

Original Research

Digital Stress, Sleep Quality, and Emotion Regulation as Predictors of Psychological Well-Being Among Migrant University Students in the United Arab Emirates

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Abstract

The proliferation of digital technology has introduced novel stressors that may disproportionately affect migrant adolescents and young adults, a growing demographic in the United Arab Emirates (UAE). This study aimed to investigate the associations between digital stress, emotion regulation, sleep quality, and psychological well-being (depression and anxiety) in this population. A quantitative, cross-sectional study was conducted with 275 multinational migrant university students (≥ 18 years) residing in the UAE. Participants completed an online survey comprising the Smartphone Addiction Scale (SAS), the Emotion Regulation Questionnaire-Short Form (ERQ-SF), the Pittsburgh Sleep Quality Index (PSQI), the Patient Health Questionnaire-9 (PHQ-9), and the Generalized Anxiety Disorder-7 (GAD-7) scale. Data were analyzed using descriptive statistics, Pearson correlations, and multiple linear regression. The mean age of participants was 21.1 years ($SD = 2.3$), with 62.5% identifying as female. Significant positive correlations were found between digital stress (SAS scores) and symptoms of depression (PHQ-9; $r = 0.58$, $p < 0.001$) and anxiety (GAD-7; $r = 0.55$, $p < 0.001$). Poor sleep quality (PSQI scores) was also strongly associated with higher depression ($r = 0.62$, $p < 0.001$) and anxiety ($r = 0.59$, $p < 0.001$). Emotion regulation strategies showed varied



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associations, with expressive suppression being linked to poorer mental health outcomes. Multiple regression analysis revealed that digital stress ($\beta = 0.34$, $p < 0.001$) and poor sleep quality ($\beta = 0.41$, $p < 0.001$) were significant independent predictors of depressive symptoms, explaining 48% of the variance ($R^2 = 0.48$, $F(3, 271) = 83.1$, $p < 0.001$). Digital stress and poor sleep quality are potent risk factors for adverse psychological well-being among migrant young adults in the UAE. The findings underscore the need for culturally sensitive, targeted interventions within university and community settings to mitigate the negative impacts of digital life and promote healthy coping mechanisms and sleep hygiene in this vulnerable population.

Keywords

Digital stress; psychological well-being; sleep quality; emotion regulation; migrant youth; UAE; smartphone addiction

1. Introduction

Adolescence and young adulthood represent a critical developmental period characterized by profound physiological, psychological, and social transformations [1]. This stage is pivotal for identity formation, the establishment of peer and romantic relationships, and the cultivation of psychological well-being that can shape lifelong mental health trajectories [2]. However, this period is also marked by heightened vulnerability to mental health challenges, including depression, anxiety, and stress-related disorders, which are leading causes of disability worldwide [3]. In recent years, the mental health landscape for young people has been dramatically reshaped by two converging forces: the ubiquity of digital technology and the stressors associated with global mobility and migration [4, 5]. The United Arab Emirates (UAE), with its highly digitized society and large, diverse migrant population, provides a unique context to explore the intersection of these phenomena [6].

The digital age has fundamentally altered how young people communicate, learn, and socialize. With smartphone penetration among teenagers approaching 95% in many developed regions, and with internet usage in the UAE reaching 91% of the population, digital platforms have become integral to daily life [7, 8]. While these technologies offer unprecedented opportunities for connection and information sharing, a growing body of evidence highlights their potential for adverse psychological consequences [9]. The concept of “digital stress” has emerged to describe the unique stressors arising from the digital environment, such as the pressure for constant availability, the fear of missing out (FoMO), and the anxiety related to online social evaluation [10]. Studies conducted in the UAE and the broader Arab region have linked high social media use and smartphone addiction to poor mental health outcomes, including increased anxiety, depression, sleep disturbances, and diminished academic performance [11, 12]. This excessive use, often termed a “double-edged sword”, can create a cycle of perpetual notifications and social pressure, exacerbating symptoms of anxiety and depression [9].

One of the most critical pathways through which digital stress may impact mental health is via the disruption of sleep. The link between screen time and poor sleep quality is well-documented,

with nighttime technology use being a significant predictor of sleep disturbances [13, 14]. Poor sleep quality, in turn, is a potent risk factor for difficulties in emotion regulation—the process by which individuals manage their emotional experiences and expressions [15]. Adolescents with insufficient sleep are more prone to emotional volatility, impulsivity, and impaired functioning of brain regions responsible for emotional processing, such as the amygdala and prefrontal cortex [16]. This bidirectional relationship creates a vicious cycle: digital stress disrupts sleep, poor sleep impairs emotion regulation, and dysregulated emotions can lead to increased reliance on digital devices for coping, further fueling stress and sleep problems [17]. The cognitive resources depleted by poor sleep and constant digital engagement can also compromise self-control and increase susceptibility to social exclusion, further compounding mental health risks [16].

For migrant university students, digital stress may operate differently from the general student population because digital platforms are not only tools for communication but also mechanisms for maintaining transnational family ties, cultural belonging, and emotional support [5]. While smartphones and social media allow migrant youth to remain connected to their home cultures, they may also intensify acculturative pressure by exposing students simultaneously to expectations from their country of origin and norms of the host society. This dual digital exposure may create identity strain, social comparison, fear of exclusion, and emotional overload, thereby increasing vulnerability to anxiety, depressive symptoms, and sleep disruption [7].

These challenges are potentially amplified for migrant adolescents and young adults. This demographic, which constitutes a significant portion of the youth population in countries like the UAE, faces a unique constellation of stressors. In addition to the universal pressures of academia and social life, they must navigate the complexities of acculturation, which involves adapting to a new host culture while often maintaining ties to their culture of origin [18]. This process can lead to acculturative stress, cultural identity struggles, and intergenerational conflict, particularly when there is a gap in the pace of acculturation between youth and their parents [19]. Research indicates that multicultural adolescents and migrant youth are at a heightened risk for depression, social withdrawal, low self-esteem, and experiences of discrimination [2, 5]. Acculturative stress has been directly linked to poorer sleep quality and increased insomnia symptoms in Latinx and Asian American immigrant populations, suggesting that the burden of cultural adaptation can manifest physically and psychologically [20, 21].

Although studies in the UAE have examined social media use, sleep disturbance, and student mental health separately, limited research has focused specifically on migrant university students as a distinct group. Even fewer studies have examined how digital stress, sleep quality, and emotion regulation jointly relate to depression and anxiety within a multinational migrant sample in the UAE. This study addresses this gap by situating digital stress within the broader context of acculturation and migrant student vulnerability [22].

This study, therefore, aims to construct a predictive model examining the relationships between digital stress, emotion regulation, sleep quality, and psychological well-being (defined by symptoms of depression and anxiety) among migrant university students in the UAE. Although this study employed a cross-sectional design that precludes causal inference, we adopted a theoretically informed predictive framework based on existing empirical evidence to examine the hypothesized relationships among digital stress, sleep quality, emotion regulation, and psychological well-being. We hypothesize that: (1) Higher levels of digital stress will be significantly associated with poorer psychological well-being (higher depression and anxiety); (2) Poorer sleep quality will be

significantly associated with poorer psychological well-being; and (3) Sleep quality and emotion regulation will mediate the relationship between digital stress and psychological well-being. By exploring these associations, this research seeks to provide actionable insights for clinicians, educators, and policymakers to foster digital wellness and mental health resilience among migrant youth in the region and beyond. Conceptually, this study assumes three interrelated pathways. First, digital stress may directly predict poorer psychological well-being through constant connectivity, online social evaluation, and difficulty disengaging from digital demands. Second, digital stress may indirectly affect well-being through sleep quality, as excessive or emotionally charged digital engagement may delay sleep onset, reduce sleep duration, and increase daytime dysfunction. Third, emotion regulation may shape how students respond to both digital and acculturative stress. Expressive suppression may intensify distress by limiting emotional disclosure, whereas cognitive reappraisal may offer some protection by helping students reinterpret stressful experiences. However, because this study is cross-sectional, these pathways are theoretical and associative rather than causal. The hypothesized conceptual framework of the study is illustrated in Figure 1.

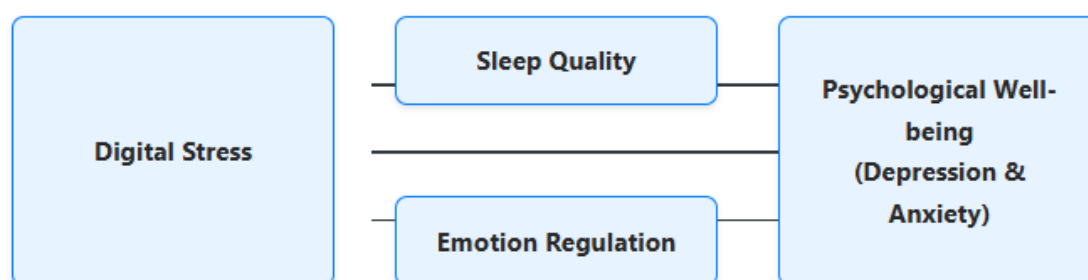


Figure 1 A conceptual diagram illustrating the hypothesized relationships based on the study's framework. Digital stress is posited to have a direct effect on psychological well-being, and also indirect effects mediated by sleep quality and emotion regulation.

2. Methods

2.1 Study Design

A quantitative, cross-sectional research design was employed to investigate the associations between digital stress, emotion regulation, sleep quality, and psychological well-being. Data were collected from participants at a single time point using a battery of standardized, self-report questionnaires administered online.

2.2 Participants and Setting

The study population consisted of undergraduate and graduate university students residing in the United Arab Emirates (UAE). A total of 275 participants were recruited using a convenience sampling method. Inclusion criteria were: (1) being aged 18 years or older; (2) being currently enrolled in a university in the UAE; and (3) identifying as a first- or second-generation migrant (i.e., the participant or at least one parent was born outside the UAE). Exclusion criteria included individuals with self-reported cognitive dysfunction that would impair their ability to complete the survey. Recruitment took place between September and December 2025 through online advertisements posted on university social media groups and digital forums. The sample was

intentionally diverse, reflecting the multinational composition of the UAE, with participants from various national backgrounds, including South Asian, Arab (from countries other than the UAE), Southeast Asian, and African regions.

2.3 Instruments

A comprehensive survey was compiled using validated, internationally recognized questionnaires. The survey was administered in English, as it is a primary language of instruction in most UAE universities.

2.4 Digital Stress

Digital stress was operationalized using the Smartphone Addiction Scale (SAS). The SAS is a 10-item self-report measure that assesses the degree of smartphone addiction, a key component of digital stress related to compulsive use and constant connectivity [9]. Participants rate their agreement with statements (e.g., “I will never give up using my smartphone even when my daily life is already greatly affected by it”) on a 6-point Likert scale. Higher total scores indicate a greater level of smartphone addiction. The SAS has demonstrated good reliability and has been validated in various cultural contexts, including Arab populations [9].

2.5 Emotion Regulation

Emotion regulation strategies were assessed using the Emotion Regulation Questionnaire-Short Form (ERQ-SF). This scale measures two common emotion regulation strategies: cognitive reappraisal (changing the way one thinks about a situation) and expressive suppression (inhibiting emotional expression) [16]. The scale consists of items rated on a 7-point Likert scale. The ERQ and its variants are widely used in psychological research to understand individual differences in emotional management.

2.6 Sleep Quality

Sleep quality over the past month was measured using the Pittsburgh Sleep Quality Index (PSQI). The PSQI is a 19-item self-report questionnaire that assesses sleep quality across seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction [23]. The component scores are summed to yield a global PSQI score, ranging from 0 to 21, where higher scores indicate poorer sleep quality. A global score >5 is commonly used to distinguish “poor” sleepers from “good” sleepers. The PSQI is a gold-standard measure for subjective sleep quality and has been validated extensively across diverse populations [24].

2.7 Psychological Well-Being

Psychological well-being was assessed through two widely used screening tools for depression and anxiety.

2.7.1 Depressive Symptoms

The Patient Health Questionnaire-9 (PHQ-9) was used to screen for and measure the severity of depressive symptoms [25]. The PHQ-9 consists of 9 items corresponding to the DSM-V criteria for major depressive disorder. Participants rate how often they have been bothered by each symptom over the last two weeks on a 4-point scale (0 = “Not at all” to 3 = “Nearly every day”). Total scores range from 0 to 27, with higher scores indicating greater depression severity. The PHQ-9 is a reliable and valid tool for use in both clinical and non-clinical settings [26].

2.7.2 Anxiety Symptoms

The Generalized Anxiety Disorder-7 (GAD-7) scale was used to measure the severity of anxiety symptoms [27]. The GAD-7 is a 7-item self-report scale where participants rate the frequency of anxiety symptoms over the past two weeks on a 4-point scale. Total scores range from 0 to 21, with higher scores reflecting more severe anxiety. The GAD-7 has demonstrated robust psychometric properties across various populations and is widely used for screening for generalized anxiety disorder [28].

2.8 Data Collection Procedure

The survey was created and hosted on Google Forms. A link to the survey was distributed online through university-affiliated channels. The first page of the survey provided detailed information about the study’s purpose, the voluntary nature of participation, confidentiality measures, and contact information for the research team. Participants provided electronic informed consent before proceeding. The survey took approximately 15-20 minutes to complete. To ensure data quality, all questionnaire items were set as mandatory, eliminating missing data from submitted responses. No personal identifiers were collected to ensure participant anonymity.

2.9 Statistical Analysis

All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS), version 29.0. A p-value of <0.05 was considered statistically significant for all tests. The analysis proceeded in three stages:

1. **Descriptive Statistics:** Frequencies, percentages, means, and standard deviations (SD) were calculated to describe the sociodemographic characteristics of the sample and the scores on the primary study variables (SAS, ERQ-SF, PSQI, PHQ-9, GAD-7).
2. **Correlational Analysis:** Pearson correlation coefficients (r) were computed to examine the bivariate relationships between digital stress, emotion regulation strategies, sleep quality, and psychological well-being (depression and anxiety).
3. **Regression Analysis:** Two separate multiple linear regression models were conducted to identify the predictors of depression (PHQ-9 scores) and anxiety (GAD-7 scores), respectively. In each model, digital stress (SAS), sleep quality (PSQI), and emotion regulation (ERQ-SF subscales) were entered as independent variables. This analysis allowed for the examination of the unique contribution of each predictor while controlling for the others.

2.10 Ethical Considerations

This study was approved by the Institutional Review Board of Bath Spa University RAK Campus (Approval No. BSURAK-PSY-2695). All procedures were conducted in accordance with the ethical principles of the Declaration of Helsinki. Participants were informed that their participation was completely voluntary and that they could withdraw at any time without penalty. Electronic informed consent was obtained from all participants before they began the survey. The data collected were anonymous and stored securely on a password-protected server accessible only to the primary research team. The survey included a concluding page with contact information for local mental health support services, providing resources for any participants who may have experienced distress while answering questions about their mental health.

3. Results

3.1 Participant Characteristics

A total of 275 university students completed the survey. The demographic characteristics of the sample are presented in Table 1. The mean age of the participants was 21.1 years ($SD = 2.3$), with an age range of 18 to 29 years. The majority of the sample identified as female ($n = 172$, 62.5%). The participants represented a diverse range of migrant backgrounds, with the largest groups being from South Asia (45.1%), other Arab countries (30.5%), and Southeast Asia (15.3%). Most participants were in their early years of university study, with 38.2% in their first year and 31.6% in their second year.

Table 1 Demographic Characteristics of Participants (N = 275).

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Female	172	62.5
	Male	103	37.5
Age Group (Years)	18-20	135	49.1
	21-23	110	40.0
	24+	30	10.9
Region of Origin	South Asia (e.g., India, Pakistan, Bangladesh)	124	45.1
	Arab Region (e.g., Egypt, Jordan, Syria)	84	30.5
	Southeast Asia (e.g., Philippines, Malaysia)	42	15.3
	Other (e.g., Africa, Europe)	25	9.1
Year of Study	First Year	105	38.2
	Second Year	87	31.6
	Third Year	55	20.0
	Fourth Year or Higher	28	10.2

3.2 Descriptive Statistics of Key Variables

The means, standard deviations, and score ranges for the main study variables are shown in Table 2. The mean score for digital stress (SAS) was 34.5 ($SD = 10.2$), indicating a moderate level of problematic smartphone use in the sample. The mean global PSQI score was 8.9 ($SD = 3.8$), which is

well above the cutoff of 5, suggesting that poor sleep quality was prevalent among participants. For psychological well-being, the mean PHQ-9 score was 12.4 (SD = 5.5) and the mean GAD-7 score was 11.8 (SD = 4.9). These scores fall into the moderate severity range for depressive and anxiety symptoms, respectively, indicating a significant level of psychological distress in the sample.

Table 2 Descriptive Statistics for Key Study Variables (N = 275).

Variable	Mean	SD	Possible Range	Observed Range
Digital Stress (SAS)	34.5	10.2	10-60	12-58
Sleep Quality (PSQI Global Score)	8.9	3.8	0-21	2-19
Depression (PHQ-9)	12.4	5.5	0-27	0-26
Anxiety (GAD-7)	11.8	4.9	0-21	0-21
Emotion Regulation: Cognitive Reappraisal (ERQ-CR)	28.7	6.1	6-42	15-42
Emotion Regulation: Expressive Suppression (ERQ-ES)	18.2	5.3	4-28	8-28

3.3 Correlational Analyses

Pearson correlation analyses were conducted to examine the relationships between all key variables (Table 3). As hypothesized, digital stress (SAS) was strongly and positively correlated with both depression (PHQ-9; $r = 0.58$, $p < 0.001$) and anxiety (GAD-7; $r = 0.55$, $p < 0.001$). Similarly, poor sleep quality (PSQI) showed strong positive correlations with depression ($r = 0.62$, $p < 0.001$) and anxiety ($r = 0.59$, $p < 0.001$). Digital stress was also moderately correlated with poor sleep quality ($r = 0.45$, $p < 0.001$). Regarding emotion regulation, expressive suppression was positively correlated with depression ($r = 0.31$, $p < 0.001$) and anxiety ($r = 0.28$, $p < 0.001$), while cognitive reappraisal showed a weak negative correlation with depression ($r = -0.19$, $p < 0.01$) but was not significantly correlated with anxiety.

Table 3 Pearson Correlation Matrix of Key Study Variables.

Variable	1	2	3	4	5	6
1. Digital Stress (SAS)	-					
2. Sleep Quality (PSQI)	0.45**	-				
3. Depression (PHQ-9)	0.58**	0.62**	-			
4. Anxiety (GAD-7)	0.55**	0.59**	0.75**	-		
5. ERQ - Cognitive Reappraisal	-0.15*	-0.22**	-0.19**	-0.11	-	
6. ERQ - Expressive Suppression	0.25**	0.20**	0.31**	0.28**	0.05	-

Note: * $p < 0.05$; ** $p < 0.01$. SAS = Smartphone Addiction Scale; PSQI = Pittsburgh Sleep Quality Index; PHQ-9 = Patient Health Questionnaire-9; GAD-7 = Generalized Anxiety Disorder-7; ERQ = Emotion Regulation Questionnaire.

3.4 Multiple Regression Analyses

Two multiple linear regression analyses were performed to determine the independent predictors of depression and anxiety. The results are summarized in Figure 2.

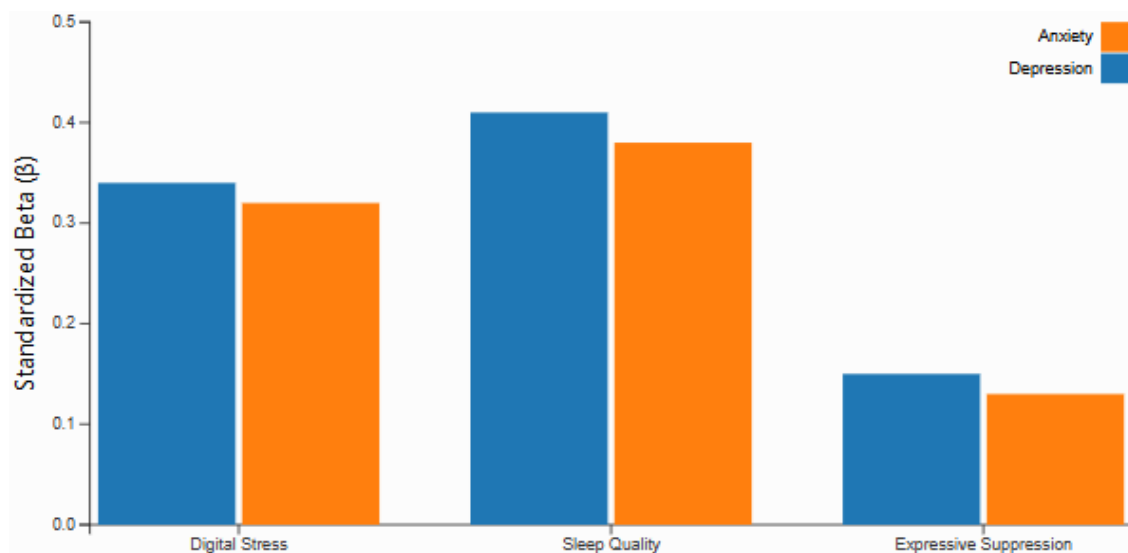


Figure 2 Standardized Beta Coefficients from Multiple Regression Analyses Predicting Depression and Anxiety.

For the prediction of depressive symptoms (PHQ-9), the model included digital stress (SAS), sleep quality (PSQI), and the two emotion regulation strategies (ERQ-CR and ERQ-ES) as predictors. The overall model was statistically significant ($F(4, 270) = 65.24, p < 0.001$) and explained 49% of the variance in depression scores (Adjusted $R^2 = 0.485$). Both poor sleep quality ($\beta = 0.41, t = 7.89, p < 0.001$) and digital stress ($\beta = 0.34, t = 6.54, p < 0.001$) emerged as strong, significant independent predictors of higher depression scores. Expressive suppression was also a significant, albeit weaker, predictor ($\beta = 0.15, t = 2.91, p < 0.01$), while cognitive reappraisal was not a significant predictor in the model.

For the prediction of anxiety symptoms (GAD-7), a similar regression model was tested. The overall model was also significant ($F(4, 270) = 58.91, p < 0.001$) and accounted for 46% of the variance in anxiety scores (Adjusted $R^2 = 0.458$). Again, poor sleep quality ($\beta = 0.38, t = 7.12, p < 0.001$) and digital stress ($\beta = 0.32, t = 6.03, p < 0.001$) were the strongest independent predictors of higher anxiety scores. Expressive suppression was also a significant predictor ($\beta = 0.13, t = 2.55, p < 0.05$). Cognitive reappraisal did not significantly predict anxiety symptoms. The final predictive path model illustrating the significant relationships among digital stress, sleep quality, emotion regulation, and psychological well-being is presented in Figure 3.

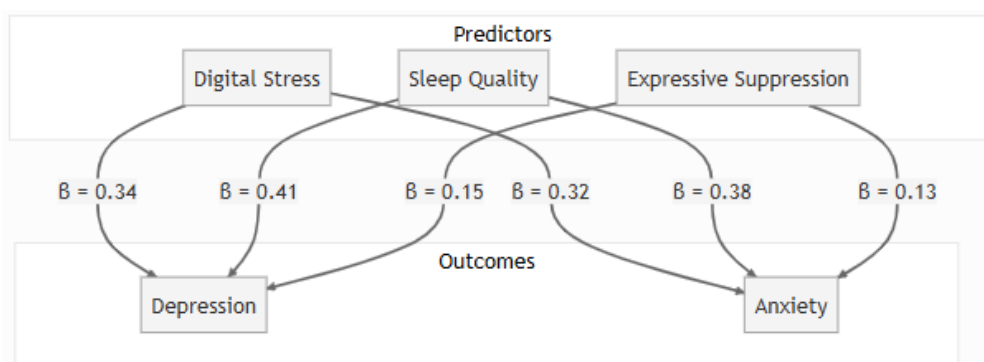


Figure 3 Path Model of Significant Predictors of Psychological Well-Being (Depression and Anxiety). Standardized coefficients are shown. All paths are significant at $p < 0.01$.

3.5 Prevalence of Clinically Significant Symptoms

Based on established cut-off scores, a substantial portion of the sample reported clinically significant symptoms of depression and anxiety (Figure 4). Using a cut-off score of ≥ 10 on the PHQ-9, 64.7% ($n = 178$) of participants screened positive for moderate to severe depressive symptoms. Similarly, using a cut-off of ≥ 10 on the GAD-7, 58.2% ($n = 160$) screened positive for moderate to severe anxiety symptoms. These findings highlight the high burden of psychological distress within this migrant student population.

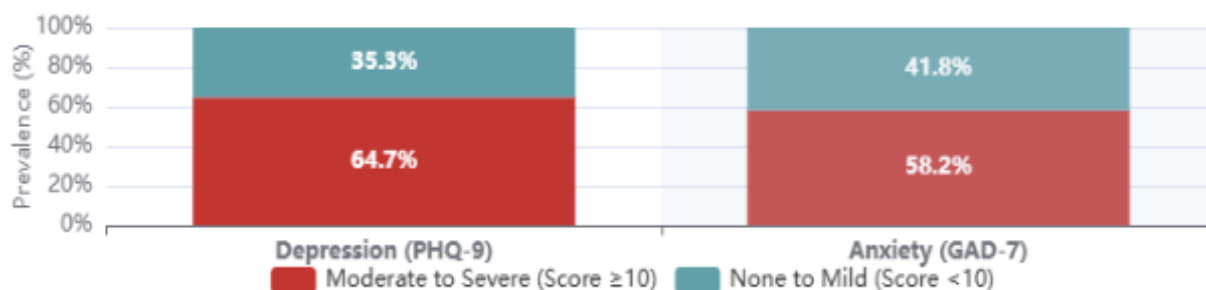


Figure 4 Prevalence of significant symptoms of depression and anxiety among the study participants ($N = 275$). The chart displays the percentage of students screening positive for moderate to severe symptoms (score ≥ 10) versus those with none to mild symptoms (score < 10) on the PHQ-9 and GAD-7 scales.

4. Discussion

This study investigated the complex interplay between digital stress, sleep quality, emotion regulation, and psychological well-being among a multinational sample of migrant university students in the UAE. Our findings reveal a significant burden of mental health challenges within this population and highlight the potent roles of digital stress and poor sleep as key risk factors. The results largely support our initial hypotheses and contribute to a growing body of literature on the mental health of young people in an increasingly digitized and globalized world [12, 29].

The strong, positive correlation between digital stress (measured via smartphone addiction) and symptoms of both depression and anxiety is a central finding of this study. This aligns with extensive research from the UAE and globally, which has consistently linked problematic technology use to adverse mental health outcomes [9, 11]. The regression analyses further solidified this relationship, demonstrating that digital stress was a significant independent predictor of both depression and anxiety, even after accounting for sleep quality and emotion regulation. This suggests that the pressure of constant connectivity, the potential for negative social comparison, and the disruption of daily routines associated with smartphone addiction exert a direct and powerful influence on the psychological well-being of young adults [10, 14]. For migrant students, who may rely more heavily on digital platforms to maintain connections with family and friends in their home countries, this digital tether may become a source of both support and significant stress [5].

Perhaps the most compelling finding is the pervasive and powerful impact of poor sleep quality. In our sample, poor sleep was the strongest independent predictor of both depression and anxiety. The mean PSQI score indicated widespread sleep problems, a finding consistent with research on university students and migrant populations, who often face academic pressure, irregular schedules,

and acculturative stress that disrupt sleep patterns [15, 20]. The bidirectional relationship between sleep and mental health is well-established; poor sleep exacerbates emotional distress, and mental health disorders like depression and anxiety disrupt sleep architecture [17]. Our results underscore that addressing sleep health is not merely an adjunct to mental health care but a fundamental and critical component. Interventions aimed at improving sleep hygiene could be a highly effective, non-stigmatizing entry point for improving overall psychological well-being in this population [22].

An alternative interpretation is also possible. Because the study is cross-sectional, digital stress and poor sleep quality may not only contribute to psychological distress but may also result from it [17]. Students experiencing anxiety or depressive symptoms may use smartphones more frequently for distraction, reassurance seeking, or social connection, and psychological distress may independently disrupt sleep. Thus, the findings should be understood as evidence of strong associations rather than proof of directional or causal effects [10].

The role of emotion regulation in this model was more nuanced. While expressive suppression was associated with poorer mental health outcomes in both correlational and regression analyses, cognitive reappraisal showed only a weak protective association with depression. This suggests that inhibiting emotional expression is maladaptive in the context of the stressors faced by these students. This finding is consistent with theories suggesting that suppressing emotions is cognitively costly and can lead to a paradoxical increase in negative affect over time [16]. The limited effect of cognitive reappraisal might indicate that for the profound stressors related to digital life and acculturation, simply reframing thoughts may be insufficient without addressing the root causes of distress or developing other coping skills.

One possible explanation for the limited effect of cognitive reappraisal is that the ERQ-SF may not fully capture culturally specific emotion regulation strategies used by a multinational migrant sample. Some students may regulate emotions through family obligation, religious coping, silence, endurance, peer belonging, or culturally shaped forms of emotional restraint that are not adequately represented in standard Western-developed measures [12]. Therefore, the weak protective effect of cognitive reappraisal should not be interpreted as evidence that adaptive emotion regulation is unimportant, but rather as an indication that culturally sensitive assessment of emotion regulation may be needed in future Gulf-based migrant research.

When considering these findings within the context of a migrant population, the results take on additional significance. Migrant youth are already navigating the “immigrant health paradox,” where initial health advantages can erode over time due to acculturative stress, discrimination, and socioeconomic challenges [18]. The digital world adds another layer of complexity. While it can facilitate connection to home cultures and provide social support, it can also expose individuals to homeland conflicts, increase feelings of social exclusion, and create pressure to maintain multiple social identities [5, 16]. These findings are also consistent with the broader context of the Gulf Cooperation Council (GCC), where migrant populations comprise a substantial proportion of the workforce and student communities. Unlike many Western settings, migrant students in the UAE often navigate temporary residency, multicultural educational environments, separation from extended family networks, financial pressures, and the continuous process of adapting to diverse cultural expectations. These unique contextual factors may amplify the psychological impact of digital stress and sleep disruption while shaping culturally specific patterns of emotion regulation. Consequently, interventions targeting migrant mental health within the GCC should not simply replicate Western models. Still, they should instead be culturally responsive and account for the

distinctive social, educational, and migration-related experiences of students in the region. The high prevalence of moderate to severe depression and anxiety symptoms found in our sample (64.7% and 58.2%, respectively) is alarming. It signals an urgent need for accessible and culturally competent mental health services within UAE universities [3, 29].

4.1 Strengths and Limitations

This study has several strengths. It is one of the first to simultaneously examine digital stress, sleep, emotion regulation, and mental health in the specific context of multinational migrant youth in the UAE. The use of validated, internationally recognized instruments enhances the reliability and comparability of our findings. The focus on a diverse migrant sample provides valuable insights into a significant but often understudied population in the Gulf region.

However, the study is not without limitations. The primary limitation is its cross-sectional design, which precludes causality or the directionality of the observed relationships. Although we framed our hypotheses based on a longitudinal predictive model, our data can only confirm associations. Future longitudinal research is essential to track these variables over time and confirm the predictive pathways suggested by our model [14]. Second, our reliance on self-report measures may be subject to social desirability and recall bias. Objective measures of sleep (e.g., actigraphy) and digital use (e.g., screen time apps) could provide more robust data in future studies. Third, the convenience sampling method may limit the generalizability of our findings to all migrant university students in the UAE. Fourth, an important limitation is the absence of a non-migrant comparison group. Without comparing migrant and non-migrant students, this study cannot determine whether the observed levels of digital stress, sleep problems, depression, and anxiety are uniquely migrant-specific or reflect broader student mental health patterns in the UAE. A comparison group would have allowed stronger conclusions about the added influence of migration status, acculturative stress, and cultural adaptation. Future studies should include both migrant and non-migrant samples to clarify whether these predictors operate differently across groups. Finally, we did not deeply explore the specific types of acculturative stress or discrimination, which are known to be important determinants of mental health in migrant populations [19, 21].

4.2 Clinical and Policy Implications

The present findings have important implications for university mental health services and institutional policy. Because digital stress ($\beta = 0.34$ for depression; $\beta = 0.32$ for anxiety) and poor sleep quality ($\beta = 0.41$ for depression; $\beta = 0.38$ for anxiety) emerged as the strongest independent predictors of psychological distress in the regression analyses, while expressive suppression also demonstrated significant positive associations with both depression and anxiety, the findings provide evidence-based directions for preventive interventions among migrant university students. These recommendations are grounded directly in the empirical findings of the present study and acknowledge the unique psychosocial challenges associated with migration, acculturation, and digital engagement in the UAE context.

4.2.1 Integrate Digital Wellness into University Health Programs

Because digital stress emerged as a significant independent predictor of both depressive ($\beta = 0.34$) and anxiety symptoms ($\beta = 0.32$), universities should develop comprehensive digital wellness initiatives to reduce problematic smartphone use and promote healthier patterns of technology engagement. These initiatives may include workshops on digital citizenship, managing online demands, establishing healthy digital boundaries, and recognizing the psychological effects of excessive smartphone use. Such interventions are supported by previous research demonstrating that digital stress is associated with increased psychological distress among adolescents and young adults [10].

4.2.2 Prioritize Sleep Health Interventions

The finding that poor sleep quality was the strongest predictor of both depression ($\beta = 0.41$) and anxiety ($\beta = 0.38$) suggests that sleep should be considered a primary intervention target rather than merely a secondary consequence of psychological distress. Universities should incorporate evidence-based sleep hygiene education, psychoeducation on healthy sleep behaviors, and Cognitive Behavioral Therapy for Insomnia (CBT-I) into existing student health services. Improving sleep quality may substantially reduce emotional distress while enhancing students' academic functioning and overall psychological well-being [22].

4.2.3 Provide Culturally Adapted Mental Health Services

The high prevalence of moderate-to-severe depressive (64.7%) and anxiety (58.2%) symptoms observed among migrant students highlights the urgent need for culturally responsive psychological services. Mental health interventions should acknowledge migration experiences, acculturative stress, language diversity, family expectations, and culturally shaped coping strategies while promoting adaptive emotion regulation skills. Counseling services should also recognize that migrant students may experience psychological distress differently from domestic students because of their unique sociocultural contexts [4, 22].

4.2.4 Foster Supportive Campus Environments

Because expressive suppression significantly predicted poorer psychological outcomes, universities should establish supportive campus environments that encourage healthy emotional expression, peer connectedness, and intercultural engagement. Structured peer mentoring programs, multicultural student organizations, and inclusive campus activities may strengthen students' sense of belonging while reducing reliance on maladaptive coping strategies, including excessive digital engagement. Creating psychologically safe environments may further reduce the negative effects of acculturative stress while promoting resilience among migrant students [23].

5. Conclusion

In conclusion, this study provides compelling evidence that digital stress and poor sleep quality are significant risk factors for depression and anxiety among migrant university students in the United Arab Emirates. The findings paint a picture of a vulnerable population grappling with the

dual pressures of academic life in a foreign land and the relentless demands of the digital age. While technology offers vital links to home and community, its overuse contributes to a cascade of negative effects, beginning with disrupted sleep and culminating in significant psychological distress. The results issue a clear call to action for universities and public health bodies in the UAE and other nations with large migrant populations. A proactive, multi-pronged approach that integrates digital wellness education, prioritizes sleep health, and provides culturally adapted mental health support is essential to foster resilience and promote the holistic well-being of the next generation.

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Author Contributions

J.M. conceived the study, developed the research design and methodology, conducted data collection and analysis, interpreted the findings, and drafted and revised the manuscript. The author approved the final version of the manuscript.

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Competing Interests

The author declares that there is no competing interests.

Data Availability Statement

The datasets generated and/or analysed during the current study are not publicly available due to the sensitive nature of the data and the need to protect participant confidentiality. However, the datasets are available from the corresponding author on reasonable request.

AI-Assisted Technologies Statement

The author declares that the artificial intelligence tool ChatGPT (OpenAI) was used solely for minor language editing and readability improvement during the preparation of this manuscript. ChatGPT was not used for data collection, data analysis, interpretation of results, or generation of scientific content. All intellectual contributions, research design, analysis, and conclusions remain the sole responsibility of the author.

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