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Association of stress and eating behaviour with premenstrual syndrome

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ABSTRACT

The present study was undertaken to observe the association between stress and eating behaviour with premenstrual syndrome. Thirty cases of premenstrual syndrome and thirty healthy, age-matched controls, were included in the study after obtaining written informed consent. Premenstrual syndrome questionnaire was used to identify participants with PMS. Stress perception was measured by using the perceived stress scale. PSS is a standard questionnaire, a global measure of perceived stress. The vulnerability of the eating disorder was assessed by using EAT-26. The value of R for the association of stress and eating behavior in participants with the premenstrual syndrome is 0.0981. Although technically a positive correlation, the relationship between your variables is weak. The value of R², the coefficient of determination, is 0.0096. The value of R for the association of stress and eating behavior in healthy participants is 0.0077. Although technically a positive correlation, the relationship between your variables is weak. The value of R², the coefficient of determination, is 0.0001. There were significantly high levels of stress score (P=0.0003) in the cases when compared to controls. However, the EAT-26 score is not significant (P=0.7288). A positive correlation was observed between the stress and eating behaviour in both healthy and premenstrual syndrome individuals. The study recommends further studies on a large scale to understand the association and underlying mechanisms to plan better management techniques and also to increase awareness in the student population.



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INTRODUCTION

Pre Menstrual Syndrome (PMS) symptoms are experienced by every woman at least once during the reproductive age which is between menarche and

menopause. Diagnosis of PMS is given by the American Association of Obstetricians and Gynaecologists according to which there should be an occurrence of emotional and physical symptoms 5-11 days before menses in the cycle. Emotional symptoms include anger outbursts, anxiety, confusion & social withdrawal symptoms. Physical symptoms include headache, abdominal bloating and swelling of extremities (Practice Bulletin No 15, 2000; Joshi *et al.*, 2010). About 85% of the women display at least one PMS symptom during a cycle (ACOG Committee on Practice Bulletins, 2000). PMS may lead to varying symptoms which range from physical pain to mood swings and loss of concentration which may cause a major setback in education. The term "stress" is often associated with PMS. Premenstrual syndrome is stress induced psycho-

physiological disorder, which causes physical, psychological and behavioural changes (Bhawana Sharma *et al.*, 2013). The stress caused by PMS decreases the quality of life due to the various dysfunctions it may cause anxiety and weakness. High BMI was found to be linked to many physical and mental symptoms caused during PMS (Tschudin *et al.*, 2010). Cravings are very prominent during the luteal phase which coincides with the period during which the PMS symptoms are noticed. This leads to improper control over food intake because during this phase the body prepares itself for pregnancy and the calorie requirements and breakdown is more. These sudden changes may have an impact on social life, education, physical activities and mental stability. The study aims to find out what impact the PMS symptoms have on the stress levels and how alterations take place in the eating habits. This study can give a clear picture of how the stress levels & eating disorders are altered which can then help in devising techniques to reduce stress and have control over eating. The condition of PMS is common among women between menarche and menopause about 40% of the women in reproductive age experience the signs and symptoms of PMS in their life span (Bendich *et al.*, 2002). It has been noticed that young girls are more prone to PMS (Benton, 2002; Mortola, 2000). It has also been learnt that PMS has a negative impact on individuals physical and mental status; it reduces the quality of life, depression and anxiety could also be noticed. Studies reveal that this is a phase in which there is an increase in the rate of crime, suicides, family quarrels and hospitalisation, this may be due to low mental status (Dickerson, 2003; Lowdermilk *et al.*, 2004). Studies stated the most commonly noted symptoms of PMS like lack of interest in regular activities, low energy, depression, mood swings, and changes in appetite; it also leads to somatic symptoms like oedema, headache, stomach ache and overweight (Berslin *et al.*, 2003). At least one of the symptoms that have been taken into consideration for diagnosing PMS was found to be positive in most of the women who have undertaken this study (Kimberly Ann Yonkers *et al.*, 2008). One such interesting study revealed an inverse relationship between the age of onset of the menstrual cycle and the mood swings. If the age of onset of the menstrual cycle in the women was below the age of 18 years, then there is a greater manifestation of psychological and physical symptoms in these women. Increased pain during the menstrual cycle was found to be associated with the levels of C reactive protein in the body. The diet pattern adopted by a particular individual also determines to a large extent the body's response to the changes that occur during the menstrual cycle. Protein-rich diet enhances the body's resistance towards the problems that occur

during the cycle and before that (Chintan Madhusudan Raval *et al.*, 2016). Women whose diet has a greater percentage of sugars and fat rich food are often associated with greater manifestations of symptoms than others. The exact cause of PMS is unknown, but several hormonal and neuroendocrine factors are shown to be contributed to this condition. The modern sedentary lifestyle also contributes to the decreased resistance towards the various symptoms of premenstrual syndrome (Bianco *et al.*, 2014; Reihane Firoozi *et al.*, 2014). Women with an active lifestyle and who tend to involve themselves in any kind of physical activity or workout can handle the menstrual cycle with ease (American Psychiatric Association, 1994). Exercise - physically to the body and mind to the brain are extremely important especially to women with pre-menstrual symptoms. Food cravings are common in women especially prior to the menstrual cycle. Many studies regarding this topic have concluded that if diet and food habits are corrected, then the symptoms might most probably reduce (Shirmohammadi *et al.*, 2009). The present study was undertaken to observe the association between stress and eating behaviour with premenstrual syndrome.

MATERIALS AND METHODS

Study design: Observational and cross-sectional study.

Study setting: The present study was conducted in the Department of Biochemistry, Apollo Institute of Medical Sciences, Hyderabad, Telangana.

Participants: Thirty cases of premenstrual syndrome and thirty healthy, age-matched controls, were included in the study after obtaining written informed consent. The participants were recruited via an advertisement on college notice boards. The following criteria were followed for selecting the cases;

1. Apparently healthy females with PMS (PMS will be screened by using PMS questionnaire) ^(5,11)
2. Having regular menstrual cycles from 28 to 34 days
3. Willing participants.

Questionnaires: All the data was collected between 9-11 am for the convenient of the participants.

1. **PMS Questionnaire:** Premenstrual syndrome questionnaire was used to identify participants with PMS (Berslin *et al.*, 2003; Sharma B *et al.*, 2013; Moos RH, 1968).
2. **Perceived stress scale (PSS):** Stress perception was measured by using perceived stress scale Cohen *et al.*, 1988). PSS is a standard questionnaire, a global measure of

perceived stress. The items are easy to understand, and the response alternatives are simple to grasp. The questions are of a general nature and hence are relatively free of content specific to any subpopulation group.

Scoring: PSS scores were obtained by reversing responses (e.g., 0=4, 1=3, 2=2, 3=1, 4=0) to the four positively state items and sum across all the scale items.

- Eating Attitude Test- 26 (EAT-26):** Vulnerability of eating disorder was assessed by using EAT-26 that needs professional attention (Garner, 1982).

Ethical consideration

The study protocol was approved by the institutional human ethical committee (AIMSR/IRB/EC/S/2018/03/066). Informed consent was obtained from all the participants after explaining the details of the study. Confidentiality of the data was maintained.

Data analysis

Data were analysed by SPSS 20.0. Pearson correlation coefficient was used to observe the correlation between the variables. A p value less than 0.05 was considered significant.

RESULTS

The value of R for the association of stress and eating behavior in participants with the premenstrual syndrome is 0.0981. Although technically a positive correlation, the relationship between your variables is weak. The value of R², the coefficient of determination, is 0.0096. The value of R for the association of stress and eating behavior in healthy participants is 0.0077. Although technically a positive correlation, the relationship between your variables is weak. The value of R², the coefficient of determination, is 0.0001. There were significantly high levels of stress score (P=0.0003) in the cases when compared to controls. However, the EAT-26 score is not significant (P=0.7288).

Table 1: Association of stress and eating behavior in cases and controls

PSS score	EAT-26 score	R-value	R ² value
21.27±1.04	13.73±1.29	0.0981	0.0096
16.23±0.80	13.07±1.42	0.0077	0.0001

DISCUSSION

Stress is a global problem in current day lifestyle. Higher levels of stress were reported in many diseased conditions. It was recommended to assess stress levels in clinical settings. The present study assessed the association between stress levels and eating behaviour in healthy individuals and individuals with premenstrual syndrome.

There was a positive correlation between the variables. Though it is not significant, the study explains the association between stress and eating behaviour in both premenstrual syndrome and healthy. When compared, the stress levels in individuals with the premenstrual syndrome were found to be significantly higher. It was well known that the majority of women feel discomfort both physiologically and psychologically one week before menstrual period (Sigmon *et al.*, 2000). The prevalence of premenstrual syndrome is thirty to forty percentages (Ryu *et al.*, 2015). The symptoms of the premenstrual syndrome include physiological, biochemical, psychological, behavioural and emotional. These symptoms start at the premenstrual period and disappear at the end of the cycle (Indusekhar *et al.*, 2007; Cubeddu *et al.*, 2011; Yonkers *et al.*, 2008; Perkonigg *et al.*, 2004). The fluctuations in the levels of hormones influence the emotional changes and mood changes and also the reactivity to the stress (Ossewaarde *et al.*, 2013). It was reported that sex hormones influence amygdala and contributes to one or more of the symptoms of premenstrual syndrome (Choi *et al.*, 2006). It was reported that there were significantly higher levels of stress in individuals with premenstrual syndrome (Dickerson *et al.*, 2004).

Stress was reported to alter the food preferences and eating behaviour. A stressed individual prefers to eat more calorie diet. Similarly, a highly stressed individual may prefer to adopt for alcohol (Zellner *et al.*, 2007; Oliver *et al.*, 1999). Interestingly, this statement was true in the case of women as they react stronger to the stress than men (Zellner *et al.*, 2006). This change in the eating behaviour may be due to alteration of the sensitivity of the reward system of the limbic system. The possible chemical substances involved are dopamine, leptin and insulin (Zheng *et al.*, 2009; Wallis *et al.*, 2009; Oliver *et al.*, 2000). The student population especially undergoes so many stressful situations, and it was proven that their levels of stress are high when compared to the general population. If these students also experience the premenstrual syndrome, their level of stress is far more and causes a negative impact on the decision making about the selection of the food (El Ansari *et al.*, 2011; Gambetta-Tessini *et al.*, 2013; El Ansari *et al.*, 2013). Earlier studies reported that there was a positive association between the stress score and eating disorders (Zheng *et al.*, 2009). Changes in food behaviour during stress may help in relieving the stress like eating more sweet may give a sensation of pleasure (Yen *et al.*, 2010). The current study agrees with earlier results as we have observed a positive correlation between

stress and eating behaviour in both healthy and premenstrual syndrome participants.

CONCLUSION

A positive correlation was observed between the stress and eating behaviour in both healthy and premenstrual syndrome individuals. The study recommends further studies on a large scale to understand the association and underlying mechanisms to plan better management techniques and also to increase awareness in the student population.

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Conflicts of interest: Nil

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