Study of stress, self-esteem and depression in medical students and effect of music on perceived stress

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Abstract

Medical students are exposed to many stressors and if stress is perceived negatively or becomes excessive can affect academic performance and health adversely. The objective of this study was to assess stress, predominant stressor and effect of music on perceived stress. 90 undergraduate students were selected randomly. A written questionnaire about personal information, stressful factors, ways to cope up stress, Rosenberg self-esteem scale (Rosenberg, 1965) and ‘Quick Inventory of Depressive Symptomatology’ self-rated 16 (QIDS–SR-16) was given.45.6% Students had mild stress, 7.7% students had moderate stress and 1.1% students had severe stress. Academic factors were the predominant cause of stress in most students, followed by physical, social and emotional. On Rosenberg self-esteem scale (Rosenberg, 1965) 85.6% students had high self-esteem and on QIDS-SR16 50% students had depression. Effect of music on perceived stress was statistically significant. Medical curriculum is associated with increased stress in students. Music can be used as simple, inexpensive and effective therapy for stress.

Introduction

Everybody experiences stress in life. Despite the fact that stress is one of the most common human experiences, it is surprisingly difficult to define. Stress is defined as inability to cope with perceived (real or imagined) threat to one's mental, physical, emotional, or spiritual well-being, which results in series of physiological responses and adaptations (1). College is a transitional period when young people undergo new experiences, meet new people, face challenges and get opportunities that may add stress in their life. For students the pressures of maintaining a balance between interpersonal relationships, academic demands, one’s own expectations, and family and peer expectations further aggravate the stress. While assessing factors of stress it is important to examine psycho-social variables in addition to demographic and other related variables because it has been found that individuals with high self-esteem are associated with low academic and life stress (2, 3).

If one has ever experienced the strength of music, its chills and its joy, it is intuitively evident that music and emotion can be inextricably linked. Physical changes such as thrills, shivers, and alterations of heart rate can occur when listening to music and neuroimaging data documents activation...
of the orbitofrontal and cingulate cortices, commonly thought to mediate physiological emotional response, during these physical changes (4). Music is even found to activate primitive and evolutionarily preserved emotional systems and thus provides for interesting consideration as to its importance in the human experience. Music has been shown even to have positive effects in memory and mood elevation (5, 6).

Many studies have documented stress in college students and medical curriculum is associated with increased stress in students which is process oriented (7). There is a need to sensitize students to stress and its adverse effects and ways to cope with it. Effects of music as stress relieving factor in students is not well documented. The objectives of this study were to assess stress, predominant stressor and effect of music on perceived stress in medical students.

Materials and Methods

This study was carried out in Department of Physiology, Seth G. S. M .C. and K.E.M. Hospital, Mumbai. Institutional ethics committee has approved the study. 90 first year M.B.,B.S. students voluntarily participated. Written informed consent was taken from all participants. Subjects with known psychiatric illness were excluded. A written questionnaire was given to participants who included: Personal data and history of any major medical and psychiatric illness, medium of school education, accommodation in hostel. Quick inventory of depressive Symptomatology (self-report) (QIDS-SR16). Total score ranges between 0-27. It is widely used as a diagnostic tool and also for follow up in patients on treatment. QIDS-SR16 scores were analysed as

0-5 : no depression
6-10 : mild depression
11-15 : moderate depression
16-20 : severe depression
21-30 : very severe depression

Rosenberg self-esteem scale (Rosenberg, 1965): It is a ten item Likert type scale. Higher the score higher the self-esteem. Scores were analysed as

0-10 : very low self-esteem
11-15 : low self-esteem
16-20 : normal self-esteem
21-30 : high self-esteem.

Stress inducing factors: The factors were divided into four categories-physical, social, academic and emotional.

1) Physical factors – college, hostel, library and canteen facilities
2) Social – social aspects in college, peer and senior interaction and role of family
3) Academic factors – lectures, demonstrations and practicals, written and viva-voce examinations, syllabus and results in exams
4) Emotional factors-love affairs, jealousy, fights with seniors and peers

Each item was scored as –

0-never stressful
1-sometimes stressful and
2- Always stressful.

A total score was obtained by adding scores for each subgroup and analyzed. Total stress was scored as :

0-10 : no stress
11-15 : mild stress
16-20 : moderate stress
21-30 : severe stress.

Perceived stress scale – Participants were asked to rate their perceived stress on a likert-type scale. 0 score indicates no stress and 10 score indicates maximum stress. On the first day change in perceived stress without acoustic stimulation (after sitting in a quiet room for 20 minutes) was tested
while next day change in perceived stress after listening light instrumental music for 20 minutes was tested. Results were analyzed statistically.

Results

45.6% students had no stress, 45.6% had mild stress, and 7.7% had moderate stress while 1.1% students had severe stress. Academic factors were the major cause of total stress followed by physical factors, social factors and emotional factors. There was no gender difference in perception of stress by Chi-square test.

<table>
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<th>Parameters</th>
<th>No. of cases</th>
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<td>English</td>
<td>70</td>
<td>77.8</td>
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<tr>
<td>Marathi</td>
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45.6% of students had normal self-esteem. 40.0% students had high self-esteem while 10.0% students had low self-esteem and 4.4% had very low self-esteem. In QIDS-SR16 scores analysis it was observed that 50.0% of students had no depression. 34.5% of students had mild depression while 12.2% students had moderate depression and only 3.3% students had severe depression. There was significant correlation between self-esteem score and QIDS-SR16 score ($r = -0.4300$). Perceived stress score decreased by 62.5% after 20 minutes of listening to music while only 30.6% decrease was observed after 20 minutes of rest. By ‘t’ test the difference was statistically significant.

Discussion

The study confirmed the general impression that medical students in this institute have considerable stress which is consistent with similar studies (7). Academic factors are the predominant stressor for students. Extensive syllabus, multiple examinations and viva-voce examinations, attending lectures and demonstrations and results in examination add up to stress faced by students along with hostel accommodation, peer and senior interaction and other emotional aspects. There was no difference in the stress on the basis of gender, stay in hostel, medium of school education indicating that academic achievement is more important than other factors in inducing stress in medical students.

There was significant negative correlation between self-esteem score and QIDS-SR$_{16}$ score. Self-esteem is an attitude about the self and is related to personal beliefs about skills, abilities, social relationships, and future outcomes. Those who have high self-esteem are presumed to be psychologically happy and healthy, whereas those with low self-esteem are believed to be psychologically distressed and perhaps even depressed (8). Having high self-esteem apparently provides benefits to those who possess it: They feel good about themselves, they are able to cope effectively with challenges and negative feedback, and they live in a social world in which they believe that people value and respect them.
Most people with high self-esteem appear to lead happy and productive lives. By contrast, people with low self-esteem see the world through a more negative filter, and their general dislike for themselves colours their perceptions of everything around them (9).

There was significant decrease in perceived stress levels after listening to music in this study as compared to rest with no acoustic stimulation. Studies have shown that while listening to music, dopamine is released onto the nucleus accumbens, an area classically thought to mediate reward perception and addiction (10). It was observed that pleasant music stimulated the inferior frontal gyrus and Rolandic operculum which reflect working memory. Pleasant (contrasted to unpleasant) music showed activations of the inferior frontal gyrus (IFG, inferior Brodmann’s area (BA) 44, BA 45, and BA 46), the anterior superior insula, the ventral striatum, Heschl’s gyrus, and the Rolandic operculum. IFG activations appear to reflect processes of music-syntactic analysis and working memory operations (10).

Given that music listening can trigger activity in brain regions linked to the experience of (intense) emotions, listening to music might also modulate anxiety levels induced by the experience of stress. Indeed, a decrease in anxiety after listening to music is the most consistent findings reported in field studies with patients and laboratory-based studies (12). An increase of parasympathetic activity in response to sedative music listening has been observed. It appears that music listening might be effective in accelerating the recovery process of the parasympathetic branch of the ANS and responsible for recovery from stressor. This may be possible mechanism for decrease in perceived stress score after listening to music as compared to rest without acoustic stimulation. Indeed, music can be an inexpensive, powerful tool of medical care that is free of adverse effects and has a broad range of potential applications. In our roles as academicians, it is our duty to utilize all available means to relieve stress in our students as effectively as we can. If an intervention as simple as providing them with music decreases their stress or minimizes their discomfort in any way, even if only by placebo effect, then why would we not participate in this endeavor.

Conclusion

Medical curriculum is associated with increased stress in students. This study suggests that there is a need to sensitize students about adverse effects of stress and intervention programs like counseling and stress relaxation programs to be provided to excessively stressed students to decrease depression. Music can effectively reduce stress, enhance sense of comfort and relaxation, elevate mood and improve performance.

References