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Assessment and Comparison of Distress and Suicidal Behavior in Medical and Paramedical Students

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ABSTRACT

Background: The sudden outbreak of coronavirus disease in 2019 resulted in major changes in mental health of healthcare workers as the front line of fighting against thedisease. Medical students who were from the main members of healthcare workers suffered double pressure. The goal of current study was evaluation of suicidal behavior and psychological distress in medical and paramedical students to determine the mental health status of these students by identifying the mentioned factors.

Methods: This is an applied, comparative and cross-sectional study. The sample members (302 participants) were selected by accessible method from medical students in Masih Daneshvari Hospital in 2023-2024. The Kessler Psychological Distress Scale (K6) and Suicide Behaviors Questionnaire-Revised (SBQ-R) were completed by all the participants. Data were analyzed by T, Chi square, Pearson and ANOVA tests by SPSS-22.

Results: The highest and lowest risk of suicide was between interns (M=7.37) and fellowships (M=3.71), respectively. The highest and the lowest score of psychological distress was between interns (M=10.82) and paramedical PhD students (M=6.9), respectively. Men had suicidal thought or attempt more than twice as likely as women (7.69% vs. 2.35%). The probability of suicide in future was more in men than women (1.53% vs. 0). There was a strong and significant (P ≤0.00) correlation between questions of suicidal behavior questionnaire and psychological distress.

Conclusion: The higher scores of suicide and psychological distress of medical students in primary educational years, can reflect the high pressure volume, which they gain more compatibility, skill and ability for coping with the problems over time. By achieving the results of the current study, researchers would pay attention to psychological issues in healthcare workers, probable problems would be solved, and eventually, treatment of patients would done by more confidence.

Keywords: Medical education, Psychological distress, Suicide

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Introduction

As students enter university by passing the adolescence period, they start taking responsibilities for life decisions. The process needs adaptation with new educational environment and compatibility with university, social and professional training demands. Many students experience psychological changes that result in problems such as stress and depression in this period (Mahmoudi, 2004; Uehara, 2010). In the meantime, COVID-19 pandemic occurrence in the year 2019 encountered the world with the largest health threat in the last century (Wu, 2020). It dramatically changed mental health of patients and their families and also the health care workers as the front line who struggled with the disease, in addition to physical consequences, widespread fear, insecurity and anxiety (Peeri, 2020). On the other hand, different educational courses impose serious psychological stress to medical students. Various reports about psychological problems including stress, suicide ideation, psychiatric disorders and personal problems between medical students have been presented during COVID-19 pandemic. According to the previous studies, medical students experience more mental disorders compared to general population (Shamsaei, 2020). Medical schools need evaluation and reconstruction of curricula and also major changes in clinical courses due to COVID-19. The students especially experienced extensive psychological disorders including anxiety, depression, stress and sleep problems due to working in COVID-19 infected places, academic pressure, night working shifts and the resulting sleep deficiency, which all affected their mental health (Nishimura, 2021), (Saddik, 2020). Probability of incidence of mood disorders, anxiety disorders, obsessive-compulsive disorder and psychological distress in medical students were higher between them compared to other students, even before COVID-19 pandemic. (Nishimura, 2021). However, there is limited information about psychological distress in medical students during the pandemic period. Psychological distress is defined as an indicator of mental disorder including psychological and behavioral symptoms related to anxiety and depression (Kessler, 2010), which is negatively correlated with social function, role limitation and perfectionist behavior (Kim, 2016) and positively correlated with hopelessness, depression, suicide ideation and feeling loneliness (Dadfar, 2016c). Many studies have shown that medical students have experienced psychological distress significantly more than general population (Bore, 2016). 48 % of the students experience psychological distress including depression or anxiety. Female scores are significantly higher than males' in this regard (Bacchi, 2017). Some studies confirm the correlation between age and psychological distress(Hoare, 2017). A study showed significant correlation between marital status, educational level, income, age and gender and psychological distress (Dismuke, 2011). Women experience psychological distress more than men in all ages (Weissman, 2015).

Medical education imposes significant challenge on quality of life in medical students. Medical students encounter personal, environmental and academic challenges which would expose them to suicide ideation or attempt risk (Seo, 2021). Suicide is an acting to kill oneself. The spectrum is various from thinking to attempting. The planning may exist since several years before or may happens suddenly and impulsively without previous planning. It may result in death or not (Sadock, Sadock, & Pedro Ruiz, 2021). Medical students are at high risk of depression and suicide ideation. Prevalence of suicide ideation is estimated to be 11.1% between them (Rotenstein; Lisa, 2016). In another study on 4840 medical students, it was demonstrated that 8.94% of them had attempted suicide in the past. Risk factors that were correlated with suicide attempt in the past included: female gender, low income level, being

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bullied by other classmates, experiencing trauma in childhood or adulthood, familial history of suicide attempt, suicide ideation in the last month, daily smoking and high risk of consuming alcohol (Marcon, 2020).

Students are from the most efficient and sensitive people in the society. Progressing the healthcare goals need mental and physical health of students, to impede educational failure and wasting the strength and ability of youngsters which would result in decline in happiness, peace and economic damage in the society. According to the data about the poor mental health in medical students, the current study was done to recognize vulnerable participants and provide appropriate mental health services by special managers in medical universities to achieve the optimum mental health in medical students.

According to the previous reviewed literature and the necessity of doing the current study, mentioned in the perevious paragragh, the goal of current study is investigating and comparing the suicidal behavior and psychological distress according to the demographic data in various degrees of medical and paramedical students in Shahid Beheshti University of Medical Sciences (Dr Massih Daneshvari Hospital). The hypothesis included the correlation between psychological distress and suicidal behavior, the correlation between demographic information and psychological distress and suicidal behavior, and the difference in psychological distress and suicide behavior between various studentship degrees.

Methods

The current study is of applied, comparative and cross-sectional type. The statistical population included all medical and paramedical students of Shahid Beheshti University of Medical sciences. They studied in different educational fields and degrees. They entered Massih Daneshvari Hoapital in the second semester of 2022-2023 and the whole educational year of 2023-2024 (1.5 year totally). Their total number was 1233.

The sampling process was done by accessible method from those who met the inclusion criteria and worked in hospital wards and completing the questionnaires was possible in them. The sample size was calculated to be 302 according to Morgan Table(Krejcie, 1970). According to this table, the sample size of 291 to 297 is sufficient for the statistical population with 1200 to 1300 members. Thus, 302 students (more than the sufficient sample size) entered the research to avoid missing data due to the probable exclusion of the participants from the research. Then, researchers made demographic questionnaire; psychological distress and suicidal behavior questionnaires were completed by all students.

All data were analyzed by descriptive and inferential statistical methods including T, Chi square, Pearson and ANOVA tests were conducted by SPSS-22. All of these procedures were under supervision of a statistics specialist.

Inclusion criteria: informed consent, being medical or paramedical student in Shahid Beheshti University of Medical Science and taking course in Masih Daneshvari Hospital

Exclusion criteria: reluctance to continue the participation in the research which was more prevalent in stagers and interns, and withdrawal from continuing education in medical and paramedical fields

Instruments

1- Researcher made demographic questionnaire: Demographic information of students including age, gender, marital status and educational level are measured by this questionnaire.

2- Kessler Psychological Distress Scale (K6): It consists of 6 phrases which are scored in 5 rating spectrums from never to always (4). The scale has a total score, which is acquired by sum of all the scores. Minimum and maximum scores are 0 and 24, respectively. The higher scores represent more psychological distress. It has a one-factor structure, which explains 58.18% of variance. Internal consistency was 0.86 and 0.83 by Cronbach's alpha and split half methods, respectively. Convergent validity was fine in determining the correlation between the K6 and

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depression, anxiety and stress. Moreover, criterion validity was fine according to gender and age (Tanhaye Reshvanloo, 2020) .

3- Suicide Behaviors Questionnaire-Revised (SBQ-R): It is a self-report scale, which has been introduced by Linhan in 1981. In 1988, it has changed from a long questionnaire to a short questionnaire with 4 items that can be completed in about 5 minutes. The responses are scored in likert type, according to the original questionnaire. Sum of scores are between 3 to 18. It is a popular screening tool as result of ease of use, but it cannot provide detailed information due to containing just 4 questions (Range, 1997). The cut-point for general adult population is 7≤, with sensitivity and specificity of 93% and 95%, respectively. The cut-point for hospitalized psychiatric patients is 8≤ , with sensitivity and specificity of 95% and 91%, respectively (Osman, 2001) This questionnaire has also been validated in Iran at Dr. Masih Deneshvari Hospital, which has shown an acceptable Cronbach's alpha coefficient (0.72). The internal consistency coefficient of all questions were within 0.96 to 1 range (M. G. B. Safa, F; Talischi, F; Masjedi, MR., 2014) .

Results

Results showed thatthe total mean age was 26.42 ± 5.25 years old. Men and women' s mean ages were 25.66 ± 4.16 and 26.99 ± 5.91 years old, respectively.

Other demographic information are presented in table1.

Table1. Demographic information

Variable			Percent (%)
Gender	Male		43
	Female		57
Marital status by gender	Single	Men	83
		Women	68.6
		Total	74.83
	Married	Men	17
		Women	31.39
		Total	25.17
Educational level	Stager		33.8
	Resident		28.5
	Intern		26.5
	Fellowship		4.6
	Paramedical		6.6
Educational level by gender	Men	Stager	30.7
		Resident	24.6
		Intern	30.7
		Fellowship	3
		Paramedical	10.7
	Women	Stager	36
		Resident	31.4
		Intern	23.2
		Fellowship	5.8
		Paramedical	3.4

According to Table 2, the average total score of suicide did not show high risk. The highest and the lowest suicide risk were seen in interns and fellowship students, respectively. In addition, the highest and the lowest psychological distress scores were seen in interns and paramedical PhD

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students, respectively (Table2).

Table2. Mean score of suicidal and psychological distress in medical and paramedical students

Educational level	Suicide Mean±SD	Distress Mean±SD
Stager	6.45±4.16	10.5±5.25
Intern	7.37±5.16	10.82±5.82
Resident	5.72±4.34	8.97±5.39
Fellowship	3.71±1.49	8.42±4.89
Paramedical PhD student	5.5±3.65	6.9±5.66
Total	6.29±4.43	8.82±5.5

According to Table 3, there was not a significant difference in psychological distress mean score between single and married students, and also male and female students. The normality test is just required for small sample groups ($n \leq 20$). However, the normality test has was conducted**.** The results of Shapiro-Wilk test was not significant for variables distribution in neither of the groups ($P > 0.05$) (Table3).

In addition, there was not a significant difference in suicide mean score between single and married students, and also male and female students (Table 3).

Table 3. Comparing the mean score of psychological distress and suicide regarding marital status and gender in medical and paramedical students

		Distress Mean±SD	T	Df	P	Suicide Mean±SD	T	Df	P
Marital status	Single	9.83 ± 5.77	- 0.01	299	0.99	6.52±4.5	0.97	298	0.32
	Married	9.84±4.78				5.71±4.26			
Gender	Men	9.64±6	0.33	299	0.73	6.5±4.88	0.50	299	0.61
	Women	9.95±5.13				6.13±4.07			

According to Table 4, the highest and the lowest risk of suicide were in stagers and fellowship students, respectively. But the difference was not significant ($P > 0.05$) (Table 4).

Table 4. Comparing the suicide mean score in different educational levels

		Low suicide risk Frequency (%)	High suicide risk Frequency (%)	Q^2	Df	P
Educational level	Stager	64 (21.19)	38 (12.58)	5.02	4	0.28
	Resident	66 (21.85)	20 (6.62)			
	Intern	48 (15.89)	32 (10.59)			
	Fellowship	12 (3.97)	2 (0.66)			
	PhD	16 (5.29)	4 (1.3)			
	Total	206 (68.21)	96 (31.78)			

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The one way ANOVA showed that there was not a significant relation between psychological distress mean score and educational level (F=1.51, P = 0.20).

The Pearson correlation results showed that there was not a significant correlation between age and psychological distress.

The Chi square test results showed that there was not a significant relation between age and suicidal behavior. According to Table5, the highest frequency was seen in expressing suicide to others. But there was not a significant difference between men and women in this regard.

Men had suicide ideation or attempttwice women. The rate of suicidal thoughts in the past year was equal in both sexes. The percentage of men who had expressed their suicidal intention to others was higher than women. Men are more likely to commit suicide in the future compared with women(Table 5).

Table 5. Frequency of high scores in suicide scale questions, and their difference in two genders

		Frequency (%)	Q^2	P
Question 1- suicide ideation or attempt	Women	4 (2.35)	3.89	0.56
	Men	10 (7.69)		
	Total	14 (4.6)		
Question 2- The amount of suicide ideation in the past year	Women	6 (4.8)	3.31	0.50
	Men	6 (4.6)		
	Total	12 (4)		
Question 3- Expressing the suicide plan to others	Women	10 (5.81)	8.95	0.06
	Men	8 (6.15)		
	Total	18 (6)		
Question 4- Possibility of suicide attempt in future	Women	0	11.97	0.10
	Men	2 (1.53)		
	Total	2 (0.7)		

There was a significant and strong correlation between SBQR questions and psychological distress (P≤0.00). The strongest correlation coefficient was observed in possibility of suicide attempt in future.

Discussion

The results of the current study showed that number of women and their average age were more than men. Most of sample group were single, in which the number of single men was more than women. Most of the participants included stagers and the lowest number belonged to fellowship students. Among women, the largest number included stagers and among men, the largest number included stagers and interns.

The highest suicidal risk and psychological distress score was in interns and lowest suicide risk was between fellowship students, and also the lowest psychological distress score was between paramedical PhD students; this indicated the amount of academic pressure and stress in lower educational levels, which was reduced dramatically by passing the major educational period and financial pressure. In other words, the individual gets more prepared to master his/her-self and improve the mental health by constantly facing the problems over time.

The absence of a significant difference in the score of suicide and distress between singles and marrieds, and women and men, indicated the same pressure and conditions between them.

Although there was no significant difference between female and male students in terms of psychological issues in the current study, some studies have shown that sleep and mental health problems are significantly more common in women than in men (Eslaminejad, 2017) .

Since the age range of the participants was in the same spectrum, there was no significant relationship between age and any of the variables of suicide and psychological distress.

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The highest frequency of high scores in SBQR was in item of expressing suicidal intent to others. This finding can be promising for saving the lives of students at risk of suicide. Because ,although the risk of committing suicide among students is a tragic issue, expressing suicidal thoughts or intent more than other aspects of suicide can be a way to quickly identify people at risk and take any necessary action.

Double number of suicidal thoughts or attempts in men compared to women, considering the smaller number of men compared to women in the present study would be a worrying factor that necessitates paying more attention to male students at suicide risk.

The higher percentage of men who had expressed their intention to commit suicide to others compared with women, considering the fact that they have higher suicidal thoughts or attempts than women, can indicate another risk factor and predictor of suicide. It requires serious and timely attention, especially by those around them.

The higher probability of suicide in the future in men compared to women indicates the serious risk of committing suicide in men repeatedly.

In fact, it is possible that the tensions caused by facing academic, social, economic, family pressures, etc. play a role in increasing the possibility of suicide among male students compared to female ones in our society.

Research in this field has shown similar results. According to the findings of these studies, suicide is more common in men than women in all countries of the world (Naghavi, 2019), and suicide mortality in elderly men is very high (Barak 2020) .

The significant and strong correlation between suicide and distress shows that as much as one increases, the other can increase. In general, the set of psychological factors interact with each other and improvement or deterioration starts from any point, which can affect other points. In this regard, the strongest relationship between the possibility of suicide in the future and distress, especially indicates the severe danger regarding this issue.

There are other studies in this regard, some of which are mentioned in the following text. In a study on medical students during the COVID-19 pandemic, it was shown that 9.65% of them experienced different levels of anxiety and 3.3% of students experienced severe depression (F. A. Safa, A; Hossain, S; Trisa, TI; Alam, SF; Rafi, MA & et al 2021). Medical students suffer much more anxiety and fear compared to non-medical students (Saddik, 2020) .

A meta-analysis in 2016 showed an overall prevalence of depression in 27.2% of medical students and an overall prevalence of suicidal ideation among11.1% of them (Rotenstein, 2016). The suicide rate in medical students is higher than the general population, and in some cases, it is 3 to 5 times higher. A systematic study on 13,244 medical students from 13 different countries showed that the prevalence of suicidal thoughts is common in a range of 1.8 to 53.6% (Mamun, 2020). In a review study on 30,817 Chinese medical students, it was shown that the prevalence of depression, anxiety, suicidal thoughts, and eating disorders were 29, 21, 11, and 2%, in them, respectively, which indicated a relatively high prevalence of depression, anxiety, and suicidal thoughts among Chinese medical students. Timely screening and appropriate intervention are highly recommended to solve these mental health problems in medical students (Zeng, 2019).

On the other hand, psychological distress and academic stress have direct and indirect effects on job burnout in medical students. The higher the psychological distress and academic stress, the higher the job burnout rate (Bahri Yusoff, 2021). In a study on 549 medical students in 2021, it was found that more than 65 percent of them experienced psychological distress due to the COVID-19 pandemic (Essangri, 2021). A study on medical students during the pandemic in 2020 depicted that students with lower self-esteem and self-efficacy showed more psychological distress (Arima, 2020). Research results show that the health of medical students in the modern era of medical education, despite the increased attention

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to health and health resources, remains poor. The risk factors that exist in this field, including female gender, financial problems, and the clinical stages of medical education, show that efforts to relieve the sorrow in medical students have been insufficient until now (Rajapuram, 2020).

Conclusion

In general, the mean scores of suicide and psychological distress in medical students in the present study were not described as dangerous, but their greater intensity in the early years of medical education is important in order to prevent the occurrence of various psychological problems in the future in this group by adopting appropriate plans. Moreover, the vicious cycle of psychological problems, job inefficiency, increase in the number of patients, etc would not get solved.

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Conflict of interest

The authors declared no conflict of interests.

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Ethical considerations

Verbal informed consent was obtained from all participants of the sample group ,and the necessary information was provided for them about the research process. They were assured about the confidentiality of their information and the participants could withdraw from the research at any time. The research process was carried out according to the Declaration of Helsinki (2013).

Code of ethics

IR.SBMU.NRITLD.REC.1402.096

Authors' Contributions

M. S. and F. Gh. B. worked on conceptualization. M. S. M. were involved with methodology. F. H. Z. , M. N. A. and N. A. entered the data into software. A. F. validated the obtained data. F. H.Z. did the statistical analysis. M. A. investigated the whole research project. M.S.M. , M.A. and A.F. administrated the project. M.S. supervised the data curation;and F. Gh. B. wrote the manuscript.

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