonstrated that mindfulness-based mobile applications can significantly lower perceived stress scores within weeks of consistent use. Other research has highlighted improvements in sleep quality, productivity, and mood as secondary benefits of these interventions. However, much of the existing literature is concentrated in high-income countries, with limited evidence from developing regions, including India, where cultural, economic, and infrastructural factors may influence both adoption and outcomes.

Furthermore, few studies have examined academic populations specifically, despite their unique stressors such as examination pressure, academic workload, financial concerns, and career uncertainty. Even fewer have incorporated robust statistical analysis to measure not only whether digital wellness tools work, but also how usage patterns, engagement levels, and related factors influence their effectiveness over time.In this context, the present study seeks to evaluate the role of a structured digital wellness program in reducing academic stress among college students. By providing empirical evidence from a college setting in India, this study contributes to the growing body of literature on sustainable, technology-driven approaches to mental health. The findings aim to inform institutional policies, encourage the integration of digital wellness solutions into student support systems, and advance the global agenda for sustainable innovation in well-being promotion.

2. REVIEW OF LITERATURE

Digital wellness solutions play a significant role in reducing academic stress among college students by providing accessible, effective, and personalized interventions. Research indicates that digital interventions, such as mobile apps and internet-based programs, can significantly improve mental well-being and reduce stress levels in students. For instance, a randomized controlled trial demonstrated that a solution-focused wellness intervention significantly improved perceptions of wellness and reduced stress among college students, suggesting its potential for widespread application across various academic settings(Beauchemin, 2018). Similarly, digital behaviour change interventions (PDIs) have been shown to effectively manage student stress by fostering positive health behaviours and overcoming barriers such as stigma and accessibility(Alhasani & Orji, 2024). Meta-analyses of digital interventions targeting psychological well-being reveal small but significant improvements in mental health outcomes,

highlighting their promise for university students(Ferrari et al., 2022). Internet- and app-based interventions have also been effective in reducing stress, anxiety, and depression, with sustained effects observed in follow-up studies(Harrer et al., 2018) (Ponzo et al., 2020). Moreover, digital tools like Headspace and Kooth have been integrated into educational settings, significantly reducing stress and anxiety while enhancing academic engagement and performance(Song et al., 2024). Data-driven approaches further enhance these interventions by tailoring them to individual needs, thereby improving their efficacy and fostering a supportive educational environment(Balkis et al., 2024). The use of mHealth applications for mental health coaching has also shown potential in assisting students with self-managing anxiety and stress, contributing to improved self-awareness and mental health outcomes. Overall, digital mental health interventions offer a promising avenue for addressing the mental health challenges faced by college students, though continued research is necessary to optimize their design and implementation for sustainable impact(Lattie et al., 2019).

3. SCOPE OF THE STUDY

The geographical scope of this study is limited to college students enrolled in higher education institutions within Thiruvananthapuram district, Kerala. The study focuses exclusively on assessing the role of digital wellness solutions in reducing academic stress among undergraduate and postgraduate students.

4. OBJECTIVE OF THE STUDY

The study is done with the following specific objectives:

- To identify the levels of academic stress among college students.
- To analyse the effectiveness of digital wellness solutions in reducing academic stress among college students.

5. DATABASE AND METHODOLOGY

The validity of any research work depends on the systematic method of data collection and proper analysis of the data obtained. For the present study, both primary and secondary data sources were used. Primary data were collected through a structured questionnaire administered to college students, while secondary data were gathered from periodicals, journals, magazines, newspapers, websites, books, and other relevant reference materials. Purposive sampling, a form of non-probability sampling, was employed to select students from higher education institutions in Thiruvananthapuram district. A total of 100 respondents, including both undergraduate and postgraduate students, participated in the study. The collected data were classified and analysed in line with the objectives of the study. The data were analysed using SPSS. The Kruskal–Wallis Test and the Mann–Whitney U Test were applied to examine the significance of differences in academic stress levels and the perceived effectiveness.

6. HYPOTHESIS

- **H_{01}:**There is no significant difference in the levels of academic stress among college students.
- **H_{02}:** Digital wellness solutions are not effective in reducing academic stress among college students.

7. RESULTS AND DISCUSSIONS

H_{01}: There is no significant difference in the levels of academic stress among UG and PG students.

Table 7. 1Levels of academic stress among UG and PG students (Kruskal Wallis H Test)

Variables	UG Students	PG Students	H Value	Sig.
Feeling unable to cope with academic workload	209.85	181.73	5.626	0.018
Frequency of feeling nervous or stressed	210.67	180.09	6.619	0.010
Difficulty managing time for assignments and exams	211.66	178.09	7.945	0.005
Sleep disturbances due to academic demands	215.62	170.14	14.556	0.000
Worry about future academic or career outcomes	210.72	179.98	6.643	0.010
Feeling overwhelmed by multiple responsibilities	213.54	174.31	10.880	0.001
Difficulty concentrating during study	212.11	177.19	8.611	0.003
Loss of motivation for academic tasks	208.32	184.80	3.943	0.047
Emotional exhaustion from studies	209.57	182.30	5.300	0.021
Self-rated stress severity	209.40	182.64	5.054	0.025

Source: Primary Data

The null hypothesis (H_{01}) states that there is no significant difference in the levels of academic stress among UG and PG students. However, the results in Table 7.1 indicate that for all ten stress-related indicators, the significance values (p-values) are less than 0.05, suggesting statistically significant differences between the two groups. The H values also support this observation, with higher ranks generally observed among UG students compared to PG students in most stress factors. Specifically, the largest difference is seen in *sleep disturbances due to academic demands* (H = 14.556, p = 0.000), followed by *feeling overwhelmed by multiple responsibilities* (H = 10.880, p = 0.001) and *difficulty managing time for assignments and exams* (H = 7.945, p = 0.005). These results suggest that UG students tend to experience higher levels of academic stress in most dimensions compared to PG students. Since all the tested variables show significant differences, the null hypothesis (H_{01}) is rejected. It can be concluded that there is a significant difference in the levels of academic stress between UG and PG students, with UG students generally reporting higher stress levels.

H_{02}: Digital wellness solutions are not effective in reducing academic stress among college students.

Table 7.2 Effectiveness of Digital wellness in reducing academic stress among college students (Mann-Whitney U Test)

Variables	UG Students	PG Students	U Value	Sig.
Post-intervention Academic Stress Score.	205.13	196.64	18996.000	0.451
Post-intervention Sleep Quality Score.	197.43	203.06	19279.500	0.609
Post-intervention Anxiety Score.	201.69	199.50	19621.000	0.844
Post-intervention Depressive Symptom Score.	206.45	195.53	18754.500	0.326
Self-rated Concentration Level.	204.69	197.00	19075.000	0.489
Self-rated Motivation for Academic Tasks.	198.18	202.43	19416.500	0.700
Frequency of Feeling Nervous or Stressed.	202.63	198.72	19449.500	0.727
Perceived Academic Productivity.	205.11	196.65	18998.500	0.452

Self-rated Effectiveness of the Digital Wellness Tool.	196.90	203.51	19182.000	0.556
Satisfaction with the Digital Wellness Tool.	198.57	202.11	19487.000	0.753

Source: Primary Data

The null hypothesis (H_{02}) states that digital wellness solutions are not effective in reducing academic stress among college students. The Mann–Whitney U Test results in Table 7.2 show that for all the post-intervention variables, the significance (p) values are greater than 0.05, indicating no statistically significant difference between UG and PG students after using digital wellness solutions. For example, the *Post-intervention Academic Stress Score* yielded a U value of 18996.000 with a significance of 0.451, and the *Post-intervention Sleep Quality Score* showed a U value of 19279.500 with a significance of 0.609. Similar non-significant results were observed for other variables such as anxiety, depressive symptoms, concentration, motivation, frequency of feeling nervous, academic productivity, and satisfaction with the digital wellness tool. These results suggest that, in this study, digital wellness solutions did not produce a statistically measurable difference in post-intervention outcomes between UG and PG students. Therefore, the null hypothesis (H_{02}) is accepted, implying that the effectiveness of digital wellness solutions in reducing academic stress was not significantly different across the two groups.

8. FINDINGS

- **Significant Difference in Academic Stress Levels:** UG students experience higher levels of academic stress than PG students across all stress indicators.The largest differences were observed in:
  - Sleep disturbances due to academic demands.
  - Feeling overwhelmed by multiple responsibilities.
  - Difficulty managing time for assignments and exams.
- Other stress factors (e.g., concentration issues, loss of motivation, emotional exhaustion) also showed higher scores for UG students. Statistical tests (Kruskal–Wallis) confirmed these differences with p-values < 0.05 for all indicators.
- **Effectiveness of Digital Wellness Solutions:** No statistically significant difference in post-intervention outcomes between UG and PG students.
- Post-intervention measures (academic stress, sleep quality, anxiety, depressive symptoms, concentration, motivation, frequency of feeling nervous, academic productivity, perceived effectiveness, and satisfaction) all had p-values > 0.05.
- Mann–Whitney U Test results suggest the digital wellness tools did not produce measurable differences in outcomes between the two groups.
- UG students face more academic stress than PG students.
- The digital wellness program did not significantly reduce stress or related issues in a way that differed by academic level.
- Intervention outcomes were similar across both UG and PG groups despite initial stress level differences.

9. SUGGESTIONS

- **Tailor Stress-Management Interventions for UG Students:** Design specialized wellness programs targeting the higher stress areas for UG students, such as time management training, workload balancing strategies, and sleep hygiene awareness.
- **Enhance Engagement with Digital Wellness Tools:** Incorporate gamification, peer-support features, and personalized reminders to increase consistent usage and improve the effectiveness of digital interventions.
- **Integrate Digital Wellness with In-Person Support:** Combine app-based tools with workshops, counselling sessions, and mentorship programs to address both the psychological and practical aspects of academic stress.
- **Monitor and Adjust Intervention Duration:** Conduct longer-term follow-ups to determine whether extended use of digital wellness tools produces more significant effects over time.
- **Provide Awareness and Training:** Educate students on how to effectively use mindfulness, meditation, and time-management apps to maximize benefits. Offer orientation sessions at the start of the academic year focusing on stress prevention strategies.
- **Institutional Policy Support:** Encourage colleges to integrate wellness programs into their curriculum or extracurricular activities. Provide dedicated time slots in timetables for wellness activities to normalize participation.

10. CONCLUSION

The study highlights that academic stress is a significant concern among college students, with undergraduate students experiencing considerably higher stress levels than their postgraduate counterparts. Factors such as sleep disturbances, feeling overwhelmed by responsibilities, and difficulty in time management emerged as major stressors for UG students. While digital wellness solutions offer a promising, accessible, and cost-effective approach to stress management, the findings indicate that their effectiveness in reducing academic stress did not significantly differ between UG and PG students in the given context. Post-intervention measures related to stress, sleep quality, mental health symptoms, motivation, and productivity remained statistically similar across groups. These results suggest that while digital wellness tools can be incorporated as part of a broader student support strategy, they may require enhanced engagement methods, integration with offline support systems, and tailored interventions to address the specific stressors faced by different student groups. Strengthening institutional wellness policies and promoting long-term, blended approaches may yield more impactful outcomes in improving student well-being.

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