



# Correlation Between Stress and Empathy in Medical Students as Compared to General Population

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## ABSTRACT

**Background:** Medical students are exposed to numerous internal and external pressures exerted by the environment which may affect their empathy towards patients. This study was conducted to find association between perceived stress and empathy.

**Methodology:** The study was conducted in Surat, Gujarat, India from August 15 2021 to September 15 2021 among 225 participants using perceived stress score and using the Toronto Empathy Questionnaire. Two groups -Undergraduate medical students and general population were compared.

**Results:** Out of 160 medical undergraduates and 65 people from general population below average empathy was noted in total 51.1%. High empathic attitude was noted in general population in comparison to other medical undergraduates. 24.4% reported low stress, 64% moderate stress and 11.6% high stress and we can appreciate that low stress scores were calculated in general population in comparison to medical undergraduate students. A weak negative correlation between empathy and perceived stress was calculated in medical students whereas strong positive correlation between empathy and perceived stress was calculated in general population.

**Conclusion:** A significant proportion of medical students had a comparatively higher stress scores and decreased empathy hence their stress is considered distress whereas general population's high stress scores were correlating to high empathic attitude, therefore their stress can be considered eustress.

**Keywords:** Perceived stress, Empathy, Medical undergraduates, Students, General Population, TEQ, PSS

## INTRODUCTION

Perceived stress is about how an individual feels about the general stressfulness of his life and the ability to handle such stress.<sup>1</sup> Medical students are exposed to numerous internal and external pressures exerted by the environment. Furthermore, university students go through a transitory period in which they are going from adolescence to adulthood and that change can be one of the most stressful times in a person's life to adapt with. Medical school is considered as highly stressful journey.

Empathy is important in medicine as having a strong

relationship leads to improved patient outcomes.<sup>2</sup> Empathy is generally understood as the capability to accurately perceive and understand another individual's state and emotions. Preston et al divided the frame of empathy into cognitive and emotional components. Cognitive empathy refers to the capability of the subject to understand the state of the object, whereas emotional empathy refers to the subject's response to the state of an object. In sympathy, the subject feels sorry for the other and is more focused on the object's situation rather than the state. Empathy results in subject's state from its perception of the object's state.<sup>3</sup>

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For general population, connection between stress and empathy might be an untouched territory. In this day and age people live stressful life. Knowing if stress has any impact on empathy or not will be useful in a way one can know if their stress is having positive impact in their lives or is affecting them negatively. Compared to the general population, medical students have higher levels of psychological stress, which may have negative impacts on their performance and mental health.<sup>4</sup> Studies have also found that high stress levels can impair one of the most important abilities among physicians: clinical empathy.<sup>5</sup> However, it should be understood that stress, as a nonspecific response of the human body to external triggers, can be divided into two categories: "eustress," referring to stress which leads to better performance and productivity, and "distress," which causes anxiety, anger, and depression<sup>6</sup>.

The aim of this study is to identify stress and empathy levels among medical students and the general population and compare it.

## MATERIAL AND METHOD

This cross-sectional study was conducted by Department of Community Medicine, Tertiary care Hospital, Surat via online mode. A structured questionnaire was prepared with the help of senior faculties from the college. This questionnaire consisted three sections. First section included socio-demographic details of the participants such as age, gender, addiction, occupation, and migration history. The second section included PSS (perceived stress scale)<sup>7</sup> and the third section included the Toronto Empathy Questionnaire (TEQ)<sup>8</sup>.

Initially it was decided to implement this questionnaire in English language only, however, considering the complexity of the questions and participation from the general population, we decided to make this questionnaire in dual language – English as well as local language i.e. Gujarati. This questionnaire was self-administered form. For the data collection, a Google form was created. This form was sent to 15 faculties of the college to assess feasibility and completeness of the questionnaire. A final questionnaire was prepared after this pilot study. A link of the form was shared to various under graduate student groups of the institute via Whatsapp. To encourage students, we visited the lecture halls and during the last 10 minutes allotted them time to fill in the google form. We also asked them to share it to their relatives and friends as much as possible. We also shared it on the social media for getting response from general population as it was an important part of study to compare the data with medical students. The first page of the online form briefly described the study and asked the participants about their agreement to participate in the study. The questionnaire was displayed to only those who agreed to participate. The students of first, second, third first, third final and internship were participated in the

study.

Participants were given 7 days to send their responses on google forms. The link was disabled after seven days. The participants were given a choice to share anonymous response. In the end, they had to enter their email id/ contact number, if they wished to know their stress and empathy levels. We sent them their results individually keeping their data confidential.

### Tools used in the study:

**Perceived Stress Scale 10 (PSS)<sup>7</sup>:** It is a tool used to measure perceived stress of the participant. The scale consists of ten questions; scoring by 5-point Likert scale (0 = Never, 1 = Rarely, 2 = Sometimes, 3 = Fairly often, and 4 = Always) is done. The scores of the four positively stated items 4, 5, 7, and 8 were reversed (e.g., 0=4, 1=3, 2=2, 3=1 and 4=0) and then add up the scores for each item to get a total. Individual scores on the PSS can range from 0 to 40 with higher scores indicating higher perceived stress (linear relation), stress was stratified in to low-stress level (Scores range from 0 to 13), moderate stress level (Scores range from 14 to 26) and high-stress level (Scores range from 27 to 40). Low-stress levels were considered as having no stress, while both moderate- and high-stress levels were merged as having stress.

**Toronto Empathy Questionnaire (TEQ)<sup>8</sup>:** is a validated tool to measure empathy.<sup>35</sup> It is composed of 16 questions, which are scored on a five-point Likert Scale ranging from 0 to 4, where 0= never, 1= rarely, 2= sometimes, 3= often and 4=always. Eight items of the TEQ are reverse coded, which include item 2,4,7,10,11,12,14,15. The individual responses of the 16 items are added to get a total empathy score that may range from 0 to 64. A higher mean empathy score indicates a higher level of empathy. Score below 45 is considered below average empathy.

**Statistical Analysis:** The predesigned questionnaire was translated in local language also under the guidance of experts. A panel of 2 experts reviewed the questionnaire. Content validity index (CVI) was calculated for each question; CVI average was 0.864.

To measure the test-retest reliability, the questionnaire was administered on 15 faculties/ residents/ students within the interval of 11 19 days and the intra-class correlation coefficient (ICC) was calculated, the reliability of the questioner, as measured by internal consistency, was found to be satisfactory (Cronbach  $\alpha = 0.89$ ). The results of test-retest reliability was  $r = 0.83, p < 0.001$ .

Descriptive statistics applied to summarize the ordinal data as median (IQR), frequency and percentage. Normality of PSS and TEQ scores were checked by Kolmogorov Smirnov test, but data didn't follow the normality. The PSS scores were high among the medical students and TEQ scores were high among

the general population and also the PSS and TEQ scores were higher in female medical students as compared to male students. To check it Mann Whitney U-test applied at 95% level of significance.

Spearman correlation was used to know the relation between PSS and TEQ scores in medical and general population. All statistical Analysis done using SPSS20.

## RESULT

This study included total 225 responses, out of them 65 (28.89%) general people and 160 (71.1%) Medical students. Table 1 show that out of the total medical students 68.1 % and 13.8% had moderate and high stress respectively. Whereas TEQ score is 24.3% less among medical students as compared to others.

**Table 1: Detail of PSS and TSQ Score with Medical Students and others.**

	N	PSS Score			TEQ Score (Empathy)	
		High Stress (27-40)	Moderate stress (14-26)	Low Stress (1-13)	Below Average (<45)	Above Average (>45)
<b>General Population</b>	65	4 (6.2)	35 (53.8)	26 (40.0)	22 (33.8)	43 (66.2)
<b>Medical Students</b>	160	22 (13.8)	109 (68.1)	29 (18.1)	93 (58.1)	67 (41.9)
<b>Total</b>	225	26 (11.6)	144 (64.0)	55 (24.4)	115 (51.1)	110 (48.9)

**Table 2: Comparison of PSS and TEQ scores among Medical Students and General population**

	PSS score			TEQ score		
	General Population	Medical students	P- value	General Population	Medical students	P- value
N	65	160	P<0.0001	65	160	0.01
Mean Rank	88.17	123.09		95.55	120.09	
Median (IQR)	16 (10-20)	19 (15-24)		47 (41-51)	44 (41-47)	

**Table 3: Gender wise comparison of PSS and TEQ scores among medical students**

Score & Gender	N (n=160)	Mean Rank	Median (IQR)	P- value
<b>PSS</b>				
Female	114	85.75	20(16-25)	0.024
Male	46	67.50	18(12-21.5)	
<b>TEQ</b>				
Female	114	86.09	46(42-51)	0.016
Male	46	66.64	45(37-50)	

**Table 4: Correlation between PSS and TEQ Score in Medical students and General Population**

	PSS & TEQ In Medical students	PSS & TEQ In General Population
Coefficient*	-0.15	0.365
P-Value	P<0.05	0.003

\* Correlation Coefficient

Table.2 depicts that the mean rank and median (IQR) for stress score (PSS) for medical students is 123.09 and 19(15-24) simultaneously whereas for general population it is 88.17 and 16(10-20). So it is evident that medical students suffer from more stress as compared to general population, which is statistically significant. Furthermore, it reveals that the mean rank and median (IQR) for empathy score (TEQ) for medical students is 120.09 and 44(41-47) simultaneously whereas for general population it is 95.55 and 47(41-51).so it is evident that medical students have less empathy as compared to general population, which is statistically significant.

There was total 160 medical students of total, among them 114 (71.25 %) female and 46(28.75%) male students. The PSS and TEQ scores were high among

the female medical students as compared to male students, which is statistically significant.

Table 4 shows the weak negative correlation between the PSS and TEQ score among medical students whereas moderate positive correlation observed in between PSS and TEQ Score in General population.

## DISCUSSION

Stress level was high among the medical students as compared to the general non-medical population. The percentage of stress (moderate and high stress) among medical students in the present study was 81.9% that was lower than a study conducted in Pakistan where stress percentage among medical students was 92.5%<sup>9</sup>, but higher than other studies conducted among medical students, as in a study at Saudi Arabia which reported stress among 71.9% of medical students<sup>10</sup> while in Egypt in a study conducted at Fayoum University, stress among medical students was about 62.3%<sup>11</sup>, in another study conducted in Ain shams university 54% of medical students reported having stress.<sup>12</sup>

The current study also found that severe stress level among medical students was 13.8%<sup>13</sup> which agreed with a study conducted in Egypt at Mansoura University where severe stress accounted for 20.1% among medical students<sup>14</sup> and also agreed with a study conducted in Saudi Arabia where 19.6% of medical students had severe stress.<sup>15</sup> However, the current finding was very less than a study conducted in Pakistan among medical students 54.6%<sup>16</sup>, other studies were done among Saudi medical students also showed that the prevalence of severe stress was

33.8% and 25%<sup>17</sup> This variation may be due to cultural differences, differences in sociodemographic background of participants, differences in the health-care system, and the tools used for measurement in these studies.

The current finding showed that the percentage of stress among the non-medical population in this study was 60% and the nonmedical population with severe stress level accounted for 6.2% which was lower than the percentage among medical students. This was in agreement with studies conducted<sup>18,19,20,21</sup> stating that medical students were at great exposure to psychological stress compared to their age-matched peers.

The results of this study revealed that female students had significantly higher stress level than male students. This finding was in agreement with other studies.<sup>22,23,24,25</sup> However, some studies found no gender differences in stress perception<sup>26,27</sup>, while some studies found that male students reported higher stress levels than female students<sup>28</sup>. These differences may be due to cultural and environmental differences.

Talking about empathy levels, medical students tend to have less empathy as compared to general population. The pattern of empathy seen in our study, may be attributed to several reasons. Studies showed that the decline might be associated with many factors, such as a lack of good role models in the clinical practice, de-idealization of clinical practice experienced by the students, time issues, academic pressure, re-adaptation and even interacting with patients<sup>29,30</sup>.

Higher empathy levels were consistently found among female students compared to male students<sup>29,30,31,32</sup>. Other studies found that female doctors tend to be more sensitive to emotional signs and signals expressed by the patient, both verbal and nonverbally, than male doctors<sup>33</sup>, and female are also better than male at managing the emotional aspect of empathy, even though they performed about the same in the cognitive aspect of empathy<sup>31,33</sup>. Empathy level measurement which focus on the cognitive aspect might not be able to address the difference between male and female which is probably anchored in the affective aspect of empathy.<sup>6</sup>

General population's positive correlation between stress and empathy shows that their stress can be considered eustress which is leading to positive outcome whereas medical student's weak negative correlation between stress and empathy depicts that they seem to be going through distress which is leading to decrease their empathy levels.

## LIMITATIONS

This depended on information reported by students. Therefore, there was a potential for reporting bias. In

addition, the perception of stress levels can vary among individuals and throughout times of the year.

We shared the results completely depended on what was filled online by students and general population. Therefore, there was a potential for reporting bias. We prepared the questionnaire in dual language to help participant properly understand the question. In addition, the perception of stress levels can vary among individuals and throughout times of the year.

## CONCLUSION

Medical students perceived more stress than general population which may lead to decrease in their empathy levels. The stress may be due to academic stressors which can be significant predictors among all. Further research is warranted to develop better understanding of various predictors of the stress among medical students. The awareness about stress and its coping strategies among medical students needs to be considered.

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