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# Medical students and mental health by SCL-90-R

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## Abstract

**Background**: The process of medical education is stressful and medical students are at risk of psychological problems. In addition to the normal stressors of everyday life, medical students must deal with stresses specific to medical school. The aim of this study was to assess mental health in senior medical students and residents.

**Methods**: This cross-sectional study included 100 senior medical students and 100 residents of Iran University of Medical Sciences, Tehran, between October and December of 2006. The measurement method was the SCL-90-R questionnaire. Respondents rate 90 items using a 5-point scale to measure the extent to which they have experienced the listed symptoms during the last 7 days. In this study we only reported GSI and raw scores of SCL-90-R subscales. We used the cut off point of 0.7 for GSI. All statistical analyses were carried out by using SPSS for Windows 14. A significant level was considered as 5%.

**Results**: The mean and standard deviation of GSI was 0.55. Overall 19.4% of participants had GSI more than 0.7, as suspected mental illness. 26% of residents compared to 12% of senior medical students scored higher than 0.7 on GSI with significant difference. 13% (11 subjects) of males compared to 24% (27 subjects) of female had GSI more than 0.7. This difference was significant (P= 0.05). 11.3% of participants with a good economic status versus 56% of those with weak status in economy scored GSI of more than 0.7 with significant difference (P = 0.006). The majority of participants (91%) with a good overall satisfaction scored less than 0.7 on GSI. This proportion between weak categories of overall satisfaction was 66%. There were significant differences between the two groups in the SOM, OBS, INT, DEP, ANX, PHO, and psychoticism subscales.

**Conclusion**: About one-fifth of participants are suspected cases of mental disorder. Residents scored significantly higher than senior medical students on all subscales (except HOS and PAR) of SCL-90-R and GSI score. The GSI score was associated with overall satisfaction, gender, satisfaction of the studying major and economic status of participants.

**Keywords**: mental health, medical students, residents, SCL-90-R

## Introduction

Medical school has long been recognized as involving numerous stressors that can affect the well-being of students. Doctors are prone to anxiety, depression, drug and alcohol problems, and even suicide [1,2,3,4].

Reported levels of stress among medical students range anywhere from 25% to 75% [5,6].

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A study on three generations of Iranian medical students and doctors [7] found that 44% of participants scored above the threshold of the GHQ-28 questionnaire, indicating probable psychiatric disorders.

Depression is an underrecognized yet common and treatable disorder among medical students. One of the difficulties with stress and depression in medical students is that they tend not to seek help from the support service available to them. The result of a survey from the University of California, San Francisco showed that 22% of depressed students were using mental health counseling services [8]. In another study, also, only 26.5% of the depressed students, despite the availability of effective medications and mental health services, reported treatment [9].

Also, a high prevalence of anxiety and other indicators of distress is suggested among medical students [10].

Comparison between medical students and other undergraduate student groups have shown a higher level of stress and depression among medical students. The results of a study of 299 medical students at the University of Oslo revealed a lower level of general self-esteem between students than the general population [11].

Despite these results, a study on basic health practices and status of medical students reported many good health behaviors among medical students when compared with other young US adults [12]. This study focuses more on behaviors and physical health of medical students.

Despite more research on mental health of medical students, there has never been a survey in which the authors assess all aspects of mental health among medical students. It is known that the quality of care is dependent on the mental well-being of health care professionals. Almost all health care in governmental hospitals in Iran is carried out by residents and senior medical students at first line. Determination of mental health status of these subjects can help detect mental problems and plan improvement programs for them. Therefore, we used the SCL-90-R questionnaire to determine nine domains of mental health between senior medical students and residents of Iran University of Medical Sciences, Tehran, Iran.

**Methods**

This cross-sectional study evaluated 100 senior medical students and 100 residents of Iran University of Medical Sciences, Tehran, between October and December 2006. The method of sampling was convenience and participation in the study was voluntary. Educated trained interviewers described the objectives of study to senior medical students and residents. The anonymous and voluntary questionnaires were given to medical students and residents during resting time or at the end of their activities.

We used the SCL-90-R questionnaire. The SCL-90-R is a 90-item self-report system inventory developed in the 1980s by Derogatis [13] and designed to reflect the psychological symptom patterns of community, medical and psychiatric respondents. The SCL-90-R is a simple questionnaire and was translated into the official language of Iran (Persian), which is understandable to almost every Iranian, and its validity and reliability were approved in an independent study [14]. Internal consistency for all dimensions of the questionnaire was more than 0.70. Correlation coefficient of the questionnaire based on pre-test and post-test was 0.97. The sensitivity and specificity of the questionnaire comparing to DSM III-R was 0.94 and 0.98 respectively [14]. It is a measure of current-in-time, psychological symptoms status.

Each item in SCL-90-R is rated on a five-point scale of distress (0-4) ranging from "not at all" to "extremely". The nine primary symptom dimensions are labeled as:

Somatization (SOM); obsessive-compulsive (O-C); interpersonal sensitivity (I-S); depression (DEP), anxiety (ANX); hostility (HOS);



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phobic anxiety (PHOB); paranoid ideation (PAR); and psychoticism (PSY).

The test was completed by respondents in about 10-15 minutes. Respondents rated 90 items using a 5-point scale to measure the extent to which they have experienced the listed symptoms during the last 7 days. There are 7 items as additional questions in SCL-90-R. These questions are important for assessing clinical symptoms of respondents.

Raw scores are calculated by dividing the sum of scores for a dimension by the number of items, in the dimension. The SCL-90-R also has 3 global indexes: the global severity index (GSI), measures the extent or depth of the individual's psychiatric disturbances; the Positive Symptom Total (PST) counts the total number of questions rated above 1 point; and the Positive Symptoms Distress Index (PSDI) is calculated by dividing the sum of all items values by the PST. In this study we only reported GSI and raw scores of SCL-90-R subscales.

Based on the study of Noorbala and his colleagues [15], we used the cut off point of 0.7 for GSI. Therefore, those scoring 0.7 and above were designated as possible cases of mental disorder.

We measured three other variables that maybe would have an association with mental health of participants, as economic status and satisfaction.

Economic status, overall satisfaction, and satisfaction with their studying major were based on the questions: "Are you satisfied with your economic status", "Are you satisfied with you living overall?" , " and, " Are you satisfied with your studying major?", respectively. The answers were rated on a three-point scale ranging from "fair" to "good".

The ethical committee of our medical school approved the study protocol.

We performed all statistical analyses using SPSS for windows 14. Chi-square test was conducted for categorical variables, and t-statistics, and one-way ANOVA for continuous variables. A significant level was considered as 5%.

**Results**

Demographic characteristics of 200 respondents are illustrated in Table 1. Females were more among senior medical students and residents. As we can see, more residents are married, and the majority of them have no children. A good "overall satisfaction" and for "satisfaction of studying major" was more prevalent among senior medical students.

Their mean age was 30.17yr. (± 2.2). Mean ages of senior medical students and residents were 26yr.(±2.3) and 34.1 yr.(±2.6), respectively.

The mean and standard deviation of GSI was 0.55. Overall 19.4% of participants had GSI more than 0.7 and were suspected as mental illness. 26% of residents compared to 12% of senior medical students scored higher than 0.7 on GSI with significant difference. 13% (11 subjects) of males compared to 24% (27 subjects) of females had GSI more than 0.7. This difference was significant (P= 0.05).

11.3% of participants with a good economic status versus 56% of those with weak status in economy got GSI more than 0.7 with significant difference (P =0.006). The majority of participants (91%) with a good overall satisfaction scored less than 0.7 on GSI. This proportion between weak categories of overall satisfaction was 66%. This difference was significant (P = 0.005).

Percentage of GSI more than 0.7, also was different based on satisfaction with studying major significantly. 87% of participants with a good satisfaction of studying major versus 64% of weak satisfaction of studying major scored less than 0.7 on GSI (P = 0.005).

Table 2 shows mean and standard deviation of SCL-90-R subscales between residents and senior medical students. The mean score on the somatization (SOM) subscale among residents was significantly higher than for senior medical students. There was not a considerable differ-



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| Variable | Senior medical students N=% | Residents N =% | P value |
|---|---|---|---|
| Sex | | | |
| Male | 41 | 45 | NS* |
| Female | 59 | 55 | |
| Marital status | | | |
| Single | 67 | 26 | |
| Married | 33 | 74 | 0.0005 |
| Number of children | | | |
| 0 | 88 | 44 | |
| 1 | 12 | 41 | 0.0005 |
| 2 | 0 | 15 | |
| Literacy of spouse | | | |
| BS or MS* | 20 | 39 | |
| Physician | 6 | 27 | 0.0005 |
| PhD | 5 | 5 | |
| Occupation of spouse | | | |
| Clerk | 21 | 24 | |
| Free | 2 | 33 | 0.0005 |
| University student | 6 | 1 | |
| Housewife | 1 | 12 | |
| Type of residence | | | |
| Own personal | 19 | 32 | |
| Rented | 34 | 51 | 0.0005 |
| Dormitory | 21 | 6 | |
| With parents | 26 | 11 | |
| Economic status | | | |
| Weak | 3 | 6 | |
| Fair | 64 | 65 | NS* |
| Good | 33 | 29 | |
| Satisfaction overall | | | |
| Weak | 24 | 24 | |
| Fair | 38 | 56 | 0.01 |
| Good | 38 | 20 | |
| Satisfaction with studying | | | |
| Weak | 22 | 23 | |
| Fair | 34 | 49 | 0.04 |
| Good | 44 | 28 | |

*Not significant

Table 1. Demographic and other characteristics of 200 respondents.

ence between mean of SOM subscale within categories of gender, marital status, area of residence, and economic status. The mean of SOM subscale was significantly different between satisfaction (overall) and satisfaction of studying major categories (Table 3).

The mean score on the obsessive-compulsive (OBS) subscale among residents was significantly higher than senior medical students (Table 2). There was significant satisfaction (overall) and satisfaction of studying major on the OBS subscale (Table 3).

The mean score on interpersonal sensitivity (INT) subscale among residents was higher than senior medical students, but not significantly (Table 2). There was a significant difference within economic status, satisfaction (overall), and satisfaction of studying major on the



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| Variable | Senior medical students | Residents | P value |
|---|---|---|---|
| Somatization | 0.50 (0.51) | 0.74 (.66) | 0.006 |
| Obsessive-Compulsive | 0.50 (0.49) | 0.68 (0.65) | 0.025 |
| Interpersonal sensitivity | 0.48 (0.49) | 0.63 (0.65) | 0.057 |
| Depression | 0.54 (0.54) | 0.75 (0.65) | 0.012 |
| Anxiety | 0.44 (0.52) | 0.64 (0.67) | 0.022 |
| Hostility | 0.53 (0.49) | 0.61(0.62) | NS* |
| Phobic Anxiety | 0.31 (0.48) | 0.56 (0.65) | 0.002 |
| Paranoid Ideation | 0.55 (0.52) | 0.60 (0.64) | NS* |
| Psychoticism | 0.30 (0.47) | 0.48 (0.64) | 0.030 |

*Not significant

Table 2. Mean and standard deviation of SCL-90-R subscales between two groups of students.

INT subscale scores (Table 3).

The mean score on the depression (DEP) subscale for residents was higher than for the senior medical students significantly. There was a significant gender, economic status, satisfaction (overall), and satisfaction of studying major differences on the DEP subscale (Table3).

Residents scored higher on the anxiety (ANX) subscale than senior medical students significantly (Table 2). There were only considerable differences between satisfaction (overall) and satisfaction of studying major on the ANT subscale (Table 3).

Hostility subscale was not different between residents and senior medical students (Table 2). The mean of hostility (HOS) was different

| Variable | Somatization | Obsessive-compulsive | Interpersonal sensitivity | Depression | Anxiety | Hostility | Phobic anxiety | Paranoid ideation | Psychoticism |
|---|---|---|---|---|---|---|---|---|---|
| Sex | | | | | | | | | |
| Male | 0.56(0.52) | 0.50(0.49) | 0.46(0.54) | 0.54(0.55)* | 0.45(0.52) | 0.47(0.46)* | 0.39(0.56) | 0.50(0.51) | 0.35(0.49) |
| Female | 0.67(0.65) | 0.66(0.64) | 0.62(0.61) | 0.72(0.63) | 0.60(0.65) | 0.65(0.61) | 0.47(0.60) | 0.63(0.63) | 0.43(0.62) |
| Marital status | | | | | | | | | |
| Single | 0.62(0.60) | 0.59(0.60) | 0.56(0.58) | 0.62(0.62) | 0.54(0.60) | 0.55(0.53) | 0.42(0.60) | 0.62(0.59) | 0.42(0.57) |
| Married | 0.63(0.60) | 0.59(0.57) | 0.55(0.59) | 0.66(0.59) | 0.54(0.61) | 0.59(0.58) | 0.44(0.57) | 0.53(0.58) | 0.37(0.57) |
| Residence | | | | | | | | | |
| Own | 0.63(0.63) | 0.61(0.58) | 0.57(0.61) | 0.73(0.65) | 0.58(0.61) | 0.65(0.56) | 0.46(0.62) | 0.64(0.55) | 0.39(0.57) |
| Rented | 0.55(0.49) | 0.52(0.48) | 0.48(0.47) | 0.54(0.45) | 0.46(0.51) | 0.50(0.49) | 0.39(0.46) | 0.46(0.51) | 0.33(0.47) |
| Dorm | 0.67(0.71) | 0.61(0.73) | 0.63(0.66) | 0.68(0.69) | 0.60(0.69) | 0.59(0.62) | 0.46(0.63) | 0.64(0.74) | 0.47(0.67) |
| Other** | 0.75(0.73) | 0.72(0.68) | 0.65(0.71) | 0.73(0.76) | 0.61(0.72) | 0.61(0.65) | 0.49(0.75) | 0.70(0.63) | 0.48(0.68) |
| Economic | | | | | | | | | |
| weak† | 0.83(0.59) | 0.80(0.70) | 0.95(0.70)$^{3*}$ | 0.88(0.65) | 0.88(0.58) | 0.79(0.58) | 0.69(0.58) | 0.75(0.60) | 0.71(0.68) |
| Fair | 0.65(0.67) | 0.64(0.63) | 0.58(0.63) | 0.72(0.65)$^{3*}$ | 0.56(0.67) | 0.61(0.61) | 0.44(0.63) | 0.61(0.63) | 0.42(0.61) |
| Good | 0.53(0.40) | 0.45(0.44) | 0.45(0.42)$^{1*}$ | 0.45(0.43)$^{2*}$ | 0.44(0.43) | 0.45(0.40) | 0.38(0.48) | 0.47(0.46) | 0.30(0.43) |
| Satisfaction (overall) | | | | | | | | | |
| Weak | 0.84(0.65)$^{3*}$ | 0.76(0.64)$^{3*}$ | 0.75(0.66)$^{3*}$ | 0.91(0.67)$^{2,3*}$ | 0.75(0.64)$^{3*}$ | 0.72(0.54)$^{3*}$ | 0.67(0.64)$^{3}$ | 0.68(0.58) | 0.57(0.65)$^{3*}$ |
| Fair | 0.65(0.54)$^{3*}$ | 0.58(0.54) | 0.56(0.52) | 0.64(0.52)$^{1*}$ | 0.53(0.56) | 0.55(0.54) | 0.43(0.53) | 0.58(0.53) | 0.38(0.52) |
| Good | 0.39(0.58)$^{1*}$ | 0.47(0.58)$^{1*}$ | 0.39(0.56)$^{1*}$ | 0.43(0.61)$^{1*}$ | 0.37(0.60)$^{1*}$ | 0.49(0.59)$^{1*}$ | 0.25(0.55)$^{1}$ | 0.48(0.65) | 0.27(0.54)$^{1*}$ |
| Satisfaction (studying) | | | | | | | | | |
| Weak | 0.82(0.64)$^{3*}$ | 0.78(0.59)$^{3*}$ | 0.78(0.59)$^{3*}$ | 0.83(0.57)$^{3*}$ | 0.77(0.60)$^{3*}$ | 0.74(0.49) | 0.68(0.60)$^{3}$ | 0.65(0.56) | 0.53(0.64) |
| Fair | 0.64(0.54) | 0.57(0.53) | 0.54(0.56) | 0.70(0.61)$^{3*}$ | 0.53(0.57) | 0.54(0.52) | 0.42(0.57) | 0.56(0.50) | 0.38(0.53) |
| Good | 0.48(0.60)$^{1*}$ | 0.50(0.62)$^{1*}$ | 0.42(0.57)$^{1*}$ | 0.45(0.58)$^{12*}$ | 0.40(0.61)$^{1*}$ | 0.50(0.62) | 0.29(0.54)$^{1}$ | 0.55(0.68) | 0.32(0.55) |

* P value less than 0.05, ** With parents, † Sample size for subgroup = 9

Table 3. Mean and standard deviation of subscales of SCL-90-R based on demographic characteristics.



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within gender, and overall satisfactions categories significantly ( Table 3).

Residents scored significantly higher on the phobic anxiety (PHO) subscale than senior medical students (Table 2). There was considerable difference on PHO subscale between satisfaction categories (Table 3) .

The mean of paranoid (PAR) subscale was not different between all categories (Table 2 and 3).

As seen in Table 2, residents scored higher on the psychoticism (PSY) subscale than senior medical students too. This difference was significant. The only significant difference in PSY subscale was seen on overall satisfaction category (Table 3).

**Conclusion**

This study focused on determining the mental health of senior medical students and residents by using SCL-90-R questionnaire. Overall 19% of participants scored GSI higher than 0.7 (the cutoff point). Our results indicate high score of all subscales between residents than for senior medical students.

There were significant differences between the two groups in the SOM, OBS, INT, DEP, ANX, PHO, and psychoticism subscales.

Medical students and residents are subject to stress from sources related to medical training in addition to personal problems, resulting in significant mental health problems. A study on medical students, residents, and graduate students at four Canadian schools of medicine revealed significant differences between the three groups in the nature and degrees of stress, with the graduate students reporting higher levels of stress [16].

In another study in Norway [11], the authors concluded that medical students do not differ from the general population in mental health. The students reported a lower level of general self-esteem than the general population. Also, a study in U.S concluded that, medical students are healthy and have many good health behaviors when compared with other young adults. This study focused more on physical health more than mental health [12].

We found a higher GSI for female than male students. This result is in line with other studies. A study on mental health of medical students in Tehran, revealed 45.7% mental distress between female versus 36.7% among male students [17] .

Also, in other Iranian studies the same results were obtained [7, 18]. The result of a Canadian study showed women reporting higher levels of stress [16]. Male medical students in Norway had more nervous symptoms and less general self-esteem than female students [11]. Some other studies didn't show any difference between gender of medical students [19,20]. However, these studies used different instruments for assessing mental health. The Iranian studies used GHQ-28 and the Canadian study applied SCL-90-R. A possible explanation could be the social roles of females as housewives and even when women work (or studying) outside the home, they still have the burden of homework. Thus this group is more prone to strains and stress.

The study revealed significant differences on all subscales (but two subscales) of SCL-90-R between senior medical students and residents. In the Canadian study, graduate students reported higher levels of stress than medical students and residents [16].

The result of our study may be explained by increasing age. Increasing prevalence rates of mental disorders with age have been reported by some studies [21,22]. This may be due to reduction in physical vigor and the greater vulnerability of older students to stress as well as mental and physical diseases. Although, it should be considered that, residents have more responsibilities in hospitals, and the majority of them were married. So, they have more family responsibilities and probably more financial problems. Thus, they are more subject to stress, anxiety, and other types of mental illnesses.



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Our study revealed that the subjects with good overall satisfaction, scored lower than the other groups on all subscales of SCL-90-R except for PAR. Also, we found a significant association between score of six subscales and satisfaction of studying major. These results are in line with another Iranian study [13]. The authors of that article showed GSI and all subscales of SCL-90-R are significantly higher in groups with less satisfaction of studying major than the other groups.

A study on Malaysian medical students [23] indicated that the effects of life dissatisfaction on depression were fully mediated by health. They concluded that, life dissatisfaction is associated with poorer health.

Considering these interpretations, it is important to point out some limitations of this study. The cross-sectional nature of the data leaves open inferences about the temporal direction of the association between nature of the medical course, the workload, and mental disorders. Therefore, conducting prospective studies with larger sample size beginning at the first day of entry of medical students to universities and following them up is recommended.

The other limitation is related to the nature of the questionnaire. The SCL-90-R was found to have a high predictive power with respect to any symptom disorder according to DSM-IV. However, the differentiated predictive power was found to be less satisfactory. The PHO subscale had a reasonably good predictive power with respect to the diagnosis of agoraphobia [24]. Therefore, diagnostic inferences about DSM-IV symptom disorders based on SCL-90-R should be conducted with care.

In conclusion, the results of this study showed that about one-fifth of participants are suspected cases of mental disorder. Residents scored significantly higher than senior medical students on all subscales (except HOS and PRA) of SCL-90-R and GSI score significantly. The GSI score was associated with overall satisfaction, gender, satisfaction of studying major and economic status of participants.

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