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EFFECT OF APP-BASED MINDFULNESS MEDITATION ON PERCEIVED STRESS AMONG FIRST-YEAR UNIVERSITY STUDENTS AT COVENANT UNIVERSITY, OTA, NIGERIA

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ABSTRACT

This study examined the effect of app-based mindfulness meditation on perceived stress among first-year university students at Covenant University, Ota, Nigeria. A two-phase design was used. In the first phase, 200 students completed the Perceived Stress Scale (PSS), and 104 students scoring above the mean were identified as eligible for the intervention phase. Sixty-three students consented and were randomly assigned to an experimental group (n = 32) or a waiting-list control group (n = 31). The experimental group received six sessions of app-based mindfulness meditation delivered through the Calm app over three weeks, while the control group received no intervention during the study period. Data were analysed using descriptive estimates, independent-samples t-tests, and paired-samples t-tests. Results showed no significant baseline gender difference in perceived stress, no significant change in the control group, but a significant reduction in perceived stress in the experimental group ($t(31) = 5.13, p < .05$). At posttest, the experimental group reported significantly lower perceived stress level than the control group ($t(61) = 4.24, p < .05$). These findings suggest that app-based mindfulness meditation may help reduce perceived stress among first-year university students. However, larger studies with larger sample sizes and longer follow-up are needed to confirm effectiveness.

Keywords: App-based mindfulness meditation, first-year university student, perceived stress, intervention study, Nigeria

INTRODUCTION

Perceived stress refers to an individual's appraisal of demands as exceeding available coping resources. Stress perceptions are linked to a decline in positive feelings and an increase in negative ones. Additionally, prolonged periods of stress can contribute to the development of psychological and mental health conditions like depression, especially if they are ongoing or coupled with inadequate coping strategies (Costa et al., 2021). Among university students, elevated stress is common and may affect academic performance, emotional well-being, and retention (Asif et al., 2020), particularly during the transition into the first year. Making the new step from high school to university can feel awkward. Change is a constant, and a person's everyday performance and quality of life are affected if they cannot adapt. When a first-year student is admitted to a university, they often face new academic challenges, expectations, unfamiliar social environments, changes in routines, and financial or housing pressures, all of which can heighten stress vulnerability (Akhtar & Akhtar, 2024; Ryan & Baik, 2026).

Research indicates that female college students appear more stressed than their male counterparts. Diverse disparities between male and female college students were discovered in several additional investigations. As Thawabin and Quaisy (2012) noted, women were more inclined to believe they had gone through higher amounts of stress. Furthermore, female students complained of stress-related problems, including melancholy, anxiety from tests, and poor self-esteem. It has also been demonstrated that female students experience more excellent general and educational strain than male classmates (Graves et al., 2021).

Lazarus and Folkman's Transactional Model of Stress and Coping (1984) explains stress as a dynamic process shaped by how individuals appraise a situation and the coping resources they believe they have. In this study, first-year university students may perceive academic and social demands as stressful when they judge them as threatening or exceeding their capacity to cope; mindfulness meditation is therefore relevant because it can promote calmer appraisal, strengthen emotional regulation, and support more adaptive coping responses. App-based mindfulness meditation may reduce perceived stress by helping students reframe stressors as more manageable, increase present-moment awareness, and improve confidence in their ability to respond effectively to challenges. Thus the model provides a useful framework for

understanding how mindfulness may reduce perceived stress by influencing both cognitive appraisal and coping processes.

A growing body of literature suggests that mindfulness-based interventions can reduce stress by improving attention regulation, emotional awareness, and non-reactive responses to difficulty (Choudhary, 2023; Nagpal, & Radliff, 2024). Aiming to promote both physical and mental well-being, mindfulness and mindfulness meditation contrast an overly hectic daily existence in a digitised society. Practicing mindfulness, which is defined as "the consciousness that arises using paying attention on purpose, in the moment at hand, and without prejudice to the unfolding events time by time," improves persistent pain symptoms, joy, job satisfaction, sense of purpose, and quality of sleep. Individuals learn to live in the now with discomfort and select a more empathetic reaction by identifying the kinds of internal or exterior triggers or discomfort that may cause hysteria or other psychological problems (Binda et al., 2022). Furthermore, it benefits mental abilities, including problem-solving skills, imaginative thinking, and attention span (Döllinger et al., 2021).

App-based delivery may expand access to such support because it is relatively inexpensive, scalable, and feasible for students who may not attend in-person programmes (Huberty et al., 2019; Zollars et al., 2019). However, evidence from low- and middle-income settings and from university populations in Sub-Saharan Africa remains limited, and more studies are needed to determine whether digital mindfulness tools are effective in local contexts.

This study, therefore, examined whether app-based mindfulness meditation would reduce perceived stress among first-year university students at Covenant University. The study also compared stress outcomes between intervention and control groups and explored whether gender differences were present at baseline.

METHOD

Study design

This study was a two-phased design. The first phase was a descriptive screening survey used to identify students with elevated perceived stress. The second phase was a pretest-posttest control group intervention study involving eligible students (those with scores above the mean on the perceived stress scale) who volunteered to participate.

Participants and sampling

Participants were first-year students from Covenant University, Ota, Nigeria. Convenience sampling was used during screening because recruitment depended on student availability across the institution's four colleges. A total of 200 students (74 males and 101 females) completed the PSS screening, 104 of whom scored above the mean score and were thus eligible for the intervention phase. Of these, 63 students voluntarily consented to participate and were randomly assigned to either the experimental group ($n = 32$) or the wait-list control group (31). Inclusion criteria were being a first-year student, having elevated perceived stress at screening, and having access to a smart device.

Ethical consideration

Ethical approval was obtained from the Covenant Health Research Ethics Committee, Covenant University, Ota, Nigeria. Participants received information about the study purpose and procedures and provided informed consent before participation. Confidentiality was maintained throughout data collection and analysis.

Measure

Perceived stress was measured using the Perceived Stress Scale (Cohen et al., 1983). The scale, which is a traditional tool for assessing stress, was administered at screening, pretest, and posttest. The scale contains 10 items, with each statement rated on a 4-point Likert scale, ranging from 0 to 4, with an approximate total score of 40. Negative statements were rated between 4 and 0, whereas positive statements were scored between 0 and 4. The scale has strong psychometric

properties with reliability coefficients ranging from 0.76 to 0.91. A Cronbach's alpha of 0.88 was established in this study.

Intervention

The experimental group received six sessions of app-based mindfulness meditation over a three-week period using audio content from the Calm app. Each session lasted approximately six minutes and was distributed two times per week via Telegram. The waiting-list control group did not receive the intervention during the study period. The Calm app offers guided meditations, sleep stories, and other mindfulness exercises to help users unwind and reduce their stress levels. It also has a function for tracking progress and creating daily practice reminders. The reduce stress option was chosen on the calm app, the question for the cause of stress, work or school was decided, and the option for when to meditate night was chosen, and the time frame was 10 pm; meditation audio that lasted was recorded, broken down into 6mins and sent to the experimental group to listen to before going to bed three two in a week for three weeks.

Procedure and analysis

Recruitment was conducted through advertisements placed in university residence halls. After baseline screening, eligible participants were enrolled in the experimental phase and assigned to study groups. The PSS was administered at pretest and again after the three-week intervention period. Independent-sample t-tests were used to compare group differences, and paired-sample t-tests were used to assess within-group change from pretest to posttest. Incentives, such as sweets for initial data collection and critical holders for experiment completion, were provided to participants. Challenges encountered included Telegram account restrictions due to perceived spam activity and participant distrust regarding the experiment's purpose. Addressing concerns about mental health diagnoses, the researcher emphasised a focus on stress assessment and assured participants of confidentiality and that the experiment posed no potential harm.

RESULTS

Table 1. T-test of an independent sample showing gender difference in perceived stress

Gender	N	Mean	SD	T	Df	P
Male	24	23.64	2.34	-1.396	61	.168
Female	39	25.16	3.86			

An independent samples t-test was performed to evaluate whether there was a significant gender difference in perceived stress at baseline. The gender comparison showed no significant difference in perceived stress before intervention ($t(61) = -1.39, p > .05$).

Table 2. Paired-sample t-test showing the difference in the control group at the pretest and post-test level

	N	Mean	SD	T	Df	P
Control Group- Pretest	31	25.03	3.361	.591	30	.559
Control Group- Posttest	31	24.39	4.766			

A paired-samples *t*-test was performed to evaluate whether there was a significant difference between the perceived stress scale in the control group at pretest and posttest levels. The results indicate that there was no significant difference in the perceived stress scale scores of the control group between the pretest and posttest ($t(30) = .591, p > .05$).

Table 3. The paired-sample *t*-test of the difference between the experimental group's pretest and posttest levels.

	N	Mean	SD	t	Df	P
Experimental Group-Pretest	32	24.63	3.900			
				5.130	31	.001
Experimental group-Posttest	32	19.78	3.816			

A paired-samples *t*-test was performed to evaluate whether there was a difference between the perceived stress scale in the experimental group at pretest and posttest levels. The results indicate that the experimental group showed a significant reduction in perceived stress from pretest to posttest ($t(31) = 5.13, p < .005$).

Table 4. The independent sample's *T*-test showed the experimental and control group differences in the post-test.

	Grouping	N	Mean	SD	t	Df	P
Posttest	Experimental group	32	19.78	3.816			
					- 4.241	61	.000
	Control group	31	24.39	4.766			

An independent samples *t*-test was performed to evaluate whether there was a difference between the perceived stress scores of the control and experimental groups at the post-test. At posttest, the experimental group reported significantly lower perceived stress than the control group $t(61) = -4.241, p < .05$.

These findings support the short-term effectiveness of app-based mindfulness meditation in this sample.

DISCUSSION

The findings suggest that app-based mindfulness meditation may help reduce perceived stress among first-year university students. The lack of change in the control group strengthens the interpretation that the observed reduction in the experimental group was not simply due to the passage of time. This is consistent with several findings affirming the effectiveness of app-based mindfulness techniques in reducing stress and promoting well-being among student populations (Wu et al., 2021; Yüksel & Yılmaz, 2020; Zollars et al., 2019). Notably, Huberty et al. (2019), in their randomised controlled experiment evaluating the effectiveness of mindfulness meditation in reducing stress using the Calm mobile app among university students, observed a significant reduction in stress among study participants at posttest. University students are a population vulnerable to stress from both academic and extracurricular obligations, as well as family dynamics and social environments. If such psychological issues are not appropriately addressed, they may have several detrimental effects. The study's findings suggest that mindfulness-based treatment can be a valuable tool for reducing students' perceived stress. Mindfulness treatment

integrates the mind and body to focus, be present, and embrace left-hand experiences, cultivating serenity, knowledge, and peace when coping with pressure.

Mindfulness-based meditation techniques have, over time, been established as effective in the management of stress, sadness, and anxiety. In global society, mindfulness-based interventions are currently gaining popularity as a form of therapy. Because mindfulness incorporates several therapeutic modalities, including yoga, deep breathing exercises, attentional concentration, and acceptance without judgment, it is regarded as a comprehensive therapy that can reduce stress and enhance psychological well-being (Kappen et al, 2019; Komariah et al., 2022). One of the central tenets of meditation is mindfulness, which consists of two essential components: maintaining attention to the present moment and accepting the experience. Mindfulness treatment is flexible and effective because it has no contraindications and can be used with people of all ages, from young toddlers to older adults. Furthermore, mindfulness therapy is straightforward and can be practised at any time and wherever the patient chooses. Using the calm app, participants achieved noteworthy reductions in stress levels. Previous research suggested that, because internet-based mindfulness therapies are more flexible and accessible, they may be incorporated into healthcare facilities to manage stress and potentially meet participants' needs (Komariah et al., 2022).

The absence of a significant gender difference at baseline suggests that stress was broadly elevated across the sample rather than concentrated in one sex. This contrasts with the findings of Graves et al. (2021), in which females reported higher stress levels than males. These results are consistent with research showing that mindfulness-based interventions can improve stress regulation in student populations. The digital format may also have improved accessibility and acceptability for students who cannot attend in-person programmes.

Nevertheless, the study's convenience sampling, small final sample, short intervention period, and lack of follow-up limit generalisability and prevent strong causal claims. Future studies should use larger samples, stronger randomisation procedures, longer follow-up, and more detailed reporting of adherence and effect sizes. It would also be useful to compare app-based mindfulness with other student support strategies and to test whether benefits persist across academic terms.

Conclusion

App-based mindfulness meditation was associated with lower perceived stress among first-year university students in this study. The findings suggest that digital mindfulness programmes may be a practical supplementary option for student well-being support in university settings. However, the evidence should be interpreted with caution, given the study's sampling strategy and short follow-up period.

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