

EVALUATION OF SUBJECTIVE AND OBJECTIVE PARAMETERS OF STRESS IN FIRST YEAR MEDICAL STUDENTS

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ABSTRACT

Introduction: Presence of stress among medical students is well known but there are very few studies that objectively prove it. This study aims to assess stress subjectively and objectively in first year medical students by a) GHQ (General Health Questionnaire) scoring system b) measuring the biochemical parameters: serum cortisol and IgA (Immunoglobulin A).

Materials and Methods: 75 students were included in the present study. Estimation of serum cortisol and Immunoglobulin A at the end of first month (time 1) and sixth month (time 2) were done by using autoanalyzers. GHQ scoring and assessment was also made at the end of the first month (time 1) and sixth month (time 2) of the first year.

Results: GHQ scoring and serum cortisol for stress had significantly increased at time 2 when compared to time 1. IgA levels were significantly decreased at time 2 when compared to time 1. All were found to be statistically significant.

Conclusion: The study showed that first year medical course to be stressful by both subjective and objective parameters. It calls for measures to reduce stress in health professional's education, in a process to improve it.

Key words: Cortisol, GHQ (General Health Questionnaire), IgA (Immunoglobulin A), stress

INTRODUCTION:

The goal of medical education is to graduate knowledgeable, skilful, and professional physicians. Medical students experience substantial stress from the beginning of the training process. Although some degree of stress is a normal part of medical training and can be a motivator for some individuals, not all students find stress constructive. For many individuals, stress arouses feelings of fear, incompetence, uselessness, anger, and guilt (Dyrbye LN et al, 2005). In addition to affecting psychological and emotional wellbeing, stress can also result in a decrease in physical health, such as the development of hypertension, heart disease, and immune deficiency disorders (Lee J and Graham AV, 2005).

Self-reported questionnaire is a good assessment tool for evaluation of stress (Schmitter M et al, 2008). Some potential for bias in self-reporting questionnaire may occur because of respondents' interpretation of the questions or desire to report their emotions in a certain way or simply because of inaccuracies of responses (Sheikh BT et al, 2008). Measurement of the activity of Hypothalamo-pituitary-adrenal axis efforts a more objective measure of the psychological state of the individual. In this context, cortisol appears to be a promising parameter to assess stress (Lucini D et al, 2002). Changes in serum IgA is another parameter associated with evaluation of stress (Maes M et al, 1997).

There is a need to undertake longitudinal research to investigate individuals' stress experiences during the period the medical students study in Medical Institution. Hence this study has been designed to assess the stress by using questionnaire (subjective) and serum cortisol and Immunoglobulin A (objective) parameters of stress and to find out the correlation between these parameters among medical students at the end of first and sixth month of first year medical course.

MATERIALS AND METHODS

The present study was conducted in Vydehi institute of Medical Sciences & Research centre, Bangalore among first year medical students. Institutional ethics review board approval was taken before the conduct of study and guidelines were followed strictly. Students who were smokers, chronic alcoholics, having a history of diabetes mellitus or chronic illness were excluded. The sample size was 75. Male and female eligible students who gave consent for the study were enrolled in the study. Personal data of the students like age, sex, ethnicity, parents' qualification, financial background for the payment of college fees etc were collected by predesigned proforma. Subjective Stress levels were assessed by General Health Questionnaire. Objective stress levels were assessed by measuring blood levels of cortisol and ImmunoglobulinA (IgA). 5 ml of fasting venous blood sample was collected from the students and subjected to analysis immediately. Serum cortisol and serum IgA were measured by chemiluminescence method using Beckman Coulter Access2 Autoanalyzer. Samples were collected twice, the first samples were collected 1 month after joining the medical course, the second set of samples were collected after 6 months of collection of 1st sample. During data collection, the students were not exposed to any form of examination stress.

Results were tabulated and subjected to statistical analysis. Statistical software used was SPSS 15.0. Students' t test, chi square test and Pearson's tests were done. A p value of <0.05 was considered to be statistically significant.

RESULTS

Table 1 shows gender distribution of the students involved in this study. Out of 75 students, 28 were males and 47 were females. GHQ scoring was done twice: 1 month after joining the course (time 1), and 6 months after the 1st scoring (time 2). Blood samples for these students were also collected twice, simultaneously. The results obtained were compared using student's t test. In the present study, results showed a significant statistical difference between the GHQ, cortisol and IgA levels between Time 1 and Time 2.

GHQ scoring for stress had increased at time 2 when compared to time 1. This was statistically significant. The cortisol levels were increased at time 2 when compared to time 1 and was found to be statistically significant, whereas, IgA levels were decreased at time 2 when compared to time 1. This was also found to be statistically significant (table 2). However, there was no statistical difference in the stress indicators between males and females as shown in table 3. GHQ positively correlated with cortisol during both time 1 and time 2. Time 2 was found to be statistically significant. However, IgA negatively correlated with GHQ and cortisol during time 1 and showed positive correlation during time 2. This was not statistically significant (Tables 4, 5).

Table 1: Gender distribution of patients studied

Gender	Number of patients	Number of patients in %
Male	28	37.3
Female	47	62.7
Total	75	100

Table 2: Comparison of cortisol, IgA & GHQ between two groups

Variables	Time 1	Time 2	P value
Cortisol	12.10±3.67	22.29±6.43	<0.001**
IgA	218.41±93.73	184.27±77.04	<0.001**
GHQ	6.25±2.29	13.95±5.21	<0.001**

Table 3: Gender-wise comparison of cortisol, IgA & GHQ done at two different times

Variables	Time 1	Time 2	P value
• Cortisol Male	12.32±4.07	22.75±6.58	<0.001**
• Cortisol Female	11.97±3.47	22.03±6.39	<0.001**
• IgA Male	210.18±82.11	160.86±51.63	<0.001**
• IgA Female	223.32±100.51	198.21±86.25	<0.001**
• GHQ Male	6.00±2.39	13.07±5.15	<0.001**
• GHQ Female	6.40±2.24	14.47±5.22	<0.001**

Table 4: Pearson's correlation between variables on first measurements

Pair	Pearson correlation (r value)	p value
Cortisol v/s IgA	-0.222	0.056
GHQ v/s Cortisol	0.004	0.974
GHQ v/s IgA	-0.090	0.441

Table 5: Pearson's correlation between variables on second measurement

Pair	Pearson correlation (r value)	P value
Cortisol v/s IgA	0.098	0.403
Cortisol v/s GHQ	0.457	<0.001**
IgA v/s GHQ	0.158	0.176

DISCUSSION

Stress is defined as 'a physical or psychological stimulus that can produce mental or physiological reactions that may lead to illness' (Singh R et al, 2012). Medical education involves multiple task and every student responds to the situation in a different manner, many a times resulting in stress. Stress is a known aspect of medical education, but stress is not always constructive or a motivating factor. There are many studies showing that long term stress may lead to mental illness.(Guthrie EA et al, 1995).Hence we decided to find out stress levels in I year medical students both subjectively (by GHQ) and objectively (by serum cortisol and IgA levels).

The GHQ used was 12 items version for the subjective assessment of stress. It has been internationally used ever since its introduction in 1978. It is simple, and has been clinically as well as for research purposes since it is sensitive, specific and reliable to assess mental health status (Yusoff MSB et al,2009).The GHQ scoring in the present study revealed that the 1st year medical students were significantly stressed at the end of 6 months following the initial assessment. This was consistent with the findings of a similar study done by Guthrie et al (Guthrie EA et al, 1998). In addition, it was also shown that the stress levels were maximum in the 1st year when compared to other years.

Stress directly stimulates HPA axis resulting in excess production of cortisol. This cortisol alters many physiological actions resulting in physical illness (Miller DB and O'Callaghan JP. 2002). In this view, cortisol was chosen to be one of the objective parameters of stress evaluation. Our study revealed significant elevation of cortisol at the end of 6 months from initial assessment, proving that 1st year medical course to be stressful.This was consistent with a previous study done by Goyal S et al in 2011 where it was concluded that chronic stress is associated with elevated serum cortisol (Goyal S et al, 2011).

IgA is known to be a marker of acute as well as chronic stress since it affects the immune response of the host. The present study showed decreased levels of serum IgA at the end of 6 months of initial assessment. This is in concordance with previous studies such as done by Tsujita S et al in 1999 (Satoshi Tsujita and Kanehisa Morimoto. 1999).

CONCLUSION

The study showed the first year medical course to be stressful. This was proved in two ways: subjectively by GHQ and objectively by measurement of serum cortisol and IgA. Hence we recommend there should be some modification in the health professional education keeping in mind the stress faced by them. There is definite need for inculcating effective mentoring programmes and relaxation techniques in the course.

We also noted that serum IgA estimation can also be done instead of salivary IgA as a marker of stress.

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