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Determining the Mental Health of Tehran University of Medical Sciences Residents, According to the General Health Questionnaire

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Abstract

Background: Mental health disorders can significantly impact medical learners, hinder their education, and potentially affect their future practice in profound ways. This study aimed to determine the general health of residents at Tehran University of Medical Sciences (TUMS).

Methods: We conducted this cross-sectional study in 2016 to assess the general health of 349 TUMS residents, using the General Health Questionnaire (GHQ). The GHQ is a widely used screening tool that evaluates general mental health across 4 domains: somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression. This tool is known for its reliability and validity in identifying individuals at risk for mental health issues. For data analysis, we applied the Mann-Whitney and Kruskal-Wallis tests, logistic regression, and chi-square tests to examine associations among study variables.

Results: Overall, general health dysfunction was observed in 54.7% of residents (95% CI, 49.4-59.8). The prevalence of somatic symptoms, anxiety, social dysfunction, and depression was 44.1% (95% CI, 39.3-49.8), 57.6% (95% CI, 52.3-62.7), 23.8% (95% CI, 19.6-28.6), and 51.5% (95% CI, 46.2-56.7), respectively. General health dysfunction was significantly associated with sex, marital status, interest in the field, exercise habits, satisfaction with leisure time and curriculum, use of sleep-aid medications, smoking, residency level, and living arrangements.

Conclusion: This study highlights the high prevalence of mental health challenges among residents at TUMS. The findings indicate that a substantial proportion of residents experience general health dysfunction, including anxiety, depression, somatic symptoms, and social dysfunction. These results emphasize the importance of ongoing monitoring and support for residents' mental well-being during their training.

Keywords: Mental health, General Health, Residents, Medical education

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Introduction

The World Health Organization (WHO) defines health as a condition of complete physical, mental, and social well-being, not only the absence of disease or disability (1). Different cultural, economic, and geographical standards exist for mental wellness. The WHO defines it as a state of well-being in which an individual recognizes their abilities, can cope with daily stressors, works successfully and fruitfully, and contributes to their community. Despite differing standards and definitions, the prevalence of mental health issues has increased dramatically (2, 3). Mental and physical well-being are inextricably linked (4, 5).

Around 25% of the world's population will develop a

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↑What is "already known" in this topic:
Mental health assessments using the General Health Questionnaire (GHQ) have been widely conducted in various populations.

→What this article adds:
This study specifically examines the mental health status of residents at Tehran University of Medical Sciences using the GHQ. It provides a detailed analysis of mental health issues prevalent in this group and offers insights into factors contributing to their well-being.

mental illness. However, just about 1% seek professional assistance from a psychiatrist or psychologist (6). According to the WHO's Burden of Disease Study, depressive disorders ranked third in 2017, from fourth in 1990 (7). In the first study of illness burden in Iran (2002-2003), psychiatric conditions were ranked second, after injuries and external causes (8).

Healthcare employees are more likely to suffer from mental and psychiatric disorders (9, 10). Many resident physicians experience depression, anxiety, burnout, fatigue, sleep disorders, and difficulty coping with challenges, highlighting the need to modify residency curricula to improve work and training conditions (11). This issue became especially pronounced during the coronavirus disease 2019 (COVID-19) pandemic and has persisted in its aftermath (12-14).

This research was conducted at the educational hospitals of Tehran University of Medical Sciences (TUMS) to assess residents' general health using the General Health Questionnaire and to inform decision-makers in improving residents' conditions during their residency period.

Methods

In this cross-sectional study conducted in the spring and summer of 2016, we evaluated the general health of TUMS residents using the General Health Questionnaire (GHQ-28). Participants were selected at random across specialties. First-year residents were excluded due to their heavy workload and demanding schedules, and fourth-year residents were excluded because of their reduced presence in hospital wards.

The total number of residents at TUMS was estimated at 2400. The sample size was calculated to assess the prevalence of psychological problems with adequate precision, based on previous studies assuming a prevalence of 20% to 40%. The following standard formula for estimating the required sample size for a proportion in a cross-sectional survey was used:

$$\frac{Z^2 \cdot p \cdot (1-p)}{^2d} = n$$

Where:

- n = required sample size
- Z = Z-score for the desired confidence level (1.96 for 95% CI)
- p = expected prevalence of psychological problems (0.2–0.4)
- d = desired margin of error (0.05).

Using this formula, the calculated sample size was approximately 335 to 350 residents. To account for potential nonresponse or incomplete questionnaires, the target sample size was increased.

The GHQ is a screening tool for short-term psychiatric problems rather than a diagnostic tool, and it can be used for all adults. Several versions exist (GHQ-60, GHQ-30, GHQ-28, GHQ-12), but we used the 28-question version, comprising 7 questions across 4 categories: somatic symptoms, anxiety, social dysfunction, and depression (16).

The traditional '0-0-1-1' scoring method was used, with scores >2 indicating distress. Patients with a total score of 6 out of 28 or greater were classified as distressed. The validity and reliability of the Persian version of GHQ-28 were previously established in Iran (15). First, we calculated residents' scores in somatic symptoms, anxiety, social dysfunction, depression, and overall general health according to the GHQ. Then, we examined associations between these scores and residents' age, sex, marital status, postgraduate year (PGY) level, living situation, exercise habits, leisure time satisfaction, curriculum satisfaction, having a second job, use of sleep aids, smoking, and interest in their field of study.

Participants with >10% missing responses in the GHQ questionnaire were excluded from analysis. For questionnaires with ≤10% missing responses, missing values were imputed using mean imputation, using the mean of participants within the same residency year and specialty group.

For statistical analysis, STATA version 12 software was used, including nonparametric tests (Mann-Whitney and Kruskal-Wallis), logistic regression, and chi-square tests for categorical variables. $P \leq 0.05$ was considered statistically significant.

Results

A total of 348 TUMS residents participated in this study. The proportion of residents of each discipline was equal to their actual proportion in the TUMS. Except for neurosurgery and urology, which are 5 years long, and emergency medicine and paediatrics, which are 3 years long, most residency courses in Iran last 4 years. Table 1 depicts the distribution of the residents by specialty.

The demographic information of the participants and the univariate analysis of GHQ scores to demographic factors are shown in Table 2. Somatic dysfunction was more prevalent among women (women: 51.81%, men: 36.87%, $P = 0.005$) and single residents (single: 56.12%, married: 35.75, $P < 0.001$). Depression and overall health problems were more common in residents who had no interest in their field of study or were single ($P < 0.05$). Residents who exercised or were pleased with their curriculum performed better across all categories. Mental health problems were significantly more common in residents who

Table 1. Distribution of Residents by Specialty

Specialty	Number of Residents (%) N: 349 (100%)
Neurology	14 (4.01%)
Cardiology	33 (9.46%)
Dermatology	16 (4.58%)
Infectious Diseases	16 (4.58%)
Internal Medicine	39 (11.15%)
Pediatrics	31 (8.89%)
Psychiatry	16 (4.58%)
ENT	25 (7.16%)
Obstetrics/Gynecology	17 (4.87%)
Neurosurgery	4 (1.15%)
Orthopedic Surgery	13 (3.73%)
Urology	7 (2.01%)
General Surgery	51 (14.67%)
Ophthalmology	26 (7.45%)
Emergency medicine	41 (11.72%)

Table 2. Analysis of GHQ Scores for Mental Disorders in Relation to Participants' Demographic Features

Variable		Total Number (%)	Somatic Disorders (Number of Positive Cases (%) OR Average Score)	Anxiety (Number of Positive Cases (%) OR Average Score)	Social Dysfunction (Number of Positive Cases (%) OR Average Score)	Depression (Number of Positive Cases (%) OR Average Score)	General Health (Number of Positive Cases (%) OR Average Score)
Gender	Male	180 (51.87%)	66 cases (36.87%)	94 cases (52.81%)	43 cases (24.16%)	87 cases (48.88%)	88 cases (49.44%)
	Female	167 (48.13%)	88 cases (51.81%)	103 cases (62.80%)	37 cases (22.56%)	88 cases (53.66%)	98 cases (59.76%)
	P-Value	-	0.005	0.062	0.728	0.377	0.056
Marital Status	Single	140 (40.23%)	78 cases (56.12%)	85 cases (62.04%)	37 cases (27.01%)	88 cases (64.23%)	91 cases (66.42%)
	Married	208 (59.77%)	74 cases (35.75%)	112 cases (54.37%)	45 cases (21.84%)	88 cases (42.72%)	96 cases (46.60%)
	P-Value	-	<0.001*	0.159	0.272	<0.001*	<0.001*
Interest in the field	Yes	317 (91.35%)	134 cases (42.41%)	177 cases (56.55%)	72 cases (23.00%)	152 cases (46.56%)	165 cases (52.72%)
	No	30 (8.65%)	18 cases (60.00%)	20 cases (66.67%)	10 cases (33.33%)	24 cases (80.00%)	22 cases (73.33%)
	P-Value	-	0.063	0.284	0.205	0.001*	0.030*
Doing Exercise	Yes	120 (34.48%)	41 cases (34.17%)	57 cases (47.50%)	14 cases (11.67%)	52 cases (43.33%)	54 cases (45.00%)
	No	228(65.52%)	111 cases (49.12%)	140 cases (62.78%)	68 cases (30.49%)	124 cases (55.61%)	133 cases (59.64%)
	P-Value	-	0.008*	0.006*	<0.001*	0.030*	0.009*
Satisfaction with leisure time	Yes	82 (23.56%)	23 cases (28.40%)	30 cases (37.04%)	8 cases (9.88%)	38 cases (46.91%)	33 cases (40.74%)
	No	266 (76.44%)	129 cases (48.68%)	167 cases (63.74%)	74 cases (28.24%)	138 cases (52.67%)	154 cases (58.78%)
	P-Value	-	0.001*	<0.001*	0.001*	0.365	0.004*
Curriculum Satisfaction	Yes	88 (25.29%)	28 cases (32.18%)	33 cases (38.82%)	10 cases (11.76%)	33 cases (38.82%)	35 cases (41.18%)
	No	260 (74.71%)	124 cases (47.88%)	164 cases (63.57%)	72 cases (27.91%)	143 cases (55.43%)	152 cases (58.91%)
	P-Value	-	0.011*	<0.001*	0.002*	0.008*	0.004*
Second Job	Yes	56 (16.09%)	27 cases (48.21%)	32 cases (57.14%)	8 cases (14.29%)	26 cases (46.43%)	29 cases (51.79%)
	No	292 (83.91%)	125 cases (43.10%)	165 cases (57.49%)	74 cases (25.78%)	150 cases (52.26%)	158 cases (55.05%)
	P-Value	-	0.480	0.962	0.065	0.424	0.653
Using Sleep aids	Yes	35 (10.12%)	21 cases (60.00%)	29 cases (82.86%)	10 cases (28.57%)	26 cases (74.29%)	29 cases (82.86%)
	No	311 (89.88%)	131 cases (42.26%)	168 cases (54.72%)	72 cases (23.45%)	150 cases (48.86%)	158 cases (51.47%)
	P-Value	-	0.045*	0.001*	0.502	0.004*	<0.001*
Smoking	Yes	44 (12.72%)	28 cases (63.64%)	33 cases (76.74%)	11 cases (25.58%)	29 cases (67.44%)	32 cases (74.42%)
	No	302 (87.28%)	124 cases (41.20%)	164 cases (54.85%)	71 cases (23.75%)	147 cases (49.16%)	155 cases (51.84%)
	P-Value	-	0.005*	0.007*	0.792	0.025*	0.005*
GHQ points related to Postgraduate year (PGY) level (Points)	1	40 (11.46%)	208.03 score	222.92 score	199.64 score	209.76 score	219.56 score
	2	165 (47.28%)	174.66 score	173.56 score	178.46 score	172.80 score	174.62 score
	3	123 (35.24%)	169.56 score	158.05 score	162.98 score	164.07 score	160.23 score
	4	21 (6.02%)	131.31 score	153.83 score	130.66 score	149.47 score	139.26 score
	P-Value		0.028*	0.003*	0.023*	0.048*	0.004*
GHQ points related to Living status (Points)	Alone	82 (23.56%)	186.47 score	195.85 score	187.16 score	197.58 score	197.98 score
	With family	250 (71.84%)	170.73 score	165.75 score	169.50 score	162.18 score	164.54 score
	Dormitory	13 (3.74%)	143.00 score	146.76 score	136.96 score	200.38 score	158.75 score
	With friends	3 (0.86%)	185.00 score	159.33 score	125.00 score	175.16 score	150.83 score
	P-Value		0.393	0.081	0.173	0.026*	0.063

were not satisfied with their leisure time, except for depression, for which the difference between the 2 groups was not significant. Using sleep aid drugs and smoking were linked to significantly higher levels of dysfunction in all categories except social dysfunction. The scores for depression and overall health problems among residents of different specialties did not differ significantly. The incidence of all dysfunctions decreased with increasing resident PGY level (Table 2).

The percentage of mental health disorders among residents according to their GHQ scores is shown in Figure 1.

Discussion

Academic pressure, a heavy workload, financial problems, inadequate sleep, the suffering of patients and their families, and curriculum satisfaction can all have an impact on medical students' mental health. On the other hand, mental health disorders can have a detrimental effect on students' academic performance, career prospects, and familial relationships. These challenges often result in increased cynicism, anxiety, burnout, depression, and, in some cases, substance abuse and physical harm (5, 17-19).

From 1999 to 2011, Noorbala et al reported an increase in the prevalence of psychological disorders in the general population of Tehran from 21.5% to 39.6% (6). Other

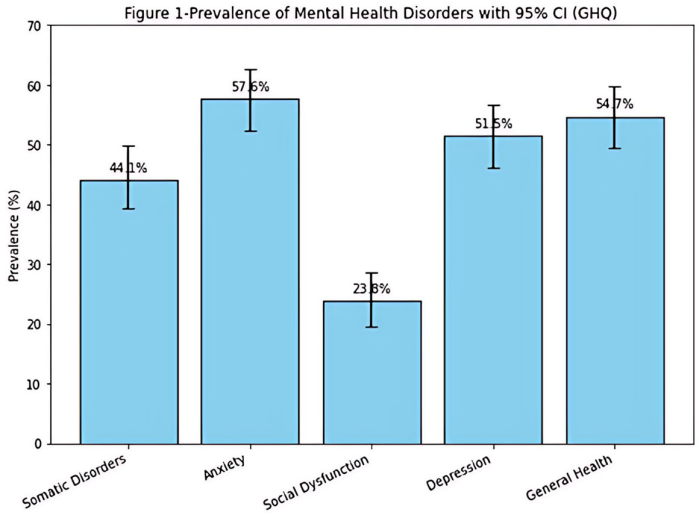


Figure 1. Percentage of residents exhibiting mental health disorders based on their General Health Questionnaire (GHQ) scores.

studies have validated this knowledge (20, 21). The present study found that residents had more psychiatric disorders than the general population, which was consistent with other studies on Iranian medical students (22-25).

Other studies looked at the prevalence of each condition among medical students or residents and discovered that 41% have general health dysfunction, 28% have depression, and 28% have an anxiety disorder (26-28). According to 2 meta-analyses, approximately 28% of medical students suffer from depression (29, 30), which amounted to 51% in our research. We may assume residency is a risk factor for depression in physicians, which needs further investigation.

Medical schools are stressful environments for students. Anxiety affects 40% of medical students in Iran (31). The prevalence of anxiety among residents in other countries is virtually identical (33%-40%), and 21% of them reported that stress interfered with their personal lives (32-34). A cross-sectional study of emergency medicine, internal medicine, and family medicine residents found that 70% of them work in a stressful workplace, with observed stress levels of 80%, 73%, and 63%, respectively (35). Our research found that 57% of residents experienced anxiety, which the authors think is due to their exposure to critical patients and stressful situations. Sleeplessness due to stress (40%) and waking up in the middle of the night (33%) were the most prevalent anxiety symptoms.

Depression and anxiety in medical students demand urgent attention due to their significant impact on both the students' well-being and patient care. Numerous studies have confirmed the serious risk of suicide among Iranian medical residents as a consequence of depression and other mood disorders. Addressing these mental health issues is crucial, as they affect not only the future healthcare professionals but also the quality of care they provide to their patients (36-38). Students who are depressed or anxious are more pessimistic and less sympathetic to patients. Depressed residents are found to make 6.2 times more medical errors per month than their healthier counterparts (39). Alarmingly, this mental health burden can also lead to compromised judgment, potentially making it easier for residents to overlook or even inadvertently facilitate patient suicides, rather than taking preventive measures (40).

In line with Noorbala et al (4), anxiety was more prevalent than somatic symptoms, depression, and social function impairment in our research. Noorbala et al also demonstrated that the prevalence of mental disorders rises with age in the general population. Nonetheless, there was no significant association between them in our study, which we attribute to the narrow age range of residents. About 74.6% of residents reported dissatisfaction with their leisure time, and 74.71% reported dissatisfaction with the curricula, which significantly affected their general health. A study reported that contentment with curricula and satisfaction with leisure time predicted a better quality of life (41). Although we believe discontent with curricula may be due to high workload and the large number of patients, further studies are needed to determine whether there is an objective relationship between them.

Our study observed a significant association between using sleep-aid drugs and smoking with health dysfunction in residents, but other studies could not find a significant relationship between them (28). These findings align with the results reported by Shi et al, who also highlighted the high prevalence of sleep disorders among medical residents (42). Although the medical literature favors the significant association between using medications or alcohol and having a health dysfunction, the results are still not conclusive.

General health dysfunction was significantly associated with residents' lack of interest in their chosen specialty. Another study showed that medical students' satisfaction with their chosen field of study could dramatically improve psychiatric health (25).

In the present study, "living in dormitories" and "living alone" were significantly related to depression and general health in residents, which indicates the role of family support and social environment in improving psychiatric

health. However, another study found no significant association between living alone and depression or anxiety (43).

Longer working hours and less exercise were significantly associated with health dysfunction in our study. Many studies, including the current study, have found a negative correlation between PGY level and general health dysfunction (26, 30, 44, 45). Other studies also showed that residents could improve their quality of life by reducing their working hours, experiencing less fatigue (41, 46-48), and exercising more (23). Additionally, implementing more comprehensive policies aimed at improving the work environment can significantly reduce chaos within hospitals (49). By fostering a more structured and supportive atmosphere, medical residents and other healthcare staff may experience less anxiety and frustration (10, 50).

Overall, these results could be attributed to fewer shifts, more leisure time, and learning to manage critical conditions in senior residents. In their meta-analysis, Rotenstein et al demonstrated that the prevalence of depression rises by 0.2% in each year of residency (29). On the other hand, Abdulghani et al. showed that stress decreases after each year of residency (35). However, Khorvash et al could not find a significant relationship between medical students' stress and the number of academic years completed (51).

In agreement with other studies, single residents had significantly more health dysfunction in our study (28, 52).

In line with findings from other studies, our research shows that single residents experience significantly more health dysfunction compared to their married peers (27, 50). This may be attributed to less emotional support and higher stress levels. Given the shortage of resources, it is crucial to identify vulnerable groups, such as single residents, those living alone or in dormitories, first-year residents, and women, to ensure that supportive services are made available to them at the very least. Prioritizing these groups can help mitigate their unique challenges and improve overall well-being.

The increasing emigration of medical graduates from Iran is a growing concern, with significant long-term implications for the country's healthcare system. Addressing the mental health challenges faced by medical residents and improving their quality of life could play a pivotal role in mitigating this trend (53). By prioritizing the well-being of medical professionals, we not only enhance their personal and professional satisfaction but also ensure patient safety and the future stability of the healthcare workforce (5, 13, 54). This shows the urgent need to tackle issues like depression among medical professionals to protect both their mental health and the quality of care provided to patients.

Strengths and Limitations of the Study

This study's large sample size provides a comprehensive view of mental health challenges among residents at TUMS. The use of validated tools for assessing general health, anxiety, depression, and somatic symptoms ensures reliable and accurate findings.

However, there are several limitations. The cross-sectional design precludes causal inference, and self-reporting may introduce information bias, as participants may under- or overreport symptoms due to social desirability. Potential sources of bias also include selection bias from nonresponse and interviewer bias when peers or senior residents helped distribute questionnaires. Additionally, including residents from a single university may limit the generalizability of results. Future studies with longitudinal designs and more diverse samples are needed to understand medical residents' mental health better.

Conclusion

More than half of the residents who participated in this study suffered from one of the general health dysfunctions, a rate significantly higher than that of the general population. Based on the results of this study, it is reasonable to design a resident support system to improve residents' quality of life and reduce their stress. Helping residents choose a specialty that aligns with their interests may also improve their overall health status. There is a significant opportunity for policymakers to introduce meaningful reforms that can positively influence the mental health of medical residents. By implementing targeted policies and supportive measures, they can create a healthier, more sustainable working environment that reduces stress, anxiety, and burnout among residents, ultimately benefiting both the healthcare professionals and the patients they serve.

Acknowledgment

N/A.

Conflict of Interests

The authors declare that they have no competing interests.

Authors' Contributions

All authors contributed to the study design, data collection, analysis, and manuscript preparation, and approved the final version.

Ethical Considerations

The study protocol was approved by the TUMS Ethics Committee (IR.TUMS.MEDICINE.REC.1395.1003).

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Data availability

Data are available from the corresponding author upon reasonable request.

AI Use Statement

AI tools were used only for language editing; all content is the authors' responsibility.

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