Physiology Section

Assessment of Perceived Stress in Postgraduate Medical Students during Training Programme

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ABSTRACT

Introduction: Postgraduate (PG) training programme in medical field is a transitional period for PG students. They are expected to be able to present state of the art information for the decisions taken for treating the patients. It requires extraordinary time demand leading to physical exhaustion. Academic, professional and personal factors cause stress in day to day life. Sustained stress leads to increased rate of anxiety, depression and suicidal tendencies. Many studies have been done to evaluate stress in undergraduate medical students but very few studies have been done in PG medical students in India.

Aim: To evaluate and compare stress amongst I and III year post graduate students by Perceived Stress Scale (PSS) and by estimating the levels of salivary cortisol.

Materials and Methods: This was a cross-sectional observational study using self administered questionnaire. The study group consisted of 60 PG students (I year-30 students and III year-30 students). They were asked to complete a questionnaire which included personal data, academic problems, social support, and other stress inducing factors. Stress was measured by PSS score and estimation of salivary cortisol was done by ELISA. Salivary cortisol was analysed by unpaired t-test. Simple percentage analysis of PSS questionnaire was done.

Results: Analysis of salivary cortisol levels and PSS score amongst I and III year PG students was statistically significant (p<0.05) and salivary cortisol levels were positively correlated with PSS score. PSS score of I year PG students was moderate (17.46±2.09) which might be due to burden of the clinical ward work, getting exposed for first time to treat critically ill patients in emergency room, dealing with patients relatives in death situations and lack of time for friends and family. PSS score of III year PG students was more as compared to first year students (22.2±4.32), which might be due to additional burden of thesis work, lack of time to review what has been learnt, vast academic curriculum and worries about future. These effects affected their daily sleep duration, diet, interpersonal relations with colleagues and family members leading to increased stress. The mean salivary cortisol level was more (9.27±2.38ng/mL) in III year PG students than I year PG students (7.12±1.60 ng/mL).

Conclusion: This study explored that both I year and III year PG medical students are under moderate stress and PSS score is directly correlated with salivary cortisol levels.

INTRODUCTION

The term stress indicates a circumstance, which may be physical, chemical, or an emotional factor, that disrupts homeostatic mechanisms in an individual. Due to rising prevalence of stress in PG medical students, psychological symptoms are becoming a matter of concern. It also affects their health and professional career. Disrupted psychological homeostasis due to stress leads to activation of central and peripheral neuroendocrine mechanisms causing various adaptive responses and behavioural changes [1].

It has been observed that students have stress during undergraduate medical course [2]. Due to vast syllabus, ever changing treatment modalities and expectation of acquiring newer skills, not only undergraduate but also post graduate medical education is also perceived as a challenging and stressful condition [3,4].

Some amount of stress has positive influence in the form of increasing self-confidence, acquisition of knowledge and important skills to deal with the patients. However, chronic stress leads to chronic diseases like hypertension, Type II diabetes mellitus, depression and poor quality of life. It can also affect patient care as the well-being of the PG students [5].

Recent studies have been done to assess stress in PG students but very few have correlated PSS score with salivary cortisol [6]. In private medical colleges students from various regions of India having socioeconomic difference are admitted for the courses.

Substantial stress during PG medical course leading to anxiety, depression and increased incidences of suicidal tendencies might be due to rising competition and difficulty in coping strategies. Therefore, the study was undertaken to assess perceived stress in I and III year PG medical students during training programme.

MATERIALS AND METHODS

This was a cross-sectional observational study using self administered questionnaire. The study was approved by institutional ethical committee. 60 male PG medical students in the first (30 students) and third (30 students) academic year of training programme from various departments of the Bharati Vidyapeeth University Medical College, Pune, Maharashtra, India, voluntarily participated in the study. Volunteers were in the age group of 25-30 years. Informed written consent was obtained from them. The study was approved by institutional ethical committee.

Collection of data

The study was conducted from August to September 2014. The participation was entirely voluntary. Volunteers were subjected to detailed history and clinical examination. The students were asked to complete a set of validated questionnaire that included general questions on socioeconomic data and personal information about duration of sleep, working hours, opinions regarding academics, hostel facilities and social environment. Questionnaire having items causing stress were divided in to academic, psychosocial and personal or health factors. The questions were formulated after discussion with the senior faculty of the institute.

Students having past history of adrenal disease, asthma, those taking medications such as acetylsalicylic acid, oral contraceptives or steroids or having oral diseases, inflammation or lesions in mouth were excluded from the study.

Perceived Stress Scale (PSS): It is a prevalidated questionnaire which measures the degree to which situations in one's life are perceived as stressful in last one month. The 10 item PSS by Cohen S (1983) consists of four positive and six negative items. Participants were asked to respond to each question on a 5 point Likert scale ranging from 0 (never) to 4 (very often), indicating how often they have felt or thought a certain way within the past month. Scores ranging from 0-13 is considered as low, 14-26 is considered as moderate and 27-40 is considered as high perceived stress [7].

Estimation of Salivary Cortisol

2 mL of saliva was collected between 6 am to 8 am in a salivette. Volunteers were instructed to avoid eating, drinking, chewing gums or even brushing teeth for 30 minutes before sampling. They were asked to rinse mouth thoroughly with cold water five minutes prior to sampling. Samples were stored at -20°C. The hormone was estimated by highly sensitive cortisol ELISA kit (DRG, USA). It was estimated by automated chemiluminescence immunoassay system. The morning salivary cortisol value ranges from 0.94-19.80 ng/mL by this kit.

Completed questionnaires and salivary samples were collected at the beginning of second semester in first year PG students and six months before the examination period in the third year PG students so that the actual examination stress would not affect the responses of the students.

STATISTICAL ANALYSIS

For statistical analysis, Statistical Package for Social Sciences for Windows, 16th version (SPSS 16.0) was used. Salivary cortisol was analysed by unpaired t-test. Simple percentage analysis of PSS questionnaire was done. Correlation coefficient was determined for salivary cortisol levels and PSS score.

RESULTS

The mean age of the subject was 25.20±4.5 years. All the participants submitted completely filled questionnaire. [Table/Fig-1] shows the percentage responses given to the questions in the questionnaire.

The important stressors during PG studies observed in this study were academic, as they have to learn large amount of content and skills to diagnose and treat patients. Lack of time to review what has been learnt was reported by 16 (54%) and 17 (55%) of I year and III year PG students respectively. Also, 13 (43%) I year students and 26 (86%) III year students had a feeling that they can not fulfil parents expectations.

In all 51 (85%) PG students were getting sleep only for 4-6 hours as most of them had long working hours. Amongst the participants 20 (33%) PG students admitted that they were taking alcohol to reduce stress. Allotment of mentor to solve the problems was mentioned by 12 (40%) PG students of I year and 7 (22%) PG students of III year.

Interpretation of PSS score revealed that amongst I year PG students eight had low, 21 had moderate and only one had high perceived stress. While in III year PG students two had low, 23 had moderate and 5 had high perceived stress. Higher PSS scores in III year PG students (22.2±4.32) than I year (17.46±2.09) indicated increased stress in III year PG students.

[Table/Fig-2] shows comparison of salivary cortisol and PSS score amongst PG medical students. The results documented that salivary cortisol levels and PSS score were high in III year PG students than I year PG students. Thus the study showed statistically significant increase in stress in III year PG students (p<0.001) as compared to I year students.

Items causing stress	Students responses (n=60) (%)
Academic	
Test/examinations	20 (33)
Lack of time to review what have been learnt	33 (55)
Thesis preparation (III year, n=30))	19 (63)
Academic curriculum	53 (88)
Psychosocial	
Need to do well (parents expectation) can not fulfil	39 (65)
Dealing with patients relatives in death situations	20 (33)
To treat critically ill patients in emergency room	15 (25)
Extra workload in wards	47 (78)
Interpersonal relations with colleagues	32 (52)
Family responsibilities (III year, n=30)	13 (41)
Lack of time for family and friends	45 (74)
Difficulty in coping up with deadlines	33 (55)
Family conflicts (III year, n=30)	9 (30)
Worries about job opportunities (III year, n=30)	27 (89)
Social environment.	7 (11)
Personal health	
Irregular diet	48 (80)
Alcohol consumption	20 (32)
Emotional exhaustion and absenteeism	7 (12)
Improper hostel facilities	14 (23)
Sleep duration (hours)	
<4	5 (7)
4-6	51 (85)
>6-7	5 (8)
Requirement of mentor	
I year	12 (40)
III year	7 (22)
Working hours (>10)	52 (88)

[Table/Fig-1]: Items causing stress and PG students responses.

Parameter	PG medical students		p-value
	I year (n=30)	III year (n=30)	
Salivary cortisol (ng/mL) (Mean±SD)	7.12±1.60	9.27±2.38	<0.001*
PSS score (Mean±SD)	17.46±2.09	22.2±4.32	<0.001*

[Table/Fig-2]: Comparison of salivary cortisol and PSS score amongst PG students.
p<0.001*-Statistically highly significant

[Table/Fig-3] shows that there is linear correlation of salivary cortisol with PSS score in PG students.
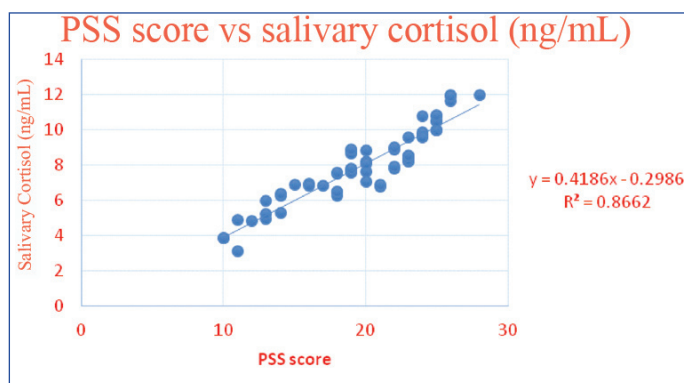
[Table/Fig-3]: Graph showing linear correlation of PSS score with salivary cortisol.

DISCUSSION

First year PG students are exposed to routine which is totally different than UG course. During III year along with this routine they have

additional stress of thesis writing and future worries about clinical practice and settlement in life. Thus, I and III year students were included in the study. It is perceived that II year students become well oriented to routine therefore, they were not included in the present study.

In the present study most of the PG students reported lack of sleep which is consistent with the intensity of work and studies. Earlier studies have reported that one third of PG medical students are already classified as 'burnout cases' at the start of their programme. It has also been observed that the nature of clinical work may correlate with stress [7,8].

In the present study, salivary cortisol was collected after six hours of sleep and not after stressful night in the wards. This was confirmed by following their ward duty schedule. Salivary cortisol was estimated by the principle of competitive inhibition enzyme immunoassay technique which has high sensitivity and specificity. It was used as a biomarker to measure stress [9]. It has been documented that only single reading of cortisol estimated can be utilised as a biomarker for various chronic illnesses or their predisease states [10,11].

Students taking alcohol reported that they consume alcohol once a week only. While collecting the sample it was also confirmed that alcohol was not consumed on prior two days. It has been observed that moderate consumption once a week has no long term effects on cortisol levels [12]. We did cross table analysis and found that p-value was not significant statistically.

PSS score of I year PG students [Table/Fig-1] was moderate (>13) which might be due to burden of all the ward work including responsibility of getting investigations to be done in newly admitted patients, getting exposed for first time to treat critically ill patients in emergency room and dealing with patients relatives in death situations.

PSS score of III year PG students [Table/Fig-2] was moderate (above 22) which might be due to additional burden of thesis work, preparation for final exams, worries about job opportunities and overload in a competitive environment causing various changes in their daily habits such as duration of sleep and diet.

Present study detected that 11 (36%) III year PG students had emotional exhaustion. In third year, 26 (86%) students reported that they were unable to cope up with work time pressures and deadlines. Proportion of family conflicts was more in third year PG students as compared to first year PG students. They were unable to give desired time for family and friends as they had to work hard for advancing the career at the expense of personal life.

It is evident from many studies that there is considerable amount of stress not only among medical students but also in health professionals who are unable to give sufficient time to family members due to time and work pressure in clinical practice [13-16]. Some of the studies also used PSS score for evaluation of stress [17,18].

It has been observed that due to high levels of stress, PG student's well-being is affected and suicidal tendencies can be increased [16,19]. Increased work related stress might lead to decreased patient care outcomes and might cause difficulty in maintaining interpersonal relationships with colleagues [7,20]. Similar results have been reported among university residents of different countries [21,22].

PSS score was directly correlated with salivary cortisol levels [Table/Fig-3]. There is a complex relationship between mental stress, the Hypothalamo Pituitary Adrenal (HPA) system and immunity. The stressors may initiate the stress response of sympathetic nervous system. Psychological stressors increase glucocorticoid levels through increased adrenal activity by activating HPA axis. Increased glucocorticoid levels inhibit the functions of lymphocytes, macrophages and monocytes, and may increase the susceptibility of infection which can lead to absenteeism [23].

Student's distress influences the professional development and affects the academic performances. Distressed students have decreased compassion and sympathy towards patients [24,25]. Therefore, it's important to ensure that these future specialty doctors have feeling of well-being and are at mental peace so that they can focus not only on giving the good standard of clinical care to patients but also keep professional knowledge and skills up to date.

Thus, it is a challenge for the departments of the medical college to recognise subject specific various stress factors and to help these students to find out coping strategies. Acute stress responses promote cognition, adaptation and survival, but chronic stress leads to poor health and makes person susceptible to diseases [26]. In considering the preventing measures it is important to enhance mental health literacy and psychological well-being.

Medical education unit in our institute gives guidance by arranging workshops on synopsis writing, manuscript writing and encourages publication of data. Lectures on time and stress management, relaxation techniques training, etc., are also arranged for the students. Considering the results from this study measures should be taken to support PG students by allotting mentor to help in difficult patient encounters, to inculcate communication skills and management skills. Identification of vulnerable individuals early during their training and provision of support might be useful for improving their emotional and professional well-being and reducing stress [27,28].

CONCLUSION

PSS score was moderate in both the I and III year PG students indicating that they were under stress during the years of PG training. Stress was more in III year than in I year PG students. Maintaining good health by balancing academic, psychosocial and personal stress factors is extremely important for well-being and giving good patient care. So evidence based identification of different stress factors will be useful to develop coping strategies in PG students.

LIMITATION

Sample size was small. Gender difference was not considered.

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