Short Communication

Correlation of Exam Stress and Happiness with Seasonal Affective Disorder in Undergraduate Students

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Abstract

Background: Seasonal Affective Disorder (SAD) is a subtype of major depressive disorder characterized by recurring seasonal depressive episodes. While several risk factors for SAD have been identified, the role of exam stress and happiness remains unexplored.

Objective: This cross-sectional study investigated the prevalence of SAD among undergraduate students and examined its association with exam-induced stress and subjective happiness.

Methods: Data were collected from 299 students across 27 institutions in Lahore, Pakistan, using the Seasonal Pattern Assessment Questionnaire (SPAQ), Westside Test Anxiety Scale (WTAS), and Subjective Happiness Scale (SHS).

Results: The prevalence of SAD was 13%, with winter SAD being the most common subtype. A significant positive correlation was found between exam stress and SAD severity, particularly among students whose exam period coincided with their SAD season (p = 0.008). However, no significant association was observed between subjective happiness and SAD (p = 0.327).

Conclusion: Non-medical students reported higher exam stress and lower happiness levels than medical students. These findings highlight the impact of academic stress on SAD and emphasize the need for psychological interventions alongside conventional treatments. Future studies should explore targeted mental health strategies to mitigate the effects of SAD among students facing academic pressure.

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Introduction

Seasonal Affective Disorder (SAD) is a subtype of major depressive disorder characterized by recurrent depressive symptoms that occur in specific seasons and remit in others.[1] Adults facing similar but milder symp-toms are diagnosed with sub-syndrome SAD.[2] However, seasonality patterns are not the same for all individuals. The most prevalent form of SAD is winter SAD, in which depressive symptoms occur in late autumn and winter and disappear in spring and summer. Winter SAD is more common in Western cultures. While summer SAD, less prevalent overall, is more common in Eastern Cultures.[3]

Several risk factors for SAD have been identified. These include female gender, single men, low-income and low-education levels, higher latitudes, and younger

adults under the age of 40,[4] decreased photoperiod, and shorter daylight exposure in winter. Vitamin D deficiency from reduced exposure to sunlight, sleep disturbances, variations in circadian clock genes, and serotonin activity are linked to SAD.[5]

Happiness is often described as a subjective state of well-being, encompassing emotional stability, life satisfaction, and a sense of fulfillment. Multiple factors, including physical health, social relationships, and personal achievements, influence it. Conversely, emotional distress and high stress levels can diminish happiness, increasing vulnerability to mood disorders. University students, particularly those under academic pressure, may experience fluctuations in happiness levels due to stressors such as exams, workload, and uncertainty about the future. Given that depression and low happiness often coexist, we hypothesized that students experiencing greater exam stress and lower happiness levels would be more prone to seasonal depressive symptoms.

Methods

This cross-sectional observational study was conducted at CMH Lahore Medical College, Pakistan, in August 2023, following the Declaration of Helsinki. Ethical approval was granted (case #.761/ERC/CMH/LMC), and informed consent was obtained. Participants, aged 18-25, were recruited via convenience sampling from 27 undergraduate institutions (7 medical, 20 non-medical). The sample size (N=296) was calculated using Cochran's formula. Data were collected through a 10-minute Google Forms questionnaire distributed via WhatsApp and Facebook.

The questionnaire included sociodemographic details, the Seasonal Pattern Assessment Questionnaire (SPAQ) to assess seasonality, the Westside Test Anxiety Scale (WTAS) for exam stress, and the Subjective Happiness Scale (SHS) for happiness levels. The study aimed to test the hypothesis that exam stress and subjective happiness might be risk factors for diagnosing Seasonal Affective Disorder (SAD).

The Seasonal Pattern Assessment Questionnaire (SPAQ) is widely used for diagnosing seasonal mood variations.[6] It includes demographic questions, a 6-item Seasonality Scale Index assessing sleep, social activity, mood, weight, appetite, and energy changes on a 5-point Likert scale (0-4), and a Global Seasonality Score (GSS) ranging from 0 to 24. 10-item calendar records seasonal variations in mood, sleep, weight, and social activity. Additional sections assess annual weight fluctuation, seasonal sleep duration, food preference changes, and the severity of seasonal problems on a yes/no basis or a 5-point Likert scale (1–5).

According to Kasper et al.[7] SAD inclusion criteria include (1) GSS ≥ 11, (2) seasonal change severity (≥ 2 for SAD, ≥ 1 for sub-SAD), and (3) feeling worst in winter (Dec–Feb) or summer (June–Aug). These timeframes were adjusted for Pakistan's climate (winter: Nov–Feb, summer: May–Aug). Additional subcategories included Spring-SAD (worst in Mar-Apr) and Autumn-SAD (worst in Sep-Oct).

For sub-syndromal SAD, Kasper's criteria (7) required (1) GSS ≥ 11 with mild/no seasonal problems or (2) GSS of 9–10 with seasonal problems. The seasonal timeframes for sub-SAD matched those of SAD.

WTAS assessed exam stress using a 10-item, 5-point Likert scale, categorizing anxiety levels from low to extremely high.[8]

SHS measured subjective happiness on a 7-point Likert scale, with higher scores indicating greater happiness.[9]

Statistical analysis was conducted using IBM SPSS 28. Normality was confirmed via the Shapiro-Wilk test. Independent-sample t-tests compared continuous variables, chi-square tests assessed categorical data, and Pearson's correlation coefficient evaluated associations between continuous variables.

Results

The research targeted undergraduate students from 27 universities in Lahore. A questionnaire combining the SPAQ, WTAS, and SHS was used alongside a separate section to assess participants' sociodemographic status. The internal consistency of these tools was measured using Cronbach's alpha, with values of 0.864 for SPAQ, 0.901 for WTAS, and 0.603 for SHS, making them reliable. Of 317 distributed questionnaires, 311 responses were received (98.1% cooperation rate), with 299 meeting the inclusion criteria. The inclusion criteria were participants aged 18-25 years, currently enrolled in undergraduate programs in Lahore, fluent in English, willing to participate voluntarily, and available during the data collection period. The questionnaires were distributed as an online survey via WhatsApp and Facebook. Table 1 details the participants' sociodemographic characteristics, exam timing, Seasonal Affective Disorder (SAD) prevalence, and subtypes.

According to the SPAQ, 13.4% of participants were diagnosed with SAD, and 6.4% with sub-SAD. Winter SAD was the most common type, affecting 21 out of 40 SAD-diagnosed individuals (Figure 1).

Table 1: *Demographics (N=299)*

Variable	Number (%)	Mean	S.D.[a]
Sex			
Male	128 (42.8%)		
Female	171 (57.2%)		
Weight		63.2 kg	13.4
Age		21.1 years	1.2
University			
Medical students	190 (63.5%)		
Non-Medical students	108 (36.1%)		
Examinations			
Winter (November-February)	195 (65.2%)		
Summer (May-August)	63 (21.1%)		
SAD Prevalence			
No SAD	240 (80.2%)		
SAD	40 (13.4%)		
Sub-SAD	19 (6.4%)		
SAD TYPE			
Winter SAD	21 (52.5%)		
Summer SAD	10 (25%)		
Spring SAD	5 (12.5 %)		
Autumn SAD	4 (10%)		

[a] *S.D. = Standard Deviation*
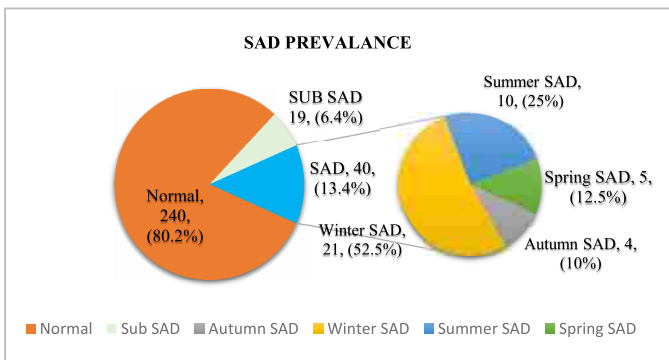
Figure 1: *SAD Prevalence*

To test the hypothesis that exam stress exacerbates SAD, participants were divided into two groups: one in which the exam period coincided with their SAD type (N = 18) and one in which it did not (N = 22). Pearson's correlation showed a moderate, significant positive correlation between WTAS and GSS in the first group (p = 0.008), whereas the second group had a low, insignificant correlation (p = 0.515).

Independent-sample t-tests were conducted to evaluate the relationship between discipline and the prevalence of SAD. The tests showed that non-medical students had significantly higher WTAS scores (p = 0.001) and lower SHS scores (p = 0.003) than medical students.

The normality of scores was confirmed using the Shapiro-

Table 2: *Correlation and Group Comparisons for Exam Stress and SAD*

Variable	N	Mean	S.D.	Test Statistic	p-value
Correlation: WTAS & GSS					
Exam Season Coincides (Yes)	18	—	—	r = 0.60	**0.008**
Exam Season Coincides (No)	22	—	—	r = 0.15	0.52
Comparison: Medical vs. Non-Medical Students					
GSS (Seasonality Score)	Med: 190	9.23	4.54	t = -1.26	0.21
	Non-Med: 108	10.02	5.53		
WTAS (Exam Stress)	Med: 190	2.96	0.85	t = -3.28	0.001
	Non-Med: 108	3.31	0.95		
SHS (Happiness Score)	Med: 190	4.35	1.15	t = 3.04	0.003
	Non-Med: 108	3.94	1.13		

[a] *S.D.- Standard deviation*
[b] *GSS-Global Seasonality Score*
[c] *WTAS – Westside Test Anxiety Scale*
[d] *SHS – Subjective Happiness Scale*

Wilks test. Independent-sample t-tests revealed that women had significantly higher GSS (p=0.034) and WTAS (p=0.003) scores than men. Participants with SAD had higher WTAS scores than those without SAD (p=0.039). No significant difference was found in happiness scores between participants with and without SAD (p=0.327). Individuals with SAD/Sub-SAD showed more marked changes in sleep length, and significant relationships were found between SAD and sleep changes (p<0.001) and between Sub-SAD and sleep changes (p<0.001) using the chi-square test.

Discussion

The study confirmed that exam stress, particularly when the exam period coincides with the SAD season, contributes to the severity of SAD symptoms. Participants with SAD who had exams in winter showed a significant positive correlation between exam stress and seasonality. However, no significant correlation was found between happiness and SAD, possibly due to the subjective nature of happiness measurement.

Our study found a 13.4% prevalence of SAD, aligning with recent studies in Pakistan, indicating that 10-20% of the normal population experiences depressive symptoms during winter.[10] This higher prevalence may be attributed to the stressful environment of university students, which exacerbates the symptoms of SAD.

The study also found that non-medical students reported

higher exam stress levels and lower happiness than medical students. This result contrasts with a study from Karachi, where medical students had higher emotional disturbances.[11] Gender differences in SAD symptoms were consistent with prior studies, which report that females tend to have higher levels of both seasonality and exam stress.

Previous research has linked cognitive vulnerability and depression to triggering factors for SAD, affecting treatment outcomes and future depression.[12] This study, however, addresses an aspect that has been overlooked in most prior research: the impact of exam-induced anxiety and happiness levels on the severity of SAD symptoms. The study focuses on undergraduate students aged 18 to 25, aiming to understand how these factors may hinder professional and practical life and impair work effectiveness. This highlights the importance of considering psychological factors when diagnosing and treating SAD, alongside the commonly recognized causes such as reduced daylight and geographical latitude. Increased exam-related anxiety and sadness can escalate into more severe mental health issues, including clinical depression and other emotional disorders. Previous research suggests that cognitive behavioral therapy (CBT) is an effective treatment for SAD, addressing the psychological aspects of the disorder. Additionally, light therapy and antidepressants are standard treatments for SAD.[13] However, integrating psychotherapy, particularly CBT, into treatment plans is crucial, as it offers a comprehensive approach to managing SAD. Combining CBT with light therapy may be particularly beneficial, as it acknowledges the multifaceted nature of SAD, incorporating both psychological and environmental factors such as exam stress and happiness, which have not been thoroughly examined in prior studies.

The study had several limitations, including recall bias, as participants were asked to reflect on their symptoms from the previous year. Lahore's winter smog may have contributed to the higher incidence of winter SAD, as reduced sunlight exposure could have worsened symptoms. Additionally, the self-reported nature of the SPAQ, WTAS, and SHS introduces a risk of information bias, as participants may have overestimated their symptoms. Selection bias could also be a concern, as the study focused on a specific group of undergraduate students, excluding those who did not participate.

Conclusion

This study highlights the significant role of exam-induced stress in the severity of SAD symptoms among undergraduate students. Future research should explore the effectiveness of cognitive-behavioral therapy (CBT) in managing SAD, particularly in high-stress academic environments. Incorporating psychotherapy into treatment plans may help address the psychological factors contributing to SAD and improve overall mental health outcomes.

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