

Original Article

## Seasonal Variation in Mood Among Undergraduate Medical Professionals

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### ABSTRACT

**Objectives:** Seasonal affective disorder (SAD) as mentioned in the Diagnostic Manual of Mental Disorders 5 categorizes depression as a form of – major depressive disorder with seasonal pattern. SAD is described as recurrent episodes of variations in mood annually in accordance with certain seasons with complete remission or a change from major depression to mania in the intervening months. The study aims to assess the knowledge and to screen for SAD among undergraduate medical professionals as well as to determine the pattern of SAD in winter/summer.

**Material and Methods:** Two hundred and fifty-two students were assessed using a self-administered questionnaire – Seasonal Pattern Assessment Questionnaire (SPAQ). It consists of three primary questions that can be used to obtain the Global Seasonality Score (GSS) and the pattern of mood change. The SPAQ is shown to have good specificity (94%) but low sensitivity (44%) and is considered a good screening tool to assess SAD.

**Results:** Only 21% of participants were aware of the existence of SAD. The screening test yielded 10.3% and 42% of the study group to be at risk for developing SAD and sub-syndromal SAD, respectively. The mean GSS score was 9.6. There was a predominant summer pattern observed. There was also no gender correlation identified.

**Conclusion:** It can be concluded that although undergraduate medical professionals currently residing in North India do face seasonal variations in mood and behavior, most lack knowledge regarding the same. They face most difficulties during the summer months. These findings stand in contrast to most studies done in the West but are consistent with those done in the East.

**Keywords:** Seasonal affective disorder , Sub-syndromal SAD, Depression, Seasonal pattern of mood disorders

### INTRODUCTION

The medical field is known to be a competitive and stressful environment to all who enter it. Undergraduate medical professionals seem especially vulnerable to developing mood disorders.<sup>[1]</sup> The most common of which is major depressive disorder.<sup>[2]</sup> However, attributing mood disorders with just stress is a common mistake of the past.<sup>[3]</sup>

Reported symptoms with change in seasons can shed light on what could be a different etiology for mood disorders. Variations in the amount of exposure to sunlight during different seasons have been noticed to be associated with mood changes. Studies carried out to determine this association show that medical students do suffer from a form of depression called seasonal affective disorder (SAD).<sup>[4,5]</sup>

SAD as mentioned in the Diagnostic Manual of Mental Disorders 5<sup>[6]</sup> is a form of depression categorized as – major depressive disorder with seasonal pattern. SAD is described as recurrent

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episodes of variations in mood annually in accordance with certain seasons with complete remission or a switch from major depression to mania in the intervening months. Sub-syndromal SAD (s-SAD) refers to those individuals who exhibit symptoms that are similar to but not severe enough for diagnosis.

The extent to which seasonal changes affect one's mood, appetite, sleep length, energy, food preference, or will to socialize with other people is called "seasonality".<sup>[7]</sup> While mild changes in behavior during different seasons may normally be seen, when these changes reach the end of the spectrum such that they hamper daily activity, this can become a problem. Studies show that patients suffering from SAD face difficulties for over 40% of the year.<sup>[8]</sup> This further leads to significant impairment of their socio-economic productivity.

Various models of study postulate the root cause to be circadian rhythm dysregulation, deranged neurotransmitters, hormones, and genetic polymorphism.<sup>[9]</sup> It is best to view the disorder as an interplay between biological, environmental, and psychological factors.

The classical form of SAD, as seen in Western countries, is of the winter/fall depression pattern with remissions during summer/spring months.<sup>[10]</sup> It is seen to be more pervasive at higher northern latitudes with a positive correlation with winter SAD.<sup>[11]</sup> Summer and winter type of SAD has several distinctions between the two. Winter type often presents with atypical vegetative features of depression – anergia, overeating, oversleeping, weight gain, and carbohydrate craving. The hypersomnia is also seen to be associated with increased sleep latency and reduced slow-wave (delta) sleep.<sup>[12]</sup> Whereas the summer type has more typical features of depression – insomnia, agitation, and weight loss.<sup>[13]</sup>

From the limited studies carried out in India, which experiences a more tropical climate as compared with the temperate climate of the West, it has been observed that among the northern states, there seems to be predominantly a summer pattern SAD.<sup>[14,15]</sup> As no studies have been done involving individuals from across the country, including the southern, eastern, and western states, the overall prevalence of SAD in India is still unknown. With the South facing less-extreme climates as compared with the North, it is also not possible to generalize summer pattern SAD in India.

Thus, there is a paucity of data regarding SAD in India, especially among undergraduate medical professionals. This leaves the masses unaware of the disorder as well as the treatment they can seek in order to achieve a better mental state of health. Further research in this field can also help discover newer modalities of treatment other than the existing phototherapeutic approach.<sup>[8,16]</sup>

This study seeks to assess the awareness and screen for SAD among undergraduate medical professionals from a North Indian college, hoping to add to existing knowledge. The information may be helpful to better tackle mental health disorders among medical students and thus promote a more productive and healthy society.

## MATERIAL AND METHODS

### Study Population

A cross-sectional study was done in which the participants were undergraduate medical professionals from a North Indian Medical college in Ludhiana, Punjab. Ludhiana is located at 30.9010°N, 75.8573°E, with harsh climatic conditions during both winters and summers.

The study included students from the college of physiotherapy, college of nursing, dental and medical college.

The inclusion criteria stated that students from first year to internship were allowed to take part in the study. Students who did not consent to the study and graduates of the respective colleges were excluded from the study.

The participants in the study, though currently residing in Punjab, originated from all across India, including its southern and western states, which vary in climate and temperature. Thus, the results in their mood changes do not pertain to just the seasons of Punjab, but rather a cumulative of their experiences with seasons from their hometown and their current place of residence, i.e., Punjab.

The total population of the college being 720, which was also the target population, led the sample size to be 251 with a 5% margin of error.

### Method

The study protocol was approved by the Institutional Ethic Committee on 07/07/2022 under the reference number BMHR-IECCMCL/0722-253 and was done in accordance with 1975 Declaration of Helsinki.

An adapted version of the Seasonal Pattern Assessment Questionnaire (SPAQ)<sup>[17]</sup> was employed. With a high specificity (94%) but low sensitivity (44%), it is considered an accurate screening tool. It is a self-administered, retrospective questionnaire that is freely available to the public domain.

The SPAQ (in English) was administered to students in their classrooms. They were first intimated about the happening of the research study following which they were requested to read through the consent form. After having read through it, if they wished to participate in the study, they signed a hard copy of the form and were then given access to the questionnaire through a Google form link. They were requested to fill out

the forms in the presence of the researcher. They were assured that all their data would remain confidential and solely used for the purpose of this study.

The demographics of the respondents were collected, including their – age, gender, college and year of study, place of residence, any previous diagnosis of psychiatric illness, and any family history of psychiatric ailments.

SPAQ consists of three primary questions that can be used to obtain the Global Seasonality Score (GSS) and the pattern of mood change. The first question included the degree to which – sleep length, social activity, weight, mood, appetite, and energy level changed with a change in seasons. They were scored on a scale of 0–4 (no change–extremely marked change) to obtain a score of 0–24.

The second question consisted of all the months of the year and the respondents were asked to choose during which months they experienced changes in their – mood, weight, ability to socialize, sleep, and appetite.

The last question assessed whether they find these changes as a problem, and if so, to rate it on the scale of 0–5 (Not a problem–Disabling). An additional question at the start of the survey, “Did you know about SAD prior to the start of this survey?” was used to assess the awareness among the participants about SAD.

As North India experiences extreme climates, the demarcation is not as clear as in temperate countries. In light of the intervening monsoon season that also prevails, for the purpose of this study, the months have been divided into:

- November–January (Winter);
- May–July (Summer);
- August–October (Rainy);
- February–April (Spring)<sup>[18]</sup>

The criteria for screening SAD using SPAQ include the following: (i) having a GSS  $\geq 11$ , (ii) a seasonal change being declared as a moderate problem or worse (score of 2 or more), and (iii) the months during which most changes are felt most will ascertain the pattern.

For screening s-SAD, the respondents should have: (i) a GSS score of  $\geq 11$  but the seasonal change is not considered an issue or only a mild issue (score of 0 or 1) or (ii) the GSS score of 9 or 10 regardless of whether the seasonal change is an issue or not.

The data collected were then analyzed using IBM SPSS Statistics (version 28.0.1.1). Frequency, proportion, and means of discrete variables were analyzed. *T* test was done

to analyze constant variables. Chi-square test was used to identify an association with *p*-value set at 0.05.

## RESULTS

### Demographic Profile

A total of 252 undergraduate medical professionals completed the SPAQ, out of which 68.3% ( $n = 172$ ) were females and 31.7% ( $n = 80$ ) were males. The age of the population ranged from 18 to 25 years of which the mean age was 20.7 (SD = 1.5).

From the total study population, 3.9% ( $n = 10$ ) were reported to have previously diagnosed psychiatric illnesses and 7.1% ( $n = 18$ ) with a family history of psychiatric illness. 2.7% ( $n = 7$ ) among these were said to have both.

With no introduction about SAD given to the participants prior to the start of the study, 21% ( $n = 53$ ) of them were aware of the existence of SAD as a psychiatric illness. Whereas 79% ( $n = 199$ ) were unaware of SAD or about any mood disorders associated with seasonal change.

### A) Global Seasonality Score and risk for SAD Among Undergraduate Medical Professionals

The mean GSS is 9.6 (SD = 5.1). Out of 252, 31.3% ( $n = 79$ ) found the changes during seasons to be a problem, specifically 13.4% ( $n = 34$ ) as a mild problem, 14.6% ( $n = 37$ ) as a moderate problem, 2.7% ( $n = 7$ ) as a severe problem, and 0.39% ( $n = 1$ ) as a disabling problem.

A total 39.3% ( $n = 99$ ) were found to have a GSS  $\geq 11$  and 17.9% ( $n = 45$ ) considered the change in seasons to be a moderate (2), marked (3), severe (4), and disabling (5) problem.

According to the diagnostic criteria of SPAQ for SAD, 10.3% ( $n = 26$ ) were found to have both a GSS  $\geq 11$  and considered change in seasons to be a moderate or greater problem. While according to the criteria for s-SAD, 42% ( $n = 106$ ) were found to have a GSS of 9 or greater, with the change in season to be not a problem (0) or a mild problem (1).

Out of the 26 individuals screened for SAD, 65.3% ( $n = 17$ ) were female and 34.6% ( $n = 9$ ) were male. However, there is no significant correlation between gender and SAD  $X^2(1, N = 26) = 0.11, p = 0.740$ .

### B) Seasonality

Among the 26 individuals screened for SAD, the following number of individuals did not find any particular month in which they felt worst ( $n = 7, 26.9\%$ ), slept least ( $n = 6, 23\%$ ), ate least ( $n = 11, 42.3\%$ ), socialized least ( $n = 10, 38.4\%$ ), lost most weight ( $n = 12, 46.1\%$ ), slept most ( $n = 8, 30.7\%$ ), gained

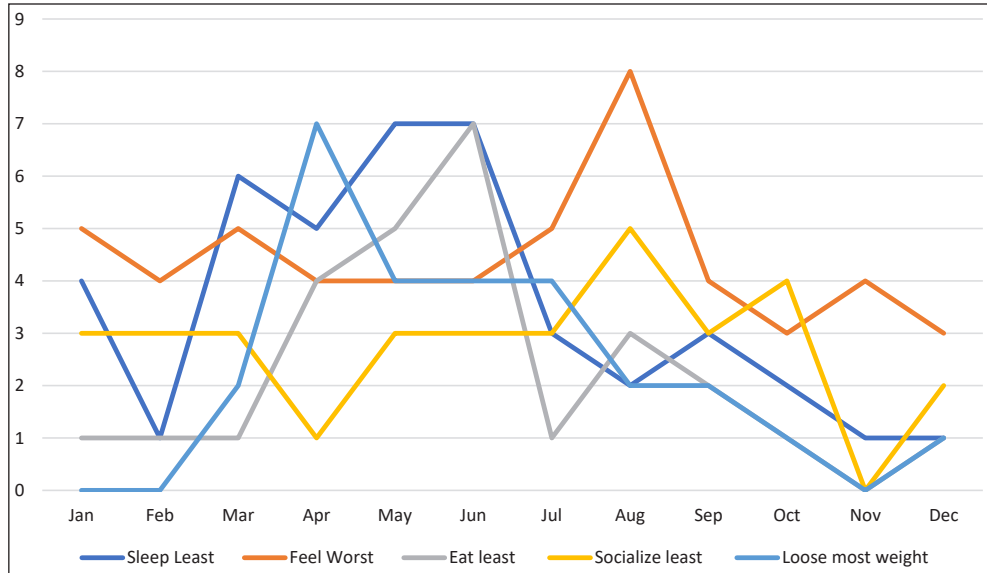


Figure 1: Monthly distribution of symptoms.

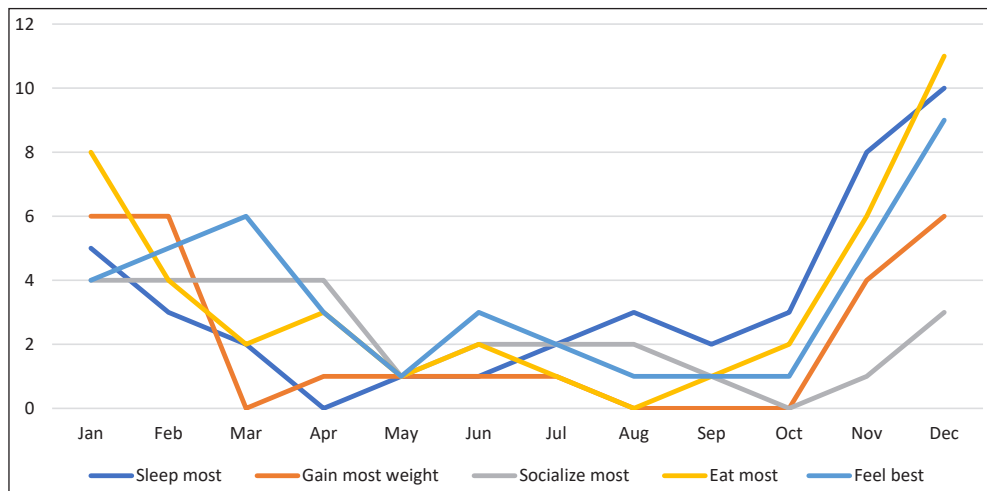


Figure 2: Monthly distribution of symptoms.

most weight ( $n = 12, 46.1\%$ ), socialized most ( $n = 12, 46.1\%$ ), ate most ( $n = 7, 26.9\%$ ), and felt best ( $n = 6, 23\%$ ).

The monthly distribution for the above-mentioned symptoms is shown in Figures 1 and 2.

The majority of the individuals did notice a change in food preferences during different seasons (78.2%,  $n = 197$ ) and fluctuation of weight during the course of the year (70.6%,  $n = 178$ ). The mean hours of sleep during each season are as follows: Winter (7.4, S.D. = 2.3), Spring (6.54, S.D. = 1.9), Summer (6.36, S.D. = 1.9), and Fall (6.6, S.D. = 2.0).

## DISCUSSION

The demographic profile of the study group was homogenous in terms of their place of residence, profession, and their mean

age being 20.7 years. The awareness among the individuals in the study regarding SAD was low. The study group, consisting mainly of healthcare professionals, showcases a gap in the education system. The lack of knowledge inhibits students from seeking the care they require. It can also have long-term complications like negligence and inability to accurately diagnose a patient with SAD.

The overall risk for developing SAD and s-SAD was 10.3% and 42%, respectively. This is much higher than the rates found among other studies conducted in India as well as other Western countries.<sup>[7,14,18,19]</sup> The mean GSS being 9.6 is also higher as compared to the aforementioned studies.

While few among those who screened positive for SAD showed no seasonal pattern, the majority experienced

depressive features of feeling bad, eating less, socializing less, sleeping less, and losing most weight predominantly during April–August, i.e., during summers.

On the contrary, there was a rise in feeling good, eating more, socializing more, sleeping more, and gaining more weight during October–February, i.e., winter. While most studies that express a winter pattern SAD, talk about atypical depressive features of hypersomnia and increased appetite, the mean hours of sleep during winters were 7.4 hours and fluctuation in weight during the course of the year was 4–7 lbs. As these remain within normal physiological limits, it is safe to conclude that due to the adequate amount of sleep and good appetite during winters, they tend to feel better and have greater socializing capacities.

Thus, the summer pattern observed is consistent with other studies done within India as well as Asia.<sup>[4,5,18]</sup> It is theorized that the depressive features seen during the summer months, despite the abundance of sunlight, are due to lack of exposure to it. Individuals prefer to stay indoors to avoid the heat and thus still experience a deficit of sunlight. This in turn decreases their serotonin release.

While the majority of the study group was females (68.3%), there was no significant correlation between gender and SAD. This stands in contrast to other studies that report SAD as having a female predisposition.<sup>[19,20]</sup>

Out of the 26 individuals screened for SAD, two individuals have a positive family history of psychiatric illness, and three have previously been diagnosed with psychiatric illness. Although it is not possible to comment on the role of genetics in SAD with such a small sample size, it is a field that can be explored more.

As the questionnaire was only administered once during the summer months, there is a possibility of recall bias towards the winter months. A repeat of the study during the winter months would be required to test the consistency of the results. A longitudinal study would prove beneficial.

### Limitations

The sample size being small and consisting of only undergraduate medical professionals from North India limit the extent to which the findings can be generalized to the Indian subcontinent.

### CONCLUSION

In conclusion, the research study provides the overall risk for the development of SAD and s-SAD among undergraduate medical professionals residing in North India. The findings suggest that contrary to the more widely recognized Winter pattern SAD, as seen in the West, the East predominantly

faces Summer pattern SAD. These results underscore the need for greater awareness and targeted treatment approaches for Summer pattern SAD, especially considering the lack of knowledge about this condition among undergraduate medical professionals. This gap in awareness can lead to underdiagnosis and inadequate treatment for those affected. Therefore, it is crucial to increase awareness about SAD to better equip future healthcare workers. Future research should continue to explore the underlying mechanism of summer pattern SAD as well as develop effective strategies for its management.

### Authors' contributions

Elbe Thomas Ambanattu - Concept and design of the study, acquisition of data, analysis and interpretation of data; Drafting the article and revising it critically for important intellectual content.

Mamta Singla - Final approval of the version to be published. Clarence J Samuel - accountable for ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

### Ethical approval

The research/study approved by the Institutional Review Board at Christian Medical College, Ludhiana, number BMHR-IECCMCL/0722-253, dated 07<sup>th</sup> July 2022.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

### Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of AI-assisted technology for assisting in the writing of the manuscript and no images were manipulated using AI.

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