

Limitations of Seasonal Pattern Assessment Questionnaire and Development of Shastun's Questionnaire for Assessment of Seasonal Affective Disorders, Among Namibian Students in Moscow

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Abstract

Background. The environmental transition from one country to another after migration may be also associated with change in seasons, weather and climate as well as in psychosocial stress which may put a greater demand on physiology and metabolism of migrants that may predispose to cardiometabolic risk. This is commonly seen among students of the People's Friendship University of Russia, Moscow. This study examines the validity of the newly developed questionnaire by Dr Shastun, for assessment of seasonal affective disorder (SAD) among students of Namibia studying at Moscow.

Subjects and Methods. After approval by the Review board/ethics committee of Faculty of Medicine, People's Friendship University of Russia, Moscow and written informed consent, subjects were recruited for this study. The study involved; Namibian students migrating to Russia while studying in Moscow. Of 87 students from Namibia, all of them volunteered to participate in the study. Seasonal affective disorder (SAD) was studied by Shastun's questionnaire and Seasonal Pattern Assessment Questionnaire (SPAQ). The SPAQ is a brief, self-administered screening tool for seasonal affective disorder (SAD) which may have limitations. The criterion for diagnosis of SAD was a score of 11 or higher on this scale which means the highest level of SAD. The diagnosis SAD was also made by administering Shastun's questionnaire.

Results. The results indicate that clinical manifestations indicating SAD were rare while the students were in Namibia, which showed significant increase after migration to Russia and staying minimum for one year. Hypersomnia, overeating and carbohydrate craving were common manifestations of SAD. The prevalence of SAD by Shastun's questionnaire was significantly lower compared to frequency of SAD by SPAQ, respectively (11.9% vs. 18.5%, $P \leq 0.05$). The number of sunny days per year and the average annual temperature of the region of stay appear to be the most significant confounders and for the occurrence of cardiometabolic risks among students.

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Conclusions. Shastun's questionnaire could be better instrument in accuracy in the diagnosis of SAD, because SPAQ has a few limitations.

Keywords: depression, cardiometabolic risks factors, seasonal health, metabolism

Introduction

There is environmental as well as nutritional transition during migration from rural area to urban area and from lower income country to higher income country. There may be marked changes in diet and lifestyle characterized with increased consumption of ready prepared western foods with lower intake of traditional foods commonly consumed in the home country [1]. Seasonal affective disorder (SAD) is a type of depression that occurs during the same season each year [2-6]. SAD is more common among subjects with past history of the disease, during the last two winters but felt much better in spring and summer. Some people may have SAD during the summer months more so with family history of SAD [2, 5]. It is more common among women, people who live far from the equator, where winter daylight hours are very short, particularly in age group of 15-55 years and the risk of getting SAD for the first time goes down with increasing age. SAD is sometimes called winter depression or seasonal depression [3, 4]. The exact etiology of SAD is not known but it could be due to disturbance in biological clock which controls sleep-wake pattern and other circadian rhythms. There may be deficiency of serotonin which is known to cause feel sad, grumpy, moody, or anxious. Clinical manifestations of SAD may be loss of interest in usual activities, eat more and crave carbohydrates, such as bread and pasta and sugary ready prepared foods, sleep more, fatigue, with poor concentration [2-6]. The symptoms manifest at about the same time each year and most people with SAD start to have symptoms in September or October and feel better by April or May.

Modern education in medical school places high demands on the students, including the state of their health. Premorbid control system and strengthening physical health, mental health and functional reserves of cardiometabolic system of the body of students from different climatic regions is very urgent health

problem. This is also the age (18-25 years) when many new diets and lifestyle are adopted by the students. At the same time, the changes in the weather and the climate in concerned regions place special demands on the body of students [7-10]. The exact prevalence SAD is difficult to know, as the disorder may go unreported and consequently underdiagnosed as well as SAD can co-occur with other depressive, bipolar, attention deficit, and eating disorders, making it over-diagnosed. The diagnosis of SAD, based on existing questionnaire; Seasonal Pattern Assessment Questionnaire (SPAQ) by Rosenthal et al. is open to bias and may have limitations, because questionnaire is self-administered which can over-diagnose SAD, in presence of other similar diseases [10]. There is need to modify this questionnaire to improve its accuracy for better diagnosis of SAD. This study examines the specificity and accuracy of Shastun's questionnaire and extent of SADs compared to SPAQ, a screening tool for SAD, among students of Namibia studying at Moscow.

Subjects and Methods

The study was approved by the review board/ethics committee of the Faculty of Medicine, of the People's Friendship University of Russia, Moscow. Recruitment of subjects was made after informed consent from all the students. The study involved; Namibian students in Namibia going to Moscow and the same, Namibian students while studying at least for 3 months to 12 in Moscow. Of 87 students from Namibia, all of them volunteered to participate in the study during the winter season. The age varied from 18-30 years and the body weights were 55 to 75 kg. Seasonal affective disorder (SAD) was studied by Shastun's questionnaire as well as by SPAQ. The number of sunny days in the year and the average annual temperature of Moscow were obtained from official records. The temperature in Moscow varied from -12°C in January 2014, with maximum 30°C in July and -11 in November-December. According to the measurements of the Meteorological Observatory of Moscow State University, the average monthly temperature in 2014 summer; June, July, August was 19.06°C; in

winter; January, February, December was -4.1. The average monthly duration of sunshine in 2014, were summer; June, July, August; 319 days in winter 45.2 days.

The diagnosis of SAD was based on various attributes of clinical manifestations measured by SPAQ, which is a brief, self-administered screening tool for SAD. The SPAQ is a retrospective, self-administered tool that screens for the existence of SAD and S-SAD. It is freely available at <http://www.guilford.com/add/forms/rosenthal2.pdf>. Training is not required to use this tool. However, scoring the SPAQ is not straightforward and clinicians and researchers use the tool in different ways which can over-diagnose or underdiagnose the presence of SAD. Questions two and three provide particularly useful information in that they yield a specific number on the Global Seasonality Score or GSS.

The extent of SAD and its presence can be identified by the number or score. This number or score can immediately indicate whether SAD or S-SAD is present and the degree of severity. As such, health professionals can use these two questions to add GS score to their client/patient assessments. In question two, respondents rate their sleep length, social activity, mood, weight, appetite, and energy level on Likert scales scored from 0 to 4. In question three, respondents rate the degree that seasonal changes are; mild, moderate, marked, severe, or disabling. A GS score of 11 or above and a problem rating of at least moderate are indicative of SAD. A GS score of 9 or 10 and a problem rating of at least mild are indicative of sub-syndromal (S) S-SAD.

Seasonal Pattern Assessment Questionnaire (SPAQ)

In the SPAQ, following questions are asked to find out seasonality and degree of symptom. Do any of following manifestations change with seasons and do they cause any problems. Length of sleep. Getting in trouble. Social activity. Substance abuse (drinking, smoking, drugs). Mood. School performance: (a) Difficulty. (b) Grades. Weight. Irritability. Energy level. Appetite.

The Reliability, Validity, and Specificity of SPAQ

The SPAQ measures consistently and to be valid in that it measures what it was designed to measure, has been demonstrated to be reliable. Despite reliability, it has been criticized for having low specificity, meaning that results may suggest people who do not have SAD will score as though they do. This low specificity may misclassify people with non-seasonal depressions which may be misleadingly, giving high estimates of prevalence of SAD.

The purpose of this form is to find out how your mood and behavior change over time. All the relevant circles are filled in. In the following questions, fill in circles for all applicable months. This may be a single month z, a cluster of months, zzz, or any other grouping. Time of year to be given.

Shastun's Questionnaire for Assessment of SAD

Shastun's questionnaire is a modified version of the SPAQ. This questionnaire was validated among 12 Namibian students, before it was used as a tool for the present study.

Table 1 shows the questions that are asked to each subject and the questionnaire is administered by a nurse or health worker to improve the accuracy of the questionnaire. The Shastun's questionnaire differs from SPAQ because it is more intensive assessment of each symptom and it is administered by health professionals. The score of attributes of >50 of SAD via Shastun's questionnaire indicated SAD which is a modification of SPAQ.

The score of attributes of >50 of SAD via Shastun's questionnaire indicated SAD. The score of 25-50 is considered possible SAD. The score of <25 means, either considered absence of SAD or that case needs follow-up. The Shastun's questionnaire was validated among 12 Namibian students.

The study also examined cardiometabolic risks factors; total cholesterol (TC), triglycerides, high density lipoprotein (HDL) cholesterol, blood glucose, body mass index etc. by standard methods in a accredited laboratory. Subjects with endogenous

depression were not considered and excluded from the diagnosis of SAD via Shastun's questionnaire.

Results

This study examined the clinical manifestations of SAD in relation with cardiometabolic risk factors among Namibian students while studying in Moscow and before going back to Namibia.

Table 2 shows the clinical manifestations of SAD among Namibian students migrating to Russia and living in Moscow. The findings indicate that clinical manifestations were rare while the students were in Namibia, which showed significant increase after migration to Russia and during the stay for one year.

The prevalence of SAD by Shastun's questionnaire was significantly lower compared to frequency of SAD by SPAQ, respectively (11.9% vs. 18.5%, $P \leq 0.05$).

The data obtained are shown in table 2. From the data presented in the table, it can be seen that the severity of the indicators of SAD in Namibian students in Moscow is significantly higher in relation to similar indicators among Namibian students in Namibia ($P \leq 0.01$ to $P \leq 0.02$).

Table 3 shows that mean body mass index was significantly greater among students at Moscow compared to when students were in Namibia. Mean triglycerides and blood glucose after an overnight fast were significantly higher among students in Moscow compared to Namibians when they were in Namibia.

Table 1. Shastun's questionnaire for assessment of seasonal affective disorders

No	Attributes occurring in a season; (Severity = No, Slight (1-2), Moderate(5-6), Marked change(9-10) (1-10)	Scores constructed based on each attribute (1-10)
1	Sleep length	
2	Social activity/lonely ness	
3	Mood (feeling of wellbeing)	
4	Agitation/anger	
5	Appetite	
6	Energy (level of fatigue)	
7	No desire to work	
8	Excess of thinking	
9	No desire to get up	
10	Weight	

Modified from Rosenthal et al., 1984, Seasonal affective disorder (SAD), Score > 50: SAD, 25-50: Possible SAD. Score < 25, no SAD. Subjects with drug abuse were not included in the study.

Table 2. Clinical manifestations of seasonal affective disorders among Namibian students

No	Manifestations	Namibians in Moscow, n = 87, n(%)	Namibians in Namibia, n = 87, n(%)	P value
1	Sleep <6 hours	9 (10.3)	1(1.1)	$P \leq 0.01$
2	Social activity/lonely ness	12(13.8)	1(1.1)	$P \leq 0.01$
3	Feeling of poor wellbeing	14(16.1)	2(2.2)	$P \leq 0.01$
4	Agitation/anger	13(14.9)	4(4.4)	$P \leq 0.02$
5	Loss of appetite	10(11.5)	5(5.7)	$P \leq 0.02$
6	Excess of fatigue	12(13.9)	1(1.1)	$P \leq 0.01$
7	No desire to work	11(12.6)	1(1.1)	$P \leq 0.01$
8	Excess of thinking	13(14.9)	2(2.2)	$P \leq 0.01$
9	No desire to get up	12(13.8)	1(1.1)	$P \leq 0.01$
10	Weight gain	13 (14.9)	1(1.1)	$P \leq 0.01$

Table 3. Body mass index and biochemical data among Namibian students

Data	Namibian in Moscow	Namibian in Namibia	P value
Mean Body Mass Index (kg/m ²).	24.8 ± 2.4*	21.6 ± 1.3	P ≤ 0.01
Total cholesterol (TC) (N < 5.0 mmol/l)	4.21 ± 0.06	4.28 ± 0.05	P ≤ 0.06
Triglycerides fasting (normal < 1.7 mmol/l)	2.01 ± 0.09*	1.3 ± 0.07	P ≤ 0.05
Glucose (normal < 5 mmol/l).	4.66 ± 0.2*	4.26 ± 0.2	P ≤ 0.05

Discussion

There is evidence that migration may also be associated with change in weather and climate, psychosocial stress and decreased physical activity due to greater use of automobiles. There may be sleep deprivation due to late night sleep and late night eating as well as due to increased demand from the home work given by the teachers. All these factors may put a greater demand on physiology and metabolism of migrants which may predispose cardiometabolic risk. This is commonly seen among students of the international universities, such as People's Friendship University of Russia where we find students from 153 countries of Asia, Africa and America.

The frequency of SAD by Shastun's questionnaire was significantly lower compared to frequency of SAD by SPAQ, respectively (11.9% vs. 18.5%, $P \leq 0.05$). Some experts consider SAD as a syndrome characterized by recurrent depressions that occur annually at the same time each year [10]. Rosenthal describe 29 patients with SAD; most of them had a bipolar affective disorder, especially bipolar II, and their depressions were generally characterized by hypersomnia, overeating, and carbohydrate craving and seemed to respond to changes in climate and latitude. These symptoms are against endogenous depression where patient have loss of appetite and insomnia. In nine depressed patients, recording of sleep confirmed the presence of hypersomnia and showed increased sleep latency and reduced slow-wave (delta) sleep [10]. A previous study was conducted to explore the associated risk and protective factors on prevalence of winter SAD (W-SAD), sub syndromal SAD (S-SAD) and Summer-SAD among five immigrant groups living in Oslo, Norway [12]. This study included 1047 subjects in the analysis, out of 3019 who participated in the

survey. Mailed questionnaire which included selected items of the seasonal pattern assessment questionnaire (SPAQ), Hopkins symptom check list (HSCL) and other variables were used in the analysis. The lowest levels of W-SAD were found among Sri Lankan men and women and the highest among Iranians. W-SAD was significantly associated with country of birth, younger age, smoking, presence of mental distress, frequent visits to general practitioner or psychiatrist, self-reported poor health and presence of chronic disorders. S-SAD was significantly associated with country of birth, smoking and higher levels of alcohol consumption.

Major limitation is that SPAQ is not yet culturally validated and response rate in the study was very poor (39.7%). Sri Lankans had the lowest levels of W-SAD compared to other ethnic groups [12]. There is a need for culturally validated instruments and further research must focus on exploring protective factors against SAD. Shastun's questionnaire could be of great help in multicultural populations. SAD is not a valid medical construct, because recurrent depression with seasonal pattern has also been considered SAD in previous studies [10-12]. However, more research is needed to establish whether it is at all fruitful to single out such a subtype of recurrent depression. It has been observed that a significant number of people are living with the debilitating effects of SAD and are not functioning to their full potential [11].

The prevalence of SAD is four fold more often in women than in men and the age of onset is estimated to be between 18 and 30 years [13, 14]. Living farthest from the equator in northern latitudes increases the susceptibility [14]. In the US, people living in Florida have much lower prevalence of SAD compared to those living in Alaska, respectively (1 vs. 9%) [15]. Approximately, 15% of the population experience winter blues and 2% to 6% experience SAD in Canada [16] whereas in the England, 20%

experience winter blues and 2% experience SAD [17, 18].

The exact diagnosis as well as exact prevalence of SAD is difficult to know because the disorder may go unreported and consequently underdiagnosed [19]. It can co-exist with other depressive, bipolar, attention deficit and eating disorders and alcoholism, making it difficult to diagnose [20]. Presence of thyroid diseases due to vague manifestations may complicate the diagnosis of SAD [21]. SAD is most common among women and it is triggered by limited exposure to sunlight. Health professionals such as nurses and other health staff who do shift work may be at particular risk [22]. SAD is common and important in mental health as well as it is used for studying the effect of environment on behavior and effects of light therapy on its manifestations [23-25].

The mechanism of development of SAD appears to be based on neurotransmitters, hormones, circadian rhythm dysregulation, genetic polymorphisms, and psychological factors [26]. The rate of serotonin turnover in the brain is lowest in the winter season, and its production increases with day light [27]. Depletion of serotonergic systems with monoaminergic challenge appears to be important in the pathogenesis of SAD [28]. Therapy with bright light predisposes relapse when serotonin and catecholamine levels are depleted [29, 30]. Efficacy of the serotonin reuptake inhibitors (SSRIs) in SAD treatment provides indirect evidence for the role of serotonin in SAD [31]. It is possible, that serotonin and catecholamines may play a role in both the pathophysiology of SAD and the antidepressant effect of light therapy [32]. Migration may also deplete melatonin due to circadian disturbances and decline in sleep resulting in SAD [33]. According to WHO, and other experts, it is possible that by 2030-2035, SADs are likely to become a public health problem due to its high prevalence, possibly, second place after CVDs [34].

Sad mood and low energy are common symptoms of winter seasonal pattern disorders [24, 25, 34]. It seems that people with SAD may frequently cry, can feel sad and irritable. Some subjects may be tired and lethargic, may have difficulty in concentration, sleep more than normal. Feeling of lack of energy reduces their physical activity levels, withdraw from social situations, crave carbohydrates and sugars, and tend to

develop obesity due to overeating [34]. Some of these depressive patients may have, thoughts of suicide which need special attention to diagnose by health professionals if using Shastun's questionnaire, because it may be difficult to assess by SPAQ.

In brief, SAD appears to be over diagnosed because according to Shastun's questionnaires, the prevalence is half of that obtained by existing SPAQ questionnaire. There was a significant increase in body weight after migration to Russia which may be a manifestation of SAD that is most significant factor for the state of cardiometabolic risk.

Conflict of interest. The authors declare that there is no conflict of interest. Dr Sergey Shastun, who submitted this article, deceased after revising it in July 2017.

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