

## Effect of Brief Behavioral Intervention Program in Managing Stress in Medical Students from Two Southern California Universities

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**Abstract:** The study aims to assess 1) the prevalence of stress among a group of third and fourth year medical students (MS) from two Southern California universities and 2) the effect of a brief behavioral intervention program (BBIP) on stress management among the students instructed on stress intervention techniques. The stress level was determined by using the General Well Being Scale (GWBS), a self-report questionnaire designed by the National Center for Health Statistics.<sup>1</sup> The stress testing was done prior to the psycho-educational lecture on stress. The prevalence of stress and the variation of stress based on gender, academic year (third vs. fourth year) and time of testing (beginning vs. end of rotation) was measured in 104 medical students. To assess the effect of the psycho-educational lectures on stress, the last 32 students who rotated in our service had the pre-test and the lecture at the beginning of the rotation and the post-test at the end of the rotation. Among the medical students studied, 53/104 (51%) reported stress; among this group, 20/53 (37.7%) reported severe stress or distress. The prevalence of stress in this group of students was not significantly different if the stress level was measured at the beginning (46.9%) vs. the end of the rotation (52.8%,  $p = 0.57$ ). The total stress score was lower (suggesting higher stress) in the fourth vs. third year MS (69.7+/-16.3 vs. 73.2+/-12.7,  $p=0.2$ ), and in female students vs. male students (69.9+/-14.5 vs. 73.7+/-13.8,  $p=0.17$ ). Female students, when compared to their male counterparts, had a lower anxiety score (12.2+/-4.4 vs. 15.4+/-4.3,  $p<0.005$ ), consistent with higher anxiety level, since the polarity for the anxiety questions is reversed. Among the students who had both a pre and post-test (N=32) after the BBIP (deep diaphragmatic breathing, self-control relaxation, walking meditation), the reported stress decreased from 46.9 % (15/32) to 21.9% (7/25) ( $p< 0.05$ ). In addition, scores indicated that the brief behavioral intervention program significantly decreased the anxiety level and improved the positive well-being. Our study showed that stress is very prevalent among the medical students tested, affecting 51% of the students. Among those who reported stress, 37.7% reported distress. Female students reported a higher level of anxiety compared to their male colleagues. Following the implementation of a brief behavioral program, the prevalence of stress in this group of students decreased by 46.7 %. This was associated with a decrease in the reported anxiety and an increase in the positive well-being. Since stress is very prevalent among medical students, increased awareness of stress and early intervention may prevent burnout, improve job satisfaction and ultimately improve health care delivery.

Stress is associated with the American way of life and influences both physical and mental health.<sup>2,3</sup> Among the 12 most stressful jobs in the United States, eight are reported to be in the medical field.<sup>4</sup> Physicians experience significant stress throughout their medical career<sup>5</sup> that can be associated with psychological morbidity such as anxiety, depression and drug abuse.<sup>6-8</sup> In addition, chronic stress can influence patient care and the complex psychodynamics of the doctor-patient relationship.<sup>9</sup> Doctors' stress begins during the medical training with clinical years being reported to be more stressful than preclinical years.<sup>10</sup> As a consequence of increased stress,<sup>11</sup> medical students experience an alarming amount of stress-associated anxiety, depression,<sup>6-8</sup> substance abuse,<sup>12, 13</sup> and

even suicide.<sup>14</sup> Chronic stress is also known to influence memory and learning, especially problem solving abilities which require flexible thinking.<sup>15</sup> Therefore, chronic stress can affect medical decisions and, ultimately, patient care. Medical students, similar to practicing physicians, frequently avoid seeking help for any psychological problems due to the stigma associated with mental illnesses.<sup>16</sup> Psychological illness is perceived as a sign of weakness, that can impact their future success in the medical field.<sup>17</sup> Poor management of stress during the medical training period may result in further increase of stress upon entering post-graduate training and subsequently full-time clinical practice.<sup>10</sup> The students' enthusiasm upon entering the residency program is reported to be replaced by

depression and anger,<sup>16</sup> which when combined with sleep deprivation and fatigue, lead to burnout.<sup>17</sup>

Stress is prevalent among medical professionals,<sup>5,11</sup> and that is also true for the medical students who have very busy and demanding schedule.<sup>5</sup> Therefore, increased awareness about stress, its consequences, and stress management modalities early in the medical career is very important. In this article, we report the prevalence of stress among a group of third and fourth year medical students and the effects of a brief behavioral intervention program on stress management.

## Methods

**Study Design** - The study group included 104 medical students from two major Southern California universities, who had a one-month rotation in Diabetes/Endocrine service at a tertiary referral center. A lecture on stress initially was given at the end of the rotation as part of the review of the endocrinology of stress response. To emphasize the ubiquity of stress in general, and particularly among the medical students, the students' stress level was tested prior to the lecture by using the General Well Being Scale (GWBS). Since many students reported stress, we decided to assess the prevalence of stress among the students rotating in our service (research aim #1). Following the students' request to learn more about stress management, the lecture changed from an instructional to a psycho-educational lecture whose objectives were stress inoculation<sup>18</sup> and inclusion of stress relieving techniques, group demonstration and practicum. To assess the effect of this intervention on the reported stress level (research aim# 2), the students had a pre-test prior to the lecture and a post-test at the end of their rotation, using the same instrument (GWBS). Following the psycho-educational lecture, the students were instructed to use the learned brief stress management techniques during the rest of their rotation and also in the future. The study was approved as IRB exempt.

**Sample** - The study sample included third and fourth year medical students and represents an accumulation of four to six medical students per one-month rotation in our service over the last three years. Among the 104 students who participated in the study, 47 were females and 57 were males. The mean age of the students was 27.4+/-3.2 years, ranging from 20 to 40 years old. The students' ethnic distribution was 51 % Caucasian, 42% Asian, and 7% Hispanic and African American. The students who participated in this study had a one-month elective medical rotation in a medical-surgical service. They took care of diabetic patients with chronic diabetic complications who were admitted to a medical-surgical service for manage-

ment of diabetic foot. Since our program has no house staff, all medical students had direct contact and supervision by the faculty on daily basis. The workload for these students was average and relatively constant during the entire rotation, with no significant variation of patient load at different times of the year. Students worked no more than eight to nine hours a day and had no weekend calls.

**Procedures** - The students were given a self-report questionnaire, the General Well Being Scale (GWBS), as a pre-test in their psycho-educational lecture on stress. The prevalence of stress (research aim # 1) was measured in the entire group of students (N=104). The variation of stress based on the time of testing (beginning vs. end of rotation), academic year (third vs. fourth year), and gender was measured in the same group. The lecture's objective evolved to stress inoculation and included a review of the endocrinology of the stress response, psychological and medical complications associated with stress, stress and medical profession, and a simple behavioral therapy (BBIP) to manage stress. The BBIP focused on stress reduction by using simple mind-body intervention techniques such as deep diaphragmatic breathing<sup>19</sup> (prolonged expiration or deep yoga breathing), self-control relaxation<sup>19,20</sup> (i.e., repetitive focus on a word, imagery of relaxing scene, or body scan meditation) and walking meditation (mindfulness when walking).<sup>20,21</sup> These techniques, known as brief methods, require minimum time to learn and practice<sup>22</sup> and have been taught in the last part of the one hour presentation given by a faculty with expertise in cognitive behavioral therapy. Medical students were advised to apply any of these simple methods of relaxation on a daily basis (three to four times a day), during their break time<sup>23</sup> and particularly when they experienced stress. The use of these techniques was reinforced by the faculty especially when students displayed evidence of stress (inability to concentrate, making careless errors, etc). Students were encouraged to use this BBIP when they experienced increased work, during the middle of a busy clinic, or even before a case presentation. The effect of BBIP on reported stress was determined in the students who had both the pre-test (beginning of their rotation) and the post-test (end of their rotation) by using the GWBS (research aim# 2). Students were not aware of the pre-test results or the significance of their score on any of the testing.

**Protocol & Methods** - Subjects were tested on their perceived stress level by using a self administered questionnaire, the General Well-Being Scale (GWBS), developed for the U.S. Health and Nutrition Examination Survey (HANES I).<sup>1</sup> The GWBS addresses how individuals feel about their "inner personal state," exploring both

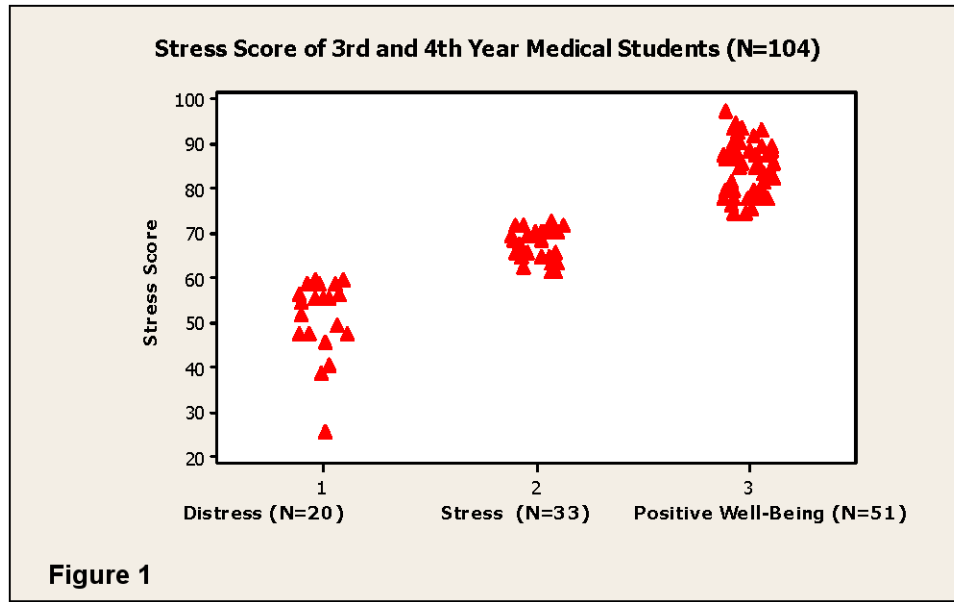


Figure 1

Prevalence of Stress Among 3rd and 4th Year Medical Students

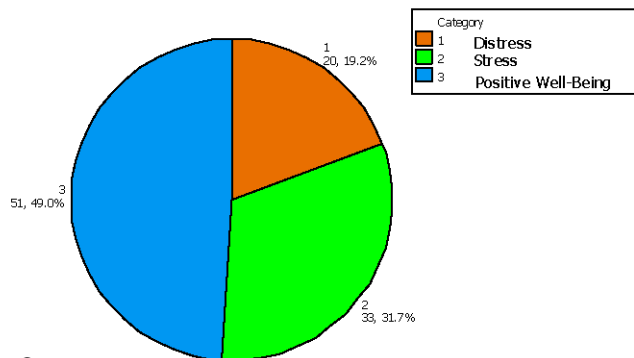


Figure 2

positive and negative feelings and covering six dimensions: anxiety, depression, positive well-being, self control, vitality, and general health.<sup>24</sup> In regards to anxiety and depression, a lower score indicates a higher level of anxiety or depression. For the other categories, a higher score represents an increase in positive-well-being, self control, vitality or general health, respectively. The GWBS total score ranges from 0 to 110. A score above 72 indicates positive well-being, while a score below 72 represents stress. Those who scored below 60 were considered to have severe stress.<sup>24</sup> The GWBS test-retest reliability was 0.68-0.85<sup>25</sup> with an internal consistency coefficient ranging from 0.91-0.95.<sup>25</sup> Regarding the test's validity, average correlations between the individual GWBS sub-scale and criterion

ratings were 0.65-0.90.<sup>25</sup> With outstanding reliability and validity, the GWBS was reported to be a useful indicator of subjective well-being in the general population.<sup>25, 26</sup>

**Statistical analysis -** Descriptive statistics and ANOVA were used for statistical analysis. Chi-square analysis was used to determine the differences between the pre-test and post- test results. Differences between groups (males vs. females, third vs. fourth year) were analyzed using the Student

t-test for independent samples. The interrelationship between quantitative variables was determined by the Pearson correlation coefficient. These comparisons included all study participants, and were applied to pre-lecture scores whether at the beginning or at the end of the rotation. All analyses were performed using MINITAB 14.<sup>27</sup> A p-value < 0.05 was considered statistically significant.

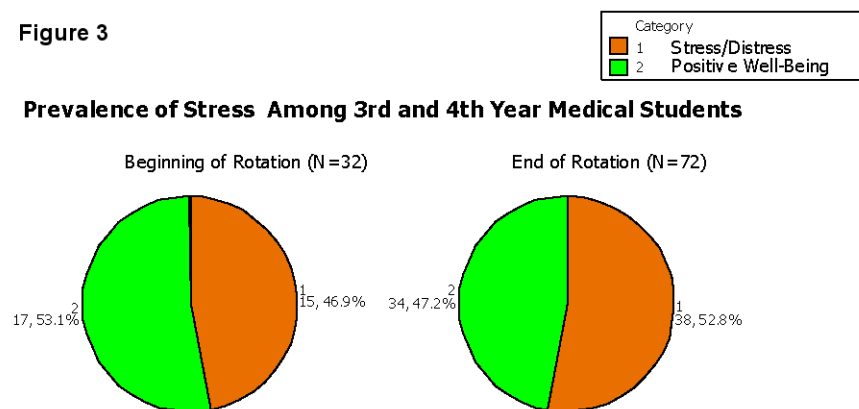
**Results**

**The Stress Score and the Prevalence of Stress/Distress in Medical Students –**

The stress score among the students studied is shown in Figure.1. The overall prevalence of stress (a score below 72) among the students tested was 53/104 (51%). Among those who reported stress, 20/53 (37.7%) had a score <60, consistent with severe stress (distress). The overall prev-

Figure 3

Prevalence of Stress Among 3rd and 4th Year Medical Students



**Table 1. Spectrum of Stress in third and fourth Year Medical Students-**

Subcategory of stress	third year students (N=65)	fourth year students (N=39)	P value (* < 0.05)
Anxiety	14.47 +/- 4.33	13.12 +/- 5.11	ns
Depression	14.93 +/- 2.55	14.06 +/- 3.76	ns
Positive Well Being	9.55 +/- 2.41	9.00 +/- 2.48	ns
Self Control	11.81 +/- 1.95	11.51 +/- 2.37	ns
Vitality	11.92 +/- 3.31	10.89 +/- 4.54	ns
General Health	11.01 +/- 2.95	11.12 +/- 3.23	ns

ns = not statistically significant

**Table 2. Stress Level in Female vs. Male Medical Students**

Subcategory of stress	Female students N=47	Male students N=57	P value (* < 0.05)
Anxiety	12.23 +/- 4.41	15.40 +/- 4.39	0.005*
Depression	14.39 +/- 3.64	14.78 +/- 2.53	ns
Positive Well Being	9.23 +/- 2.45	9.43 +/- 2.45	ns
Self-control	11.46 +/- 2.45	11.89 +/- 1.78	ns
Vitality	11.51 +/- 3.53	11.56 +/- 4.08	ns
General Health	11.23 +/- 3.33	10.91 +/- 2.81	ns

ns = not statistically significant

absence of distress, stress and positive well-being in the study group is shown in (Figure 2). There were no significant differences in the prevalence of stress/distress measured at the beginning vs. the end of the rotation (p=0.57) (Figure 3).

**Stress Level Among the third and fourth Year Medical Students-** The mean total stress score was lower among fourth year medical students compared to third year medical students (71.5 +/- 15.3 vs.73.5 +/- 13.5),

indicating greater stress. The difference was not statistically significant (p=0.202). The subcategories of stress among the two groups of students are shown in Table 1.

**Stress Level in Female vs. Male Medical Students**

- The mean total stress score was not significantly different between female and male students (69.95 +/- 14.4 vs. 73.75 +/- 13.8, p=0.175). However, female students had a lower anxiety score, therefore more anxiety, compared to their male counterparts (see Table 2), since the polarity of certain questions was reversed.<sup>24</sup>

**Prevalence of stress before and after the brief behavioral intervention program**

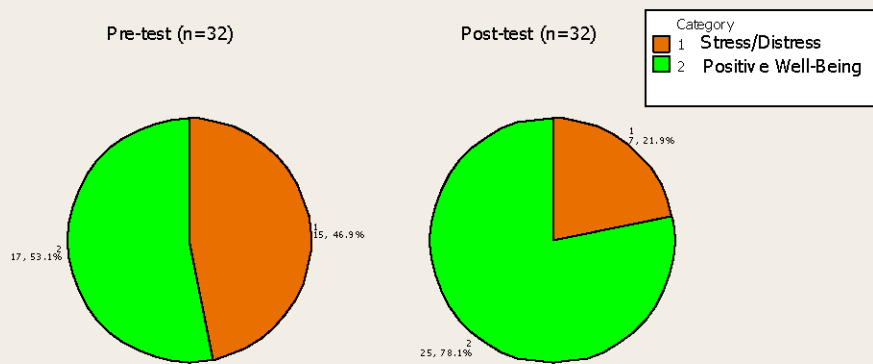


Figure 4

**The effect of brief behavioral intervention -**

In the students who had both a pre and post-test (N=32), prevalence of reported stress decreased by 46.7 % (p=0.035), following the Brief Behavioral Intervention Program (see Figure.4).

**The effect of the behavioral intervention program on the subcategories**

**Table 3. Subcategories-of Stress Before and After BBIP**

Subcategory of stress	Before	After	P value (* < 0.05)
Anxiety	13.96 +/- 3.63	16.26 +/- 3.63	0.002*
Depression	15.14 +/- 2.33	15.93 +/- 2.34	ns
Positive Well Being	9.18 +/- 2.46	10.21 +/- 2.52	0.012*
Self Control	11.93 +/- 1.86	12.18 +/- 1.83	ns
Vitality	12.03 +/- 2.42	12.50 +/- 3.40	ns
General Health	11.81 +/- 2.62	11.60 +/- 3.12	ns

ns = not statistically significant

**of stress-** Following the behavioral intervention program students experienced a decrease in the anxiety level, reflected by higher GWBS anxiety score. They also showed a significant increase in the positive well-being score (see Table 3).

### Discussion

The medical profession has always been considered highly stressful.<sup>28</sup> The complex psychodynamics of the doctor-patient relationship, the work overload,<sup>8</sup> loss of sleep,<sup>29</sup> a large group practice, and managed care regulations are some of the multi-tiered stressors experienced by the practicing physician.<sup>28</sup> Techno-stress secondary to information overload and increased patients' demands via e-mails may also add to the stress level.<sup>28</sup> The high level of stress experienced by doctors not only affects their psychological and physical health but can influence medical decisions and subsequent patient care.<sup>30</sup> These considerations are particularly important for physicians in training, for whom medical errors can affect their entire medical career. Medical training is considered a vulnerable time when medical students may learn to manage stress or develop either maladaptive stress coping mechanisms or attitudes of denial.<sup>11</sup> Therefore, stress management during medical training is particularly important, before ineffective strategies become lifelong habits.

**Prevalence of stress-** Our study showed that stress is very prevalent among the third and fourth year medical students tested, affecting 51% of these students. We did not find any significant difference if the stress was measured at the beginning vs. the end of the rotation. The stress level was not significantly different between the third and fourth year medical students. However, data in the literature showed that senior students experience more stress and more frequently display maladaptive responses to stress, including drug abuse<sup>8</sup>. Among those who reported stress in our study, 37.7% reported severe stress or distress.

**Consequences of early stress-** Students who reported stress or distress had significantly lower scores for the subcategories of stress, such as anxiety, depression, positive well being, self control, vitality and general health, when compared to the students who reported well-being. We did not find any significant difference in the stress score between the third and fourth year students, although the fourth year students had a lower stress score compared to the younger group; therefore, higher stress. When these subcategories of stress were compared in females versus male students, female students did report a lower anxiety score compared to their male counterparts. Since the polarity of anxiety questions were reversed, the lower anxiety score was consistent with more anxiety.<sup>24</sup> Anxiety can be a normal response that involves physical, cognitive and behavioral changes. However, when severe, anxiety can be associated with confusion, difficulty in concentrating, relaxing and coping,<sup>31</sup> which can further increase the stress level. Depression is also common among medical students and has been reported to impair cognitive performance, with subsequent academic difficulties and further emotional distress.<sup>11</sup> Poorly managed depression can lead to alcohol<sup>32</sup> and other drug abuse or can culminate in suicide, which seems to occur more often among doctors compared to other workers.<sup>33</sup>

**Psycho-educational intervention-** In our study, use of brief behavioral techniques, which included stress awareness and simple methods for stress management (deep diaphragmatic breathing, relaxation, and walking meditation), were effective in decreasing the reported stress level. Similar results were obtained in a "stress inoculation" program for 1<sup>st</sup> year law students, after which students experienced lower levels of anxiety, stress, and irrationality over time.<sup>18</sup> Data published in Europe showed that stress management for medical students during their first clinical year was associated with both short-term and long-term protective effects.<sup>34</sup> Stress intervention for medical students is also important, since the way in which medical students choose to cope with stressors during their training may act as blueprints for how they

will deal with stress in the future, both at professional and personal levels.<sup>35</sup>

**Study Limitations** - A potential limitation of the study is the use of an instrument (GWBS) which was initially tested in 1977. However, a recent study reported that this instrument remains a valid and reliable tool in assessing well being.<sup>26</sup> It continues to be used in several studies.<sup>36,37</sup> The results of our study are based on a self-reported questionnaire regarding the perceived stress in the last month prior to testing. These are subjective data and could reflect the stress students experienced during their prior rotation, particularly for the students who were tested at the beginning of the rotation. However, all students in this subgroup were tested during a similar period of time. Following the BBIP the group of students who had a post test at the end of their rotation might display demand characteristics, as they learned preferred responses from the intervention. However, in this group we had students who had no improvements or even a lower stress score, suggesting that the use of preferred responses was less likely. Other limitations of the study are the relatively small number of students involved in the behavioral intervention program and the unequal number of third vs. fourth year students. The latter could affect the comparison of scores between the two groups. These limitations emphasize the importance of further controlled and randomized studies aimed at assessing the effect of stress management among medical students and its impact on student emotional and physical health and the subsequent quality of health care delivery.

## Conclusions

Stress is very prevalent among medical students. Increased awareness of stress and early intervention may prevent burnout and improve health care delivery.<sup>38</sup> In our group of students, a brief stress management intervention during the third and 4<sup>th</sup> year of medical training had salutary effects. Addressing the effect of stress on doctors, particularly young doctors in training, becomes paramount since high stress and its associated consequences can result in either losing doctors from the medical profession<sup>8</sup> or putting both doctors and patients at risk. Medical schools are called upon to identify and help medical students to manage stress,<sup>38,39</sup> since learning to cope with stress early in the medical training will prepare them to better deal with the undoubtedly high stress they will be exposed to in the medical practice.<sup>37</sup> By doing so, students will be empowered to find solutions to their academic, social, and medical career difficulties and help them to better adjust to the complex life of a practicing physician in the 21<sup>st</sup> century.

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