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Effectiveness of Body Scan Training in Reducing Problematic Internet Use Among Female College Students

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Abstract

Female college students are vulnerable to Problematic Internet Use (PIU) due to increased autonomy, abundant free time, and easy access to the internet. PIU may negatively affect physical and psychological health, academic performance, and social relationships, particularly when the internet is used as a coping mechanism for stress and negative emotions. Mindfulness, defined as non-judgmental awareness of present-moment experiences, has been suggested as a potential intervention for reducing maladaptive internet use. This study aimed to evaluate the effectiveness of body scan training in reducing Problematic Internet Use among female college students. Participants consisted of eight active female college students who used the internet for at least six hours per day and demonstrated moderate to high levels of PIU. The study employed a quasi-experimental one group pretest–posttest with follow-up design. Problematic Internet Use was measured using the Generalized Problematic Internet Use Scale-2 (GPIUS-2). The intervention was based on an adapted mindfulness training module and consisted of five sessions delivered across two meetings. Descriptive analysis showed a decrease in PIU scores from pre-test (M = 58.4, SD = 8.02) to post-test (M = 47.8, SD = 4.62), with a further decrease at follow-up (M = 47.1, SD = 5.06). Friedman test results indicated a significant difference in PIU scores across the three measurement points ($\chi^2 = 12.30$, $p = .002$). Durbin–Conover post hoc analysis revealed a significant difference between pre-test and post-test scores ($p < .001$), whereas no significant difference was found between post-test and follow-up scores ($p = .350$), suggesting that the intervention effects were maintained over time. These findings provide preliminary evidence that body scan training may be an effective intervention for reducing Problematic Internet Use among female college students.

Keywords: College Students, Mindfulness, Problematic Internet Use

1 INTRODUCTION

Students are individuals currently undergoing the educational process at institutions of higher education [1]. Most students use the internet because they recognize its role in supporting education and social interaction [2]. The internet has become an integral part of the daily lives of students worldwide, significantly transforming how they interact and access information during their studies [3]. The ease of internet access on campus is also utilized by students to address various challenges during their studies, such as time management and completing assignments [4].

The internet is widely used in Indonesia due to technological advancements. The 2024 Indonesian Internet Penetration Survey released by APJII shows that internet penetration among students is very high, reaching 95.92%. This figure indicates that nearly all students in Indonesia have access to the internet in their daily lives [5]. The high intensity of internet use among students indicates that the internet has become an integral part of daily life. Although it offers many benefits, internet use also carries certain risks [6].

One risk that has received widespread attention is Problematic Internet Use (PIU). The term Problematic Internet Use (PIU) refers to unhealthy behavioral and cognitive patterns related to internet use that can lead to negative consequences in various aspects of life, such as academics, work, and social relationships [7]. Caplan [8] explains that PIU is characterized by a preference for online social interaction, using the internet to regulate mood, constant preoccupation with online activities, and difficulty controlling the duration of internet use. College students are identified as a group vulnerable to PIU due to easy internet access, unstructured free time, and minimal external supervision [9],[10].

Young and Abreu [11] state that a person can be considered to have PIU if they spend more than 38 hours

per week accessing the internet. This means that individuals with PIU spend at least 6 hours per day using the internet [12]. Research by Wahjoe and Hamdan [13] found that 304 out of 426 college students in Bandung were engaged in PIU, with 58.9% spending 6–8 hours per day on internet activities. Excessive internet use is associated with various negative impacts, such as physical health problems, decreased academic performance, sleep disturbances, and psychosocial problems such as stress and mental fatigue [3], [14].

Problematic Internet Use (PIU) among university students is often associated with using the internet as a means of avoiding stress and negative emotions. The internet is frequently used to escape academic pressures and personal problems, reflecting a maladaptive coping mechanism [15], [16]. Ineffective coping strategies can increase an individual's vulnerability to maladaptive behaviors, including problematic internet use [17], [18].

Among the university student population, female students represent an important group to investigate in the context of Problematic Internet Use (PIU). Several studies have shown that women are more likely than men to use the internet for activities related to social interaction, emotional communication, and mood regulation [19]. Female students also tend to demonstrate greater emotional awareness and expression and are more likely to employ emotion-focused coping strategies. When experiencing stress, loneliness, and negative emotions, online environments are often utilized as a means of emotion regulation and seeking social support [20]. Given that mood regulation is one of the primary mechanisms underlying PIU, female students may be particularly vulnerable to problematic internet use when emotional difficulties are not managed effectively [21].

The inability to effectively manage stress and negative emotions highlights the importance of interventions that focus on enhancing self-awareness and emotion regulation. Mindfulness is defined as the awareness that emerges from intentionally paying attention to present-moment experiences in a nonjudgmental manner [22]. Research has demonstrated that mindfulness training is effective in helping individuals regulate their emotions, reduce stress, and improve psychological well-being [23], [24], [25].

One relevant mindfulness technique is the body scan, a practice that involves systematically focusing attention on bodily sensations. A body scan is a focused attention technique that involves systematically directing attention to sensations occurring in various parts of the body [26]. Unlike mindfulness interventions, which emphasize general awareness of thoughts and emotions, a body scan specifically focuses on increasing interoceptive awareness, namely an individual's ability to recognize and understand sensations arising from within the body [26]. Increased interoceptive awareness allows individuals to be more sensitive to recognizing physiological and emotional signs, such as stress and anxiety, so they can manage them more adaptively before they develop into maladaptive behaviors [26].

Because Problematic Internet Use is often driven by emotional distress and the tendency to use the internet as a coping strategy for negative affect, early signs such as tension, restlessness, boredom, and anxiety may precede excessive internet use [8], [29]. Interventions that enhance awareness of these internal signals may therefore be particularly relevant for addressing PIU. Compared with broader mindfulness practices that primarily emphasize awareness of thoughts and emotions, body scan directly targets bodily sensations associated with emerging emotional distress by cultivating interoceptive awareness [22], [26].

The body scan technique has been shown to be effective in reducing addictive behaviors associated with internet and electronic device use. Gibson [26] found that body scan meditation helps improve emotion regulation by strengthening attentional focus on bodily sensations. As a focused-attention technique, body scan works by gradually directing attention to different parts of the body, thereby enhancing interoceptive awareness, which enables individuals to become more sensitive to signs of stress, anxiety, or boredom that may trigger excessive internet use. This technique has also been demonstrated to improve emotion regulation and impulse control, while reducing stress and internet-related addictive behaviors [26], [27].

Although various studies have shown that mindfulness is effective in helping regulate emotions and reduce addictive behaviors, research specifically testing its effectiveness in reducing Problematic Internet Use (PIU) in female students is still limited. Furthermore, the use of body scan techniques as an intervention to address PIU among college students is also rarely studied. Among various mindfulness techniques, body scans are particularly relevant because they train interoceptive awareness, namely the ability to recognize and understand internal sensations related to stress, anxiety, boredom, and compulsive urges. This ability allows individuals to recognize their emotional states earlier and respond more adaptively. Therefore, this study aims to test the effectiveness of body scan training in reducing the tendency for Problematic Internet Use in female students and provide an empirical contribution to the development of psychological interventions to address PIU among college students.

2 LITERATURE REVIEW

2.1 Problematic Internet Use

Problematic Internet Use (PIU) refers to a maladaptive pattern of internet use that negatively affects an individual’s academic, social, and

psychological functioning [7]. Unlike internet addiction, PIU emphasizes unhealthy patterns of internet use that interfere with daily functioning without necessarily meeting the criteria of a behavioral addiction [15]. Therefore, PIU is often conceptualized as an early stage of problematic behavior associated with excessive internet use.

PIU is recognized as a multidimensional phenomenon involving cognitive, emotional, and behavioral components [28]. Individuals with PIU often experience difficulties regulating internet use despite being aware of its negative consequences. Common characteristics include excessive preoccupation with online activities, compulsive internet use, preference for online social interaction, and the use of the internet as a strategy for mood regulation [8].

The cognitive-behavioral model proposed by Davis [29] explains that PIU develops through maladaptive cognitions that influence how individuals perceive themselves and their environment. Individuals with PIU tend to develop distorted beliefs, such as perceiving online interactions as safer or more rewarding than offline interactions, or believing that internet use is the most effective way to cope with stress and negative emotions. These cognitive distortions reinforce excessive internet use and contribute to the maintenance of problematic behaviors over time.

Furthermore, Davis [29] distinguishes PIU into two forms: specific PIU and generalized PIU. Specific PIU refers to excessive involvement in particular online activities, such as gaming, gambling, or social media use, whereas generalized PIU reflects excessive internet use across multiple online activities without a specific focus. In both forms, the internet often functions as a maladaptive coping mechanism used to avoid psychological distress, which may ultimately worsen emotional well-being and daily functioning [30].

2.2 Mindfulness

Mindfulness is generally defined as the capacity to intentionally attend to present-moment experiences with openness, acceptance, and without judgment [31]. It involves maintaining awareness of internal and external experiences as they occur, rather than becoming absorbed in automatic thoughts, emotional reactions, or habitual behaviors.

Several scholars have provided complementary definitions of mindfulness. Weinstein, Brown, and Ryan [32] describe mindfulness as a natural state of awareness characterized by sustained attention to present experiences. Similarly, Baer et al. [33] define mindfulness as a process of cultivating awareness through present-centered attention and nonjudgmental acceptance of thoughts, emotions, and bodily sensations. Shapiro et al. [34] further emphasize that mindfulness consists of three core elements: intention, attention, and attitude.

Mindfulness has been widely studied as a psychological intervention because of its beneficial effects on emotional regulation, stress reduction, and psychological well-being. Research suggests that mindfulness helps individuals become more aware of their thoughts and emotions without reacting impulsively to them [23], [24], [25]. By fostering a more accepting relationship with internal experiences, mindfulness reduces the tendency to engage in maladaptive coping behaviors when confronted with psychological distress.

2.3 Mindfulness Technique: Body Scan

Body scanning is a core technique used in mindfulness-based interventions, particularly in Mindfulness-Based Stress Reduction (MBSR) programs [22]. This technique involves systematically directing attention to various parts of the body, typically from the feet to the head, while observing bodily sensations without judgment or attempts to change them. The primary goal of body scanning is to awaken awareness of the present moment in the body. Through repeated practice, individuals learn to notice physical sensations, emotional reactions, and mental experiences with greater clarity and acceptance. This process helps develop a stronger connection between bodily experiences and psychological states [22].

Research indicates that body scanning enhances interoceptive awareness, which refers to the ability to sense and interpret internal bodily signals such as muscle tension, changes in heart rate, breathing patterns, and sensations associated with emotional experiences [26]. Increased interoceptive awareness allows individuals to recognize early signs of stress, anxiety, boredom, or emotional discomfort before these experiences escalate.

2.4 Mindfulness Technique (Body Scan) and Problematic Internet Use

The relationship between body scan practice and Problematic Internet Use (PIU) can be understood through the cognitive-behavioral model proposed by Davis [29]. According to this model, PIU is maintained by maladaptive cognitions and the tendency to use the internet as a strategy for regulating negative emotions. Individuals experiencing stress, anxiety, loneliness, or emotional discomfort may develop distorted beliefs that internet use is the most effective way to cope with these experiences. Over time, these beliefs are reinforced through repeated internet use and contribute to compulsive behavioral patterns [29].

Body scan practice may help interrupt this cycle through enhanced interoceptive awareness, namely the

ability to perceive and interpret internal bodily signals associated with emotional experiences [26]. By systematically directing attention to bodily sensations, individuals become more sensitive to early signs of stress, anxiety, boredom, or emotional discomfort that often precede excessive internet use [22], [23]. This heightened awareness provides an opportunity to recognize emotional distress at an earlier stage and respond more deliberately, rather than automatically turning to the internet as a coping strategy.

From this perspective, interoceptive awareness may function as an important mechanism linking mindfulness practice to reductions in PIU. Greater awareness of internal experiences allows individuals to observe emotional states without immediately reacting to them, thereby reducing reliance on maladaptive beliefs that internet use is necessary for emotional regulation [23], [24], [25]. As individuals become more capable of acknowledging and accepting uncomfortable emotions, they may be more likely to employ adaptive coping strategies instead of engaging in excessive internet use. Consequently, body scan practice may contribute to reducing both the cognitive distortions and behavioral patterns that sustain PIU [27], [35].

Empirical evidence supports this theoretical relationship. Hozeng et al. [35] found that mindfulness training using body scan techniques reduced tendencies toward PIU by enhancing self-awareness and reducing impulsive internet-related behaviors. Similarly, Samanta et al. [27] reported that mindfulness-based interventions reduced problematic internet use through improvements in emotional regulation and reductions in stress, anxiety, and depression. Xiong et al. [36] also demonstrated that mindfulness interventions involving body scan contributed to lower levels of problematic social media use. Furthermore, Gámez-Guadix and Calvete [37] found that individuals with higher mindfulness levels tended to report lower levels of PIU because they were less likely to use the internet as a strategy for escaping negative emotions.

Taken together, these findings suggest that body scan practice may reduce Problematic Internet Use by enhancing interoceptive awareness, improving emotional regulation, reducing maladaptive cognitions, and decreasing impulsive responses to psychological distress. Based on this theoretical framework and previous empirical findings, body scan training is expected to be an effective intervention for reducing Problematic Internet Use among female college students.

3 RESEARCH METHODS

This study employs a quantitative approach with a quasi-experimental design aimed at testing the effectiveness of a mindfulness intervention using body scan techniques in reducing Problematic Internet Use (PIU) among college students. The research design used is a single-group pretest–posttest design with follow-up, in which all participants received the same treatment without a control group. Although this design allowed changes in PIU to be observed across multiple measurement points, the absence of a control group and the relatively small sample size (N = 8) limit the generalizability of the findings and increase the possibility that extraneous variables may have influenced the results. The participants consisted of 8 active college students who used the internet for at least 6 hours per day and had moderate to high levels of PIU. Participants were selected using purposive sampling. This study was conducted at Universitas Negeri Makassar.

The measurement tool used was the Generalized Problematic Internet Use Scale-2 (GPIUS-2), developed by Caplan [8] and adapted by Reynaldo and Sokang [38]. The GPIUS-2 scale consists of 15 items with five response options: strongly disagree, disagree, neutral, agree, and strongly agree. Scores for these items range from 1 to 5, resulting in a total score range of 15–75. Based on content validity testing, the Aiken's V coefficients for the 15 items ranged from 0.80 to 0.95, indicating good content validity for all items. Item discrimination tests conducted on 130 respondents showed item-rest correlation values ranging from 0.436 to 0.656, indicating that all items are acceptable (≥ 0.30) for use in this study. Furthermore, a reliability test using Cronbach's Alpha yielded a value of 0.90, indicating that the GPIUS-2 scale possesses high reliability.

The intervention module used in this study was adapted from research conducted by Hozeng, Noviekayati, and Santi [35], with the technique applied being the mindfulness body scan. The module's feasibility was evaluated through an expert assessment involving psychology faculty members with expertise in clinical psychology. The results of the expert evaluation indicated that the mindfulness body scan module was deemed suitable for use. The mindfulness training module in this study consisted of several sessions, including body scan exercises, self-reflection, and independent activities designed to increase participants' awareness of their present-moment experiences, manage stress, and adaptively cope with negative emotions. The module content includes material on PIU, the concept of mindfulness, and mindfulness body scan exercises practiced progressively through role-playing sessions.

The intervention consisted of five sessions delivered through two face-to-face meetings and a period of independent practice. The first meeting lasted approximately 150 minutes and included psychoeducation on Problematic Internet Use, an introduction to mindfulness, guided body scan practice, self-reflection activities, and evaluation. The second

meeting lasted approximately 30–40 minutes and included the administration of the post-test, a discussion of participants' experiences during independent practice, and an evaluation of the intervention implementation.

Between the two meetings, participants were instructed to engage in body scan practice independently every day for seven consecutive days. Participant adherence was monitored through a WhatsApp group created specifically for this intervention. The researcher provided daily reminders and encouraged participants to report the completion of their practice sessions. This monitoring procedure was implemented to support adherence to the intervention protocol while facilitating the development of a regular mindfulness practice habit. Seven days after the post-test assessment, participants were asked to complete a follow-up assessment to evaluate the sustainability of the intervention's effects on Problematic Internet Use.

The Friedman test was used to analyze differences in scores on the initial test, final test, and follow-up test. The Durbin-Conover test was used to further analyze specific differences between measurement time points, namely to determine whether there were significant differences between the initial and final tests, the initial and follow-up tests, and the final and follow-up tests. All statistical analyses in this study were performed using Jamovi software version 2.3.26.

4 RESULTS AND DISCUSSION

4.1 Descripction of Research Participants

The participants in this study consisted of eight active university students in Makassar City who use the internet for a minimum of six hours per day, exhibit moderate to high levels of Problematic Internet Use (PIU) as measured by the GPIUS-2 scale and were willing to participate in the study. All participants were female, aged 20–22 years with the majority coming from the eighth semester of the Faculty of Psychology and one participant from the sixth semester of the Faculty of Economics.

Table 1. Research Participants

No	Initial	Age	Gender	University	Faculty	Seme-ster
1	AMNR	21	Female	UNM	Psychology	8
2	ALM	21	Female	UNM	Psychology	8
3	ANKK	20	Female	UNM	Psychology	8
4	AISS	21	Female	UNM	Psychology	8
5	AR	22	Female	UNM	Psychology	8
6	AFF	21	Female	UNM	Psychology	8
7	AZ	21	Female	UNM	Economics	6
8	MNJ	21	Female	UNM	Psychology	8

The research data were obtained from measurements using the GPIUS-2 scale administered at three stages: pre-test, post-test, and follow-up. At the pre-test stage, participants were classified into moderate and high categories. Following the intervention, all participants demonstrated a decrease in their levels of Problematic Internet Use.

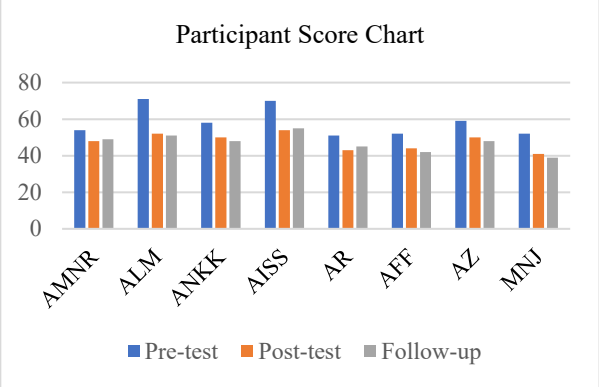

Figure 1. Score chart for all participants

Based on the chart above, in the pre-test phase, four participants were categorized as high-level and four as moderate-level. After participating in mindfulness training using the body scan technique, accompanied by seven days of self-practice, all participants showed a decrease in scores in the post-test phase and were classified into the moderate category. This decrease indicates a change in the level of Problematic Internet Use following the intervention. In the follow-up phase, participants' scores remained stable and continued to fall within the moderate category. This suggests that mindfulness training using the body scan technique is not only effective in reducing levels of Problematic Internet Use but also contributes to sustaining the changes that occurred following the intervention.

4.1 Results of Descriptive Analysis

Descriptive analysis was used to summarize the numerical data of the Problematic Internet Use variable.

Table 2. Results of Descriptive Analys

Measurement Time	Mean	SD	Min	Max
Pre-test	58,4	8,02	51	71
Post-test	47,8	4,62	41	54
Follow-up	47,1	5,06	39	55

Based on the table above, there was a decrease in the mean Problematic Internet Use (PIU) score from pre-test (M = 58.4; SD = 8.02) to post-test (M = 47.8; SD = 4.62). At the follow-up stage, the mean PIU score showed a slight further decrease (M = 47.1; SD = 5.06). The standard deviation at follow-up increased compared to the post-test, but remained lower than that of the pre-test.

4.2 Results of Hypothesis Testing

Hypothesis testing in this study was conducted using the Friedman test, followed by the Durbin–Conover test to identify specific differences between measurement time points.

Table 3. Results of the Friedman Test

χ^2	*df*	*p*
12,30	2	.002

Based on the results of the Friedman test, the chi-square value (χ^2) was 12.30 with 2 degrees of freedom (df) and a significance value of $p = 0.002$ ($p < 0.05$). These findings indicate a significant difference in the level of Problematic Internet Use following the intervention. Thus, mindfulness training using the body scan technique was proven to be effective in reducing Problematic Internet Use among university students.

Subsequently, the analysis was continued with a post hoc test using the Durbin–Conover method to examine specific differences between the measurement time points.

Table 4. Results of the Durbin–Conover Test

Pairwise Comparisons (Durbin–Conover)	*Statistic*	*p*
Pre-test-Postest	5,31	<0.001
Pre-test-Follow-up test	6,28	<0.001
Post-test- Follow-up test	0,96	0,350

Based on the results of the Durbin–Conover pairwise comparisons, significant differences in participants PIU levels were found between the pre-test and post-test (Durbin–Conover = 5.31, $p < 0.001$), and between the pre-test and follow-up (Durbin–Conover = 6.28, $p < 0.001$). However, no significant difference was found between the post-test and follow-up (Durbin–Conover = 0.96, $p = 0.350$). These findings indicate that mindfulness training using the body scan technique is effective in reducing Problematic Internet Use among university students, and that participants' PIU levels at the post-test and follow-up remained within the same category.

4.3 Discussion

The results of this pilot study indicate that mindfulness training using the body scan technique was associated with a reduction in Problematic Internet Use (PIU) among female college students. Based on the pre-test results, four participants were categorized as having high PIU and four participants were categorized as having moderate PIU. Participants in the high category reported difficulties controlling the duration of internet use, strong urges to remain online, and a tendency to neglect important academic and daily responsibilities. In contrast, participants in the moderate category demonstrated some ability to regulate their internet use, although they still reported relying on the internet as a means of coping with stress and negative emotions. These findings are consistent with the conceptualization of PIU proposed by Caplan [8] and Davis [29], who emphasize that problematic internet use is characterized by impaired self-regulation and the tendency to use online activities as a maladaptive coping strategy.

Following the intervention, all participants demonstrated reductions in PIU scores, as reflected by their movement into the moderate category during the post-test assessment. Furthermore, the follow-up results indicated that these improvements were generally maintained over time. The Friedman test revealed significant differences across the three measurement points, suggesting that mindfulness training using the body scan technique contributed to changes in participants' levels of problematic internet use. These findings support previous studies indicating that mindfulness-based interventions can reduce problematic internet-related behaviors by enhancing self-awareness and reducing automatic behavioral responses [27], [35].

The effectiveness of the intervention may be understood through the mechanism of interoceptive awareness cultivated during body scan practice. Gibson [26] argues that body scan meditation enhances awareness of bodily sensations and internal experiences, enabling individuals to become more sensitive to the early signs of stress, anxiety, tension, and boredom. This heightened awareness allows individuals to recognize emotional discomfort before it escalates into automatic behavioral responses. According to Davis's cognitive-behavioral model [29], PIU is maintained by maladaptive cognitions and the tendency to use the internet as a strategy for regulating negative emotions. Individuals experiencing emotional distress may develop beliefs that internet use is the most effective way to alleviate discomfort. Through body scan practice, participants learn to observe bodily sensations and emotional experiences without immediately reacting to them, thereby reducing reliance on internet use as an automatic coping mechanism.

The findings also suggest that body scan practice may support emotional regulation processes. Previous studies have shown that mindfulness interventions help individuals respond more adaptively to stressful experiences by increasing acceptance and awareness of present-moment experiences [23], [24], [25]. Samanta et al. [27] further reported that mindfulness-based interventions reduce stress, anxiety, and depression, all of which are psychological factors commonly associated with problematic internet use. Consequently, the reduction in PIU observed in the present study may not result solely from changes in internet-use behavior itself, but also from improvements in participants' ability to regulate emotional experiences.

Qualitative reflections collected throughout the intervention provide additional insight into the quantitative findings. Prior to participating in the training, several participants reported experiencing physical tension, racing thoughts, difficulties concentrating, and a tendency to use the internet whenever they felt stressed, overwhelmed, or emotionally distressed. Participants frequently described internet use as a quick and accessible means of escaping from academic pressures, personal concerns, or unpleasant emotions. Following the body scan exercises, participants reported feeling physically more relaxed, mentally calmer, and increasingly aware of their bodily sensations and emotional states. Several participants also reported becoming more aware of urges to access the internet and experiencing a greater capacity to pause and reflect before acting on those urges. These reflections suggest that the intervention facilitated greater self-awareness and emotional regulation, processes that may not be fully captured by quantitative scores alone.

The qualitative findings further support the theoretical assumption that problematic internet use often functions as a mood-regulation strategy. Moore et al. [39] suggest that individuals experiencing negative emotional states tend to seek immediate forms of relief rather than engage in reflective decision-making. Similarly, Sinha et al. [40] argue that internet-based activities often provide rapid gratification and distraction, making them attractive coping strategies during periods of emotional distress. The participants' reflections in the present study indicate that many initially relied on internet use to avoid unpleasant emotions but gradually developed greater awareness of these emotional experiences through body scan practice. As participants became more capable of recognizing and accepting emotional discomfort, their reliance on internet use as a coping mechanism appeared to decrease.

An important practical implication of these findings is that the body scan technique may represent a feasible and accessible intervention for university students. Unlike many psychological interventions that require extensive resources, body scan exercises can be practiced independently, require minimal equipment, and can be delivered through guided audio recordings. Kogan and Bussolari [41] describe body scan as one of the most accessible mindfulness practices for beginners because of its simplicity and flexibility. Similarly, Ussher et al. [42] argue that brief mindfulness interventions are cost-effective and relatively easy to implement across different settings. Therefore, body scan training may be particularly suitable for university counseling services seeking low-cost approaches to support students' digital well-being and reduce problematic internet use.

Despite these promising findings, several limitations should be considered when interpreting the results. First, the study employed a one-group pretest-posttest design without a control group and involved only eight participants. Although the findings provide preliminary support for the effectiveness of the intervention, the small sample size limits the generalizability of the results and increases vulnerability to potential confounding variables. Consequently, the findings should be interpreted as preliminary evidence rather than definitive proof of effectiveness.

Second, environmental conditions during the face-to-face training sessions were not entirely conducive to mindfulness practice. External distractions, including conversations outside the room and construction-related noise, occasionally disrupted participants' concentration during the body scan exercises. Previous studies have demonstrated that environmental noise can interfere with attentional focus and reduce the effectiveness of meditation-based interventions [44], [45]. Therefore, environmental conditions may have influenced the quality of participants' mindfulness experiences and potentially affected the magnitude of the intervention effects.

Another factor that may have influenced the results concerns compliance with the seven-day self-guided practice period. Participants were monitored daily through a WhatsApp group and received reminders to complete their independent body scan exercises. However, although monitoring procedures were implemented, the duration, quality, and level of engagement in self-practice likely varied across participants. Such variation may partially explain why several participants exhibited slight increases in PIU scores during the follow-up assessment despite maintaining overall improvements relative to baseline. Morgan et al. [43] emphasize that the benefits of mindfulness are strongly dependent on regular and sustained practice. Accordingly, differences in participants' engagement with independent practice may have contributed to variations in the stability of outcomes observed at follow-up.

Overall, the findings of this pilot study provide preliminary evidence that mindfulness training using the body scan technique may reduce Problematic Internet Use among female college students. The integration of quantitative findings and participant reflections suggests that increased interoceptive awareness and improved emotional regulation may represent important mechanisms underlying these changes. Nevertheless, future studies involving larger and more diverse samples, control groups, longer follow-up periods, and more objective measures of practice adherence are necessary to further establish the effectiveness and long-term impact of body scan interventions for Problematic Internet Use.

5 CONCLUSION

Based on the results of this study, it can be concluded that body scan training provides preliminary support for its effectiveness in reducing Problematic Internet Use (PIU) among female university students. The decrease in PIU scores following the intervention, which was maintained at the follow-up stage, suggests that body scan training has the potential to help students manage their internet use more adaptively through enhanced self-awareness and emotion regulation.

These findings indicate that body scan training may be considered an accessible, low-cost digital well-being intervention that can be integrated into university counseling services. However, given that this study was a pilot investigation with a limited number of participants, future research should involve larger and more diverse samples and employ control groups to provide stronger evidence regarding the effectiveness of the intervention. Furthermore, the use of more objective and standardized methods for monitoring independent practice is needed to more accurately evaluate the sustainability of the intervention's effects over time.

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