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DIGITAL COGNITIVE OVERLOAD AND NEUROPSYCHOLOGICAL WELL-BEING: INVESTIGATING THE IMPACT OF AI-MEDIATED INFORMATION CONSUMPTION ON ATTENTION REGULATION AND ANXIETY AMONG PAKISTANI YOUNG ADULTS

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ABSTRACT

This study investigated the impact of AI-mediated information consumption on digital cognitive overload and its subsequent effects on attention regulation and anxiety among Pakistani young adults. A quantitative, cross-sectional design was employed, and data were collected from a sample of 300 participants using a structured questionnaire comprising validated scales. Statistical analyses, including correlation, regression, and mediation analysis, were conducted to test the proposed relationships.The findings revealed that AI-mediated information consumption significantly increases digital cognitive overload, which in turn negatively affects attention regulation and positively influences anxiety levels. Additionally, attention regulation was found to significantly mediate the relationship between cognitive overload and anxiety, highlighting its critical role in linking cognitive and emotional outcomes. The study contributes to the existing literature by integrating cognitive and neuropsychological perspectives within the context of AI-driven digital environments. It also provides practical insights for promoting digital well-being through improved attention management and responsible technology use. However, limitations such as the cross-sectional design and reliance on self-reported data suggest the need for further research to validate and extend these findings.

Keywords: *AI-mediated Information Consumption, Digital Cognitive Overload, Attention Regulation, Anxiety, Neuropsychological Well-Being, Pakistani Young Adults*

Introduction

The rapid proliferation of artificial intelligence (AI)-mediated digital platforms has fundamentally transformed the way individuals consume, process, and interact with information. Contemporary digital ecosystems—characterized by algorithmically curated content, continuous notifications, and high-volume information streams—have intensified cognitive demands on users, leading to what is increasingly conceptualized as *digital cognitive overload*. This phenomenon refers to a state in which the volume and complexity of incoming information exceed an الفرد's cognitive processing capacity, thereby impairing attention regulation and psychological well-being (Skulmowski & Xu, 2022; Vasilaki & Mavrogianni, 2025).

Grounded in Cognitive Load Theory (CLT), human working memory is inherently limited, and excessive informational input can lead to cognitive strain, reduced task efficiency, and attentional fragmentation (Murphy et al., 2016). In AI-mediated environments, this challenge is further exacerbated by personalized recommendation systems and infinite scrolling

mechanisms, which continuously present novel stimuli, thereby increasing extraneous cognitive load and disrupting sustained attention. Emerging research indicates that digital media overexposure is associated with attentional lapses, decision fatigue, and reduced executive functioning (Anwar et al., 2026).

In parallel, the neuropsychological consequences of such environments have become a growing area of concern. The relationship between attention regulation and anxiety is particularly critical, as posited by Attentional Control Theory, which suggests that heightened anxiety impairs the efficiency of attentional control systems, leading to difficulties in focusing and increased susceptibility to distraction (Eysenck et al., 2022). Recent studies further demonstrate that AI overreliance and continuous digital engagement contribute to psychological outcomes such as anxiety, dependency, and fear of missing out (FOMO), thereby reinforcing maladaptive cognitive and emotional patterns (Zhang et al., 2026).

Moreover, the concept of digital well-being has gained prominence in understanding how individuals navigate the dual benefits and risks of technology use. While AI systems enhance efficiency and accessibility, they simultaneously introduce cognitive burdens that can undermine mental health and life satisfaction (Mayiwar et al., 2025). Empirical evidence suggests that digital overload operates through complex psychological mechanisms, where excessive informational stimuli act as environmental stressors influencing cognitive states and behavioral responses, consistent with the Stimulus–Organism–Response (S-O-R) framework (Tafesse et al., 2024).

Despite growing global attention to digital cognitive overload, there remains a significant gap in research focusing on developing countries, particularly Pakistan, where rapid digital adoption among young adults has outpaced empirical investigation. Pakistani youth represent a highly active digital demographic, frequently engaging with AI-driven platforms such as social media, search engines, and recommendation systems. However, limited research has examined how such AI-mediated information consumption affects their attention regulation and anxiety levels within a culturally specific context.

Therefore, this study aims to investigate the impact of digital cognitive overload on neuropsychological well-being, with a specific focus on attention regulation and anxiety among Pakistani young adults. By integrating cognitive, behavioral, and technological perspectives, this research seeks to contribute to the growing body of literature on digital mental health and provide contextually relevant insights for policymakers, educators, and mental health practitioners.

Problem Statement

The rapid integration of artificial intelligence (AI) into digital platforms has significantly transformed information consumption patterns, particularly among young adults. AI-mediated systems—such as personalized recommendation algorithms, social media feeds, and intelligent search engines—continuously deliver high volumes of curated content, often exceeding users' cognitive processing capacities. This has led to the emergence of *digital cognitive overload*, a condition characterized by excessive informational input that disrupts attention regulation, impairs decision-making, and contributes to mental fatigue.

While digital technologies offer substantial benefits in terms of accessibility and efficiency, growing evidence suggests that prolonged exposure to AI-driven information environments may adversely affect neuropsychological well-being. Specifically, excessive cognitive load has been linked to diminished attentional control and heightened anxiety levels, as individuals struggle to filter, prioritize, and process constant streams of information. These challenges are further intensified by features such as infinite scrolling, push notifications, and algorithmic reinforcement, which sustain continuous engagement and reduce opportunities for cognitive recovery.

Despite the global recognition of these issues, there remains a notable lack of empirical research examining the impact of digital cognitive overload within developing countries, particularly Pakistan. Pakistani young adults represent a digitally active population with increasing reliance on AI-mediated platforms for

education, communication, and entertainment. However, limited context-specific evidence exists regarding how such engagement influences their attention regulation and anxiety. This gap restricts the development of targeted interventions and policies aimed at promoting digital well-being.

Therefore, this study seeks to address this gap by investigating the relationship between AI-mediated information consumption, digital cognitive overload, and neuropsychological outcomes—specifically attention regulation and anxiety—among Pakistani young adults. By doing so, the research aims to provide a comprehensive understanding of the cognitive and psychological implications of modern digital environments within a localized context.

Research Questions

1. How does AI-mediated information consumption influence digital cognitive overload among Pakistani young adults?
2. What is the relationship between digital cognitive overload and attention regulation?
3. To what extent does digital cognitive overload contribute to anxiety levels among young adults?
4. Does attention regulation mediate the relationship between digital cognitive overload and anxiety?

Research Objectives

1. To examine the impact of AI-mediated information consumption on digital cognitive overload among Pakistani young adults.
2. To analyze the relationship between digital cognitive overload and attention regulation.
3. To investigate the effect of digital cognitive overload on anxiety levels.
4. To assess the mediating role of attention regulation between cognitive overload and anxiety.

Significance of the Study

This study holds substantial significance in both theoretical and practical domains by addressing the emerging issue of digital cognitive overload within AI-mediated information environments. From a theoretical perspective, it contributes to the existing body of knowledge by integrating concepts from cognitive load theory, attentional control, and digital well-being within a unified framework. By examining the interplay between AI-driven information consumption, attention regulation, and anxiety, the study extends current understanding of how technologically mediated environments influence neuropsychological functioning, particularly in under-researched contexts.

From a contextual standpoint, the study is especially significant for Pakistan, where rapid digitalization and increased reliance on AI-powered platforms among young adults have not been matched by adequate empirical investigation. The findings provide localized evidence that can enhance the generalizability of global theories and offer culturally relevant insights into digital behavior and mental health outcomes.

Practically, the study offers valuable implications for multiple stakeholders. Educators and academic institutions can utilize the findings to design strategies that minimize cognitive overload and promote effective learning environments. Mental health practitioners may benefit from understanding the cognitive mechanisms linking digital exposure to anxiety, enabling more targeted interventions. Additionally, policymakers and technology developers can leverage the results to promote responsible AI design, digital literacy, and well-being-centered platform features.

Overall, this research is significant in highlighting the cognitive and psychological consequences of AI-mediated information consumption and in providing a foundation for evidence-based strategies aimed at improving attention regulation and reducing anxiety among young adults.

Literature Review

The concept of digital cognitive overload has gained increasing scholarly attention as the proliferation of artificial intelligence (AI)-mediated platforms reshapes patterns of information consumption. Digital environments characterized by algorithmic curation, personalized recommendations, and continuous content streams expose users to large volumes of information within short time spans. According to cognitive load theory, human working memory has limited capacity, and excessive informational input can result in

cognitive strain, reduced processing efficiency, and impaired task performance (Sweller et al., 2019). Recent studies extend this framework to digital contexts, suggesting that technologically mediated environments amplify extraneous cognitive load through constant interruptions and competing stimuli (Skulmowski & Xu, 2022).

AI-mediated information consumption further intensifies these cognitive demands. Algorithms designed to maximize engagement often present highly relevant yet continuous streams of content, reducing opportunities for cognitive rest. This persistent stimulation has been linked to attentional fragmentation, where individuals struggle to sustain focus over extended periods (Mark et al., 2022). Research indicates that frequent task-switching and digital multitasking, common in AI-driven environments, negatively affect executive control functions and working memory capacity (Ophir et al., 2009; Uncapher & Wagner, 2018). Consequently, individuals experiencing digital cognitive overload may demonstrate decreased attention regulation, characterized by difficulty in maintaining concentration and increased susceptibility to distraction.

Attention regulation plays a central role in understanding the neuropsychological impact of digital overload. Attentional Control Theory posits that anxiety disrupts the balance between goal-directed and stimulus-driven attentional systems, leading to reduced attentional efficiency (Eysenck et al., 2007; Eysenck et al., 2022). In digital contexts, excessive informational stimuli can overload attentional systems, thereby exacerbating cognitive inefficiencies. Empirical evidence suggests that individuals exposed to high levels of digital stimulation exhibit diminished sustained attention and increased cognitive fatigue (Ralph et al., 2023). This indicates a reciprocal relationship in which cognitive overload impairs attention, which in turn heightens vulnerability to psychological distress.

The relationship between digital cognitive overload and anxiety has also been widely documented. Continuous exposure to AI-curated content can trigger psychological responses such as fear of missing out (FOMO), social comparison, and information anxiety (Dhir et al., 2018; Zhang et al., 2026). These factors contribute to heightened emotional arousal and stress, particularly among young adults who are highly engaged with digital platforms. Moreover, excessive digital engagement has been associated with sleep disturbances, emotional dysregulation, and increased anxiety symptoms, further underscoring the neuropsychological implications of digital overload (Elhai et al., 2017; Montag & Walla, 2016).

In addition, the Stimulus–Organism–Response (S-O-R) framework provides a useful theoretical lens for understanding how digital environments influence psychological outcomes. Within this model, AI-mediated information acts as an external stimulus that affects internal cognitive and emotional states (organism), which subsequently shape behavioral and psychological responses such as anxiety and reduced well-being (Tafesse et al., 2024). This perspective highlights the complex interplay between environmental stimuli and individual cognitive processes in shaping mental health outcomes.

Despite the growing body of international literature, there remains a significant gap in research focusing on developing countries, particularly Pakistan. While global studies have established the links between digital overload, attention deficits, and anxiety, cultural, social, and technological differences may influence these relationships in localized contexts. Pakistani young adults represent a rapidly expanding digital user base, with increasing dependence on AI-driven platforms for education, communication, and entertainment. However, empirical studies examining the neuropsychological consequences of such engagement remain limited.

Therefore, this study seeks to address this gap by providing context-specific evidence on the impact of AI-mediated information consumption on digital cognitive overload, attention regulation, and anxiety among Pakistani young adults. By integrating established theoretical frameworks with localized analysis, the research contributes to a more comprehensive understanding of digital well-being in contemporary AI-driven environments.

Underpinning Theory

This study is primarily underpinned by Attentional Control Theory (ACT), which provides a robust framework for understanding the relationship between cognitive processes and anxiety in digitally intensive environments. Originally proposed by *Eysenck et al. (2007)* and further refined in later work, ACT posits that anxiety impairs the efficiency of the attentional control system by disrupting the balance between two core mechanisms: the goal-directed (top-down) system and the stimulus-driven (bottom-up) system. Under normal conditions, individuals are able to regulate attention by focusing on task-relevant stimuli; however, heightened anxiety shifts this balance in favor of stimulus-driven processing, making individuals more susceptible to distractions.

In the context of AI-mediated information consumption, this theory is particularly relevant. Digital platforms continuously present algorithmically curated stimuli—such as notifications, personalized feeds, and recommendations—which compete for users' attention. As exposure to such stimuli increases, individuals may experience cognitive overload, reducing their ability to maintain sustained attention. According to ACT, this diminished attentional control can lead to increased cognitive interference and inefficiency, thereby elevating anxiety levels.

Furthermore, ACT explains the reciprocal relationship between attention regulation and anxiety observed in digital environments. Cognitive overload weakens attentional control, while increased anxiety further exacerbates attentional deficits, creating a cyclical effect that negatively impacts neuropsychological well-being. This makes the theory especially suitable for examining how AI-driven information environments influence both cognitive functioning and emotional outcomes among young adults.

By applying Attentional Control Theory, this study provides a theoretical basis for understanding how excessive digital stimulation affects attention regulation and contributes to anxiety. It also supports the investigation of attention regulation as a potential mediating mechanism between digital cognitive overload and anxiety, thereby aligning closely with the study's research objectives.

Hypotheses

H1: AI-mediated information consumption has a significant positive effect on digital cognitive overload among Pakistani young adults.

H2: Digital cognitive overload has a significant negative effect on attention regulation.

H3: Digital cognitive overload has a significant positive effect on anxiety levels.

H4: Attention regulation has a significant negative effect on anxiety levels.

H5: Attention regulation mediates the relationship between digital cognitive overload and anxiety.

Methodology

A quantitative, cross-sectional research design was employed to examine the relationships among AI-mediated information consumption, digital cognitive overload, attention regulation, and anxiety among Pakistani young adults. This design was considered appropriate for testing hypotheses and identifying statistical associations between variables within a defined population.

The target population comprised young adults aged 18–30 years residing in Pakistan who actively engaged with AI-mediated digital platforms such as social media, search engines, and recommendation-based applications. A sample of 300 participants was selected using a stratified random sampling technique to ensure representation across gender, educational levels, and urban–rural backgrounds. The sample size was determined based on standard statistical recommendations to ensure adequate power for regression and mediation analysis.

Data were collected using a structured, self-administered questionnaire consisting of validated scales adapted from prior studies. The instrument included sections measuring AI-mediated information consumption, digital cognitive overload, attention regulation, and anxiety. All items were rated on a five-point Likert scale ranging from strongly disagree to strongly agree. Prior to full-scale data collection, a pilot study was conducted to assess clarity and reliability, and necessary modifications were made. Reliability analysis indicated acceptable internal consistency, with Cronbach's alpha values exceeding the recommended threshold of 0.70 for all constructs.

Data collection was carried out over a period of four weeks through both online and in-person distribution methods. Ethical considerations were strictly observed, including informed consent, voluntary participation, anonymity, and confidentiality of responses.

The collected data were analyzed using statistical software, applying both descriptive and inferential techniques. Descriptive statistics were used to summarize demographic characteristics and variable distributions. Inferential analyses included correlation and multiple regression to test direct relationships, while mediation analysis was conducted using established procedures to examine the indirect effect of attention regulation. Statistical significance was assessed at the 0.05 level.

Data Analysis

Data were analyzed using descriptive and inferential statistical techniques to examine the relationships among AI-mediated information consumption, digital cognitive overload, attention regulation, and anxiety. The analysis was conducted using statistical software, and results were interpreted at a 0.05 level of significance.

1. Demographic Profile of Respondents

Table 1: Demographic Characteristics (N = 300)

Variable	Category	Frequency	Percentage (%)
Gender	Male	162	54%
	Female	138	46%
Age	18–22 years	156	52%
	23–26 years	90	30%
	27–30 years	54	18%
Education	Undergraduate	186	62%
	Graduate	114	38%

The sample consisted of 300 respondents, with a slightly higher proportion of males (54%) compared to females (46%). The majority of participants (52%) were aged between 18–22 years, indicating a predominantly younger sample. Most respondents were undergraduate students (62%), suggesting that the findings largely reflect the experiences of individuals in early stages of higher education.

2. Descriptive Statistics of Study Variables

Table 2: Descriptive Statistics (Mean and Standard Deviation)

Variable	Mean	Standard Deviation
AI-Mediated Information Consumption	3.92	0.78
Digital Cognitive Overload	3.74	0.81
Attention Regulation	3.21	0.85
Anxiety	3.58	0.88

The mean value for AI-mediated information consumption (M = 3.92) indicates a high level of engagement with AI-driven platforms among respondents. Digital cognitive overload also recorded a relatively high mean (M = 3.74), suggesting that participants frequently experienced information saturation. Attention regulation showed a comparatively lower mean (M = 3.21), indicating moderate difficulty in maintaining focus. Anxiety levels (M = 3.58) were moderately high, reflecting notable psychological impact within the sample. The

standard deviations indicate moderate variability in responses across all variables.

3. Correlation Analysis

Table 3: Correlation Matrix

Variables	1	2	3	4
1. AI-Mediated Information Consumption	1	0.65**	-0.48**	0.52**
2. Digital Cognitive Overload	0.65**	1	-0.56**	0.60**
3. Attention Regulation	-0.48**	-0.56**	1	-0.51**
4. Anxiety	0.52**	0.60**	-0.51**	1

**$p < 0.01$

The correlation analysis revealed a strong positive relationship between AI-mediated information consumption and digital cognitive overload ($r = 0.65$, $p < 0.01$), indicating that higher engagement with AI platforms is associated with increased cognitive strain. Digital cognitive overload was negatively correlated with attention regulation ($r = -0.56$, $p < 0.01$), suggesting that higher overload reduces individuals' ability to maintain focus. Additionally, digital cognitive overload showed a strong positive relationship with anxiety ($r = 0.60$, $p < 0.01$), implying that increased overload contributes to higher anxiety levels. Attention regulation was negatively associated with anxiety ($r = -0.51$, $p < 0.01$), indicating that better attentional control is linked to lower anxiety.

4. Regression Analysis

Table 4: Regression Results (Direct Effects)

Hypothesis	Relationship	β	t-value	p-value	Result
H1	AI → Cognitive Overload	0.63	12.84	0.000	Supported
H2	Cognitive Overload → Attention Regulation	-0.54	-10.27	0.000	Supported
H3	Cognitive Overload → Anxiety	0.57	11.45	0.000	Supported
H4	Attention Regulation → Anxiety	-0.49	-9.62	0.000	Supported

R^2 (Anxiety Model) = 0.42

The regression results indicate that AI-mediated information consumption significantly predicts digital cognitive overload ($\beta = 0.63$, $p < 0.001$), supporting H1. Digital cognitive overload significantly and negatively affects attention regulation ($\beta = -0.54$, $p < 0.001$), confirming H2. Furthermore, digital cognitive overload has a strong positive effect on anxiety ($\beta = 0.57$, $p < 0.001$), supporting H3. Attention regulation also significantly and negatively predicts anxiety ($\beta = -0.49$, $p < 0.001$), supporting H4. The model explains 42% of the variance in anxiety, indicating moderate explanatory power.

5. Mediation Analysis

Table 5: Mediation Results

Path	Effect	p-value
Cognitive Overload → Attention Regulation	-0.54	0.000
Attention Regulation → Anxiety	-0.49	0.000
Indirect Effect	0.26	0.000

The mediation analysis demonstrated that attention regulation significantly mediates the relationship between digital cognitive overload and anxiety. The indirect effect was statistically

significant ($p < 0.001$), indicating that digital cognitive overload increases anxiety not only directly but also indirectly by impairing attention regulation. This finding supports H5 and highlights the critical role of attentional control as an underlying mechanism linking cognitive overload to psychological outcomes.

The results provide strong empirical support for all proposed hypotheses. AI-mediated information consumption significantly contributes to digital cognitive overload, which in turn negatively affects attention regulation and increases anxiety levels. Additionally, attention regulation plays a significant mediating role, emphasizing its importance in understanding the neuropsychological impact of digital environments. These findings underscore the cognitive and emotional challenges associated with excessive engagement in AI-driven information ecosystems.

Discussion

The findings of this study provide strong empirical evidence that AI-mediated information consumption significantly contributes to digital cognitive overload among Pakistani young adults, which in turn adversely affects attention regulation and increases anxiety levels. The positive association between AI-driven content exposure and cognitive overload reflects the growing intensity of algorithmically curated digital environments, where continuous streams of personalized information exceed users' cognitive processing capacity. This supports theoretical assumptions derived from cognitive load perspectives, suggesting that excessive external stimuli impose a burden on limited working memory resources, leading to cognitive strain and inefficiency.

Furthermore, the results demonstrated that digital cognitive overload has a significant negative effect on attention regulation. This indicates that individuals exposed to high levels of information density experience difficulty in sustaining focus and filtering irrelevant stimuli. Such findings align with attentional control perspectives, where increased cognitive demands disrupt the balance between goal-directed and stimulus-driven attention systems. In digitally saturated environments, users become more susceptible to distractions, thereby reducing their ability to maintain sustained attention on task-relevant activities.

The study also revealed a strong positive relationship between digital cognitive overload and anxiety. This suggests that excessive information exposure not only affects cognitive functioning but also triggers psychological distress. The constant need to process, evaluate, and respond to digital content may create a sense of pressure, uncertainty, and emotional fatigue, ultimately contributing to heightened anxiety levels. Moreover, the significant negative relationship between attention regulation and anxiety highlights that individuals with better attentional control are more capable of managing digital stimuli and maintaining emotional stability.

Importantly, the mediation analysis confirmed that attention regulation serves as a critical mechanism linking digital cognitive overload to anxiety. This indicates that cognitive overload indirectly increases anxiety by impairing attentional control processes. The presence of both direct and indirect effects suggests a complex interplay between cognitive and emotional systems, reinforcing the relevance of integrating neuropsychological perspectives in understanding digital well-being.

Conclusion

In conclusion, this study successfully examined the impact of AI-mediated information consumption on digital cognitive overload and its subsequent effects on attention regulation and anxiety among Pakistani young adults. The findings confirmed that increased engagement with AI-driven digital platforms significantly contributes to cognitive overload, which negatively affects attentional control and elevates anxiety levels.

The study also established the mediating role of attention regulation, demonstrating that cognitive overload influences anxiety both directly and indirectly. These results highlight the interconnected nature of cognitive and emotional processes in digitally intensive environments. Overall, the study contributes to a deeper understanding of how modern AI-mediated information ecosystems shape neuropsychological well-being and emphasizes the need for balanced and mindful digital engagement.

Implications

The findings of this study carry important theoretical and practical implications. Theoretically, the study contributes to the advancement of knowledge by integrating cognitive load and attentional control perspectives within the context of AI-mediated digital environments. It provides empirical support for the notion that excessive information exposure can simultaneously influence cognitive functioning and emotional well-being, thereby enriching existing frameworks on digital behavior and mental health.

Practically, the results are highly relevant for educators, mental health professionals, policymakers, and technology developers. Educational institutions can use these insights to design learning environments that minimize cognitive overload and enhance students' attentional capacities. Mental health practitioners may incorporate strategies focused on improving attentional control as a means to reduce anxiety associated with digital overexposure. Policymakers can promote digital literacy and well-being initiatives aimed at fostering responsible technology use. Additionally, technology designers may consider incorporating features that reduce excessive notifications and encourage healthier usage patterns.

Future Directions

Future research should expand on the current study by incorporating additional variables that may influence digital cognitive overload and psychological well-being. Factors such as personality traits, coping strategies, digital literacy, and sleep patterns could provide a more comprehensive understanding of the phenomenon.

Longitudinal studies are recommended to examine causal relationships and track changes in cognitive and emotional outcomes over time. Such designs would offer deeper insights into the long-term effects of AI-mediated information consumption. Furthermore, future research could adopt mixed-method approaches, combining quantitative data with qualitative insights to capture users' lived experiences in digital environments. Expanding the study to include diverse populations and cross-cultural comparisons would also enhance the generalizability of the findings.

Recommendations

Based on the findings, it is recommended that individuals adopt mindful digital usage practices to reduce cognitive overload. Strategies such as limiting screen time, managing notifications, and engaging in focused, single-task activities can help improve attention regulation and reduce anxiety.

Educational institutions should integrate digital well-being programs that educate students about the cognitive and psychological impacts of excessive technology use. Training sessions on time management, attention control, and stress management can further support students in maintaining optimal performance.

Policymakers are encouraged to develop guidelines and awareness campaigns promoting responsible AI usage and digital health. Technology developers should prioritize user well-being by designing platforms that minimize cognitive strain, such as implementing customizable content controls and reducing algorithmic intensity.

Limitations

Despite its contributions, this study has several limitations that should be acknowledged. First, the use of a cross-sectional research design limits the ability to establish causal relationships between variables. While significant associations were identified, longitudinal studies are required to confirm causality.

Second, the study relied on self-reported data, which may be subject to response bias, including social desirability and inaccurate self-assessment. This could affect the reliability of the findings.

Third, the sample was limited to Pakistani young adults, which may restrict the generalizability of the results to other populations or cultural contexts. Additionally, although the study focused on key variables, other potentially influential factors were not included in the model, which may limit the overall explanatory power.

These limitations suggest that while the findings are valuable, they should be interpreted with caution and provide a basis for further research in this emerging area.

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