

## A Cross-Sectional Study on Empathy and its Association With Stress in Medical Students

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### ABSTRACT

**Introduction:** Empathy is the cornerstone of the doctor-patient relationship and a crucial quality associated with better patient compliance and clinical outcomes. This study aims to assess the level of empathy and its association with the level of stress in 3rd and 4th year medical students

**Methods:** This cross-sectional study was conducted in Kathmandu Medical College after taking ethical approval from the Institutional Review Committee and informed written consent from all the participants. The respondents completed a structured questionnaire including demographic profile, Jefferson Scale of Empathy-Student Version, and Perceived Stress Scale. Data were entered and analyzed in Statistical Package for the Social Sciences version 20.

**Results:** A total of 255 questionnaires were obtained with a response rate of 85.2%. The mean empathy score was 101.79 (SD = 11.26) and the mean perceived stress score was 18.55 (SD = 5.56). There was a statistically significant negative correlation between empathy and stress (p-value <0.01) and similar negative correlations were seen in sub-group analysis. Female students had higher empathy scores compared to their male counterparts (p-value <0.01). Fourth-year students reported lower empathy scores than third-year students (p-value <0.05).

**Conclusion:** Stress was found to be a significant determinant of empathy among medical students. Medical educators must be aware of this and should try to incorporate means to alleviate stress in medical education. Furthermore, effective stress management techniques to preserve empathy in medical students with a view to improve clinical competency and achieve optimum patient care needs to be studied.

**Key words:** Empathy, Medical education, Medical students, Stress.

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### INTRODUCTION

Empathy is an essential component of professionalism in medical science and is crucial for physicians for the provision of quality patient care. Physician empathy uniquely contributes to optimal clinical outcomes irrespective of the physician's age, sex and other variables.<sup>1</sup> A Systematic Review of 964 original research articles found that empathy of the physician and patients' satisfaction significantly correlated, and physician's empathy helped lower patient anxiety and distress thus delivering significantly better clinical outcomes.<sup>2</sup>



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The current study becomes particularly important since empathy not only affects the intrapsychic dynamics of the clinician but also the interpsychic dynamics between the clinician and the patient. Establishing a strong therapeutic alliance to maintain it, and keeping the trust between the clinician and the patient is crucial for the efficacy of an intervention, in whatever form it may be. It is imperative that the outcome eventually reflects the ability to empathize with the patients' needs, thus affecting the treatment outcome

Despite adequate awareness regarding the crucial role of empathy in patient care, studies have shown a decline in empathy levels in medical students during their medical education. This decline of empathy in medical students can be attributed to several factors, including a lack of role models, a high volume of materials to learn, time pressure, and patient and environmental factors.<sup>3,4</sup> Other studies suggest that trainee distress could be a key determinant of empathy decline. Distress may arise from mistreatment by seniors or mentors, the vulnerability of medical students and residents, social support problems, and high workload.<sup>5,6</sup> Thus, it is important to be aware of the factors that modulate empathy, including stress, which may be an antecedent to empathy decline. The role of empathy in patient care varies according to culture and social setting.<sup>7</sup> This study was undertaken to assess variations of empathy in third- and fourth-year medical students of a Medical College.

## METHODS

This cross-sectional study was conducted in the clinical science division of Kathmandu Medical College in Sinamangal, Kathmandu, Nepal. All the students were third and fourth-year undergraduate medical students studying Bachelor of Medicine, Bachelor of Surgery (MBBS). The third and fourth (final) year students were chosen for this study, as they are students in the clinical science wing of the college. These students are exposed to actual stressful clinical scenarios in contrast to basic science students, and the third year is said to be the period when a decline in empathy is observed in medical students.<sup>3</sup> A total of 299 students were studying in the third and fourth year at the time of this study as mentioned in the administrative records. All these students were enrolled in the study. Ethical clearance and approval for this study were obtained from the Institutional Review Committee of Kathmandu Medical College (Ref.: 2502202204). Informed written

consent was taken from all the participants and confidentiality of information was maintained.

The participants were asked to complete a structured questionnaire consisting of a demographic profile like age, sex and year of study. They were also asked to complete the Jefferson Scale Empathy (JSE) and the Perceived Stress Scale (PSS). The student's version of JSE which is a validated and widely used scale in medical students was used in the study.<sup>8</sup> The JSE has a total of 20 items to evaluate the three underlying aspects of empathy, comprising 10 items on perspective taking (PT), 8 on compassionate care (CC), and 2 on standing in the patient's shoes (SP). Each item is rated using a 7-point Likert scale with a maximum score of 140. The total score is the sum of individual item scores and a higher score indicates a higher level of empathy.

PSS is a standard 10-item self-administered questionnaire that was developed by Dr. Stephen Cohen and colleagues to specifically measure stress.<sup>9</sup> It uses a psychological approach to measure perceived stress levels within the past month with good reliability and validity.<sup>10</sup> Each item is rated on a 5-point Likert scale with a maximum score of 40. The total score is the sum of all item scores and a higher score represents greater perceived stress.

Medical students who filled and submitted the questionnaires were the study unit. A respondent should have answered at least 16 (80%) of the 20 items of JSE for the survey to be regarded as complete and all incomplete surveys were excluded from data analysis following the scoring schematics of the scale.

Data was entered and analyzed in Statistical Package for the Social Sciences- IBM SPSS Statistics for Windows, version 20 (IBM Corp., Armonk, N.Y., USA). Demographic profiles were analyzed using frequency, mean and standard deviation. Age groups were divided into those aged below the mean age, those at the mean age, and those aged above the mean age to maintain homogeneity of data for analysis purposes. Analysis of variance (ANOVA) was used to analyze the differences in empathy and stress according to gender, year of study and age group. Dunnett's T3 test was done for posthoc analysis of differences in empathy in-between age groups. Pearson's correlation analysis was performed to assess the relationship between empathy and stress along with a sub-analysis based on gender, year of study and age group. Multiple Linear

Regression (Enter method) was used to evaluate stress as a predictor of empathy and, significance was declared at a  $p$ -value  $< 0.05$ .

## RESULTS

A total of 255 out of 299 distributed questionnaires, with a response rate of 85.2%, were returned which were regarded as complete and included in the study. The study population was almost evenly distributed among males and females. The mean age of the respondents was  $22.14 \pm 1.08$ , with a range of 20–27.

The mean score on JSE in total was  $101.79 \pm 11.26$ . The mean score on JSE by female students  $104.45 \pm 10.38$  was higher than that of the male students  $99.78 \pm 11.52$  ( $p=0.001$ ). There was a statistically significant difference between the empathy scores among the age groups ( $p=0.029$ ). Post-hoc analysis showed that there was a statistically significant difference between empathy scores of students aged below the mean age  $103.75 \pm 10.73$  ( $p=0.046$ ) and students aged above the mean age ( $99.14 \pm 12.54$ ). The mean empathy scores for students at mean age were not statistically significant. The mean JSE score of third-year students

$103.45 \pm 10.43$  was higher than fourth-year students  $100.04 \pm 11.9$  ( $p=0.015$ ) (Table 1).

There were no statistically significant differences in mean PSS scores of students according to gender, age group, or year of study.

The JSE score and the PSS score showed a statistically significant weak, negative correlation ( $r = -0.18$ ,  $p$ -value = 0.003). Similarly, a sub-analysis of empathy among female students, students aged above the mean age and fourth-year students also showed statistically significant correlations with PSS scores. However, the correlation between empathy and stress in the sub-analysis of males, other age groups and third-year students was not significant (Table 2).

The results of the regression analysis showed that the PSS score was a statistically significant predictor of the JSE scores among all the students. Similarly, a sub-analysis based on demographics also showed that PSS was a statistically significant predictor of the JSE score. However, stress was not found to be a significant predictor of empathy in males, certain age groups and third-year students (Table 3).

**Table 1:** JSE and PSS scores and their association with different variables.

| Variables             | Frequency (Percent %) | JSE Mean $\pm$ SD | PSS Mean $\pm$ SD |
|-----------------------|-----------------------|-------------------|-------------------|
| <b>Total students</b> | 255                   | 101.79 (11.26)    | 18.55 (5.560)     |
| <b>Gender</b>         |                       |                   |                   |
| Male                  | 145 (56.9)            | 99.78 (11.52)     | 18.24 (5.38)      |
| Female                | 110 (43.1)            | 104.45 (10.38) *  | 18.95 (5.79)      |
| <b>Age Group</b>      |                       |                   |                   |
| Aged below mean age   | 72 (28.2)             | 103.75 (10.73) †  | 18.40 (5.808)     |
| Aged at mean age      | 103 (40.4)            | 102.49 (10.25)    | 18.70 (5.603)     |
| Aged above mean age   | 80 (31.4)             | 99.14 (12.54)     | 18.55 (5.56)      |
| <b>Year of study</b>  |                       |                   |                   |
| Third year            | 131 (51.4)            | 103.45 (10.403) ‡ | 17.98 (6.16)      |
| Fourth year           | 124 (48.6)            | 100.04 (11.901)   | 19.15 (4.8)       |

\* $p$ -value $<0.01$  in comparison to male students; † $p$ -value $<0.05$  in comparison to students aged above mean age; ‡ $p$ -value $<0.05$  in comparison to fourth year students

**Table 2:** Pearson's correlation coefficient obtained for JSE and PSS scores.

| Variables             | Pearson's correlation coefficient | p-value |
|-----------------------|-----------------------------------|---------|
| <b>Total students</b> | -0.18                             | 0.003   |
| <b>Gender</b>         |                                   |         |
| Male                  | -0.15                             | 0.07    |
| Female                | -0.27                             | 0.004   |
| <b>Age Groups</b>     |                                   |         |
| Aged below mean age   | 0.106                             | 0.085   |
| Aged at mean age      | 0.204                             | 0.285   |
| Aged above mean age   | -0.26                             | 0.018   |
| <b>Year of study</b>  |                                   |         |
| Third year            | -0.13                             | 0.130   |
| Fourth year           | -0.22                             | 0.013   |

**Table 3:** PSS score as a predictor of JSE score.

| Variables             | Unstandardized coefficient (B) | Standard Error | Standardized coefficient ( $\beta$ ) | t      | p-value |
|-----------------------|--------------------------------|----------------|--------------------------------------|--------|---------|
| <b>Total Students</b> | -0.372                         | 0.125          | -0.184                               | -2.972 | 0.003   |
| <b>Gender</b>         |                                |                |                                      |        |         |
| Male                  | -0.322                         | 0.177          | -0.151                               | -1.823 | 0.07    |
| Female                | -0.488                         | 0.166          | -0.273                               | -2.943 | 0.004   |
| <b>Age groups</b>     |                                |                |                                      |        |         |
| Aged below mean age   | -0.377                         | 0.216          | -0.204                               | -1.744 | 0.085   |
| Aged at mean age      | -0.195                         | 0.181          | -0.106                               | -1.075 | 0.285   |
| Aged above mean age   | -0.619                         | 0.256          | -0.264                               | -2.418 | 0.018   |
| <b>Year of study</b>  |                                |                |                                      |        |         |
| Third year            | -0.224                         | 0.147          | -0.133                               | -1.523 | 0.130   |
| Fourth Year           | -0.552                         | 0.219          | -0.223                               | -2.522 | 0.013   |

## DISCUSSION

In this study, the mean total score on JSE was lower than that of Korean medical students ( $M = 105.47$ ,  $SD = 14.67$ ) and Japanese medical students ( $M = 104.3$ ,  $SD = 13.1$ ) but higher than that of Indian medical students ( $M = 96.01$ ,  $SD = 14.56$ ) [10, 11, 12]. The mean total score on PSS was similar to Chinese medical students ( $M = 18.44$ ,  $SD = 7.35$ ) but higher than that of medical students from the United States of America ( $M = 16.6$ ,  $SD = 7.49$ ).<sup>11,12</sup> These differences might be the result of factors such as social and cultural practices and norms.

Female students particularly had a higher mean score on JSE as compared to male students despite having similar mean scores on PSS. This is similar to what has been previously stated in several other studies.<sup>13,8,14,15</sup> This may be related to females' higher capability for empathetic communication with others.<sup>16</sup> Studies have shown that females are more receptive to social/emotional cues and better understand and respond

to emotional states and variations which contributes to better empathetic relationships. Moreover, women are believed to develop more caregiving attitudes toward their offspring than men and hence possess the capacity to be more empathetic.<sup>17</sup>

Age was also found to be a determinant of empathy as students aged below the mean age showed a higher score on JSE as compared to those aged above the mean age. With the increase in age, there seemed to be a fall in mean JSE scores despite the age groups having similar mean PSS scores. Such a trend of decline in empathy with the increasing age group has also been shown in the literature.<sup>18</sup>

This decline in empathy level with increasing age rightfully corresponded with the fact that fourth-year medical students showed a lower mean score on JSE when compared to third-year students. These findings also support the hypothesis that empathy erodes with increase in the level of medical education. Park et al. also showed that fourth year students had lower

mean JSE scores than the preceding year students.<sup>14</sup> Literature also suggests that empathy levels in medical students are high in the first year of medical school but fall after the third year and remain low up until the final year.<sup>19</sup>

This study showed that there was a negative correlation between scores on JSE and PSS which suggests that empathy seems to be inversely related with stress. Higher the levels of stress lower will be the levels of empathy; this is also in accordance with what has been shown by several other studies.<sup>5, 6, 14</sup> Relation between empathy and stress was stronger in female students which is in contrast to the findings by Park et al. who showed negligible correlation between empathy and stress in female students.<sup>14</sup> Susceptibility to empathy decline in response to stress in female medical students of Nepal may be influenced by societal norms or cultural disparities when compared to settings abroad which have not yet been studied. Studies suggest that female students have more difficulty in coping with stress and report higher levels of depression and anxiety because they may be more competitive, more concerned about securing higher marks and engage in less exercise-related activities.<sup>20, 21</sup>

Similarly, those aged above the mean age and fourth-year students, both of which roughly represent the same cohort also showed a higher correlation between empathy and stress. As medical education level increases, medical students transition from classroom-based learning into stressful clinical scenarios. This transition is said to have a negative impact on many students as it has been reported that as many as 75% of medical students become more cynical about academic life and the medical profession during this period.<sup>22,23</sup> This acquired cynicism may be the reason for their higher susceptibility to stress in terms of decline in empathy. Regression analysis also revealed that stress was a significant predictor of empathy in especially females and fourth-year medical students. This is indicative of the fact that reduction in stress levels could help to improve empathy levels in these students.

Mindfulness-based stress reduction exercises have been shown to significantly reduce stress at the same time they may also help in improving the overall levels of empathy in medical and premedical students.<sup>24</sup>

## Limitations

Limitations of time and resources did not allow extensive data collection at a larger scale. As this was only a cross-sectional study, changes in empathy among the same individuals over a period of time could not be assessed. The findings regarding stress levels may be temporary as the PSS questionnaire measures stress relating to the previous month. Data were collected only from clinical science students of a single medical school which does not allow generalization of the findings and thus may not be representative of an average Nepalese medical student. Furthermore, self-reported measures, such as the JSE have a respondent bias as respondents may under or overestimate their empathetic nature due to social desirability, lack of recall or misinterpretation of their behaviors and experiences.

## CONCLUSION

The level of Empathy in third and fourth-year medical students was measured using and its association with stress and other demographic variables were explored using JSE and PSS. Fourth-year students had lower empathy than third-year students and female students had higher empathy than their male counterparts. Stress was found to be a significant determinant of empathy, particularly among female students and fourth-year students.

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