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EMPATHY LEVELS AND THEIR DETERMINANTS AMONG UNDERGRADUATE MEDICAL STUDENTS IN CENTRAL ODISHA: A CROSS-SECTIONAL STUDY USING THE INTERPERSONAL REACTIVITY INDEX

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ABSTRACT

Background: Empathy can be a critical area in patient care and management, yet several studies imply that it reduces in budding doctors during their education and medical training due to academic stress, burnout and due to increase in patient exposure in day-to-day practice. In this study medical undergraduates in a medical college in central Odisha India were assessed by comparing trends and changes in across the academic years from first year to final year, for finding various determinants of low empathy among the medical undergraduates.

Materials and Methods: In this cross-sectional study, 879 students and interns were selected from a Teaching Medical college and Hospital in Central Odisha, India. Through Interpersonal Reactivity Index (IRI) scale empathy was evaluated. Domains which were considered were Perspective taking scale (PT), Fantasy scales (FS), Empathic concern scale (EC) and Personal distress scale (PD). Binary logistics regression was used to see association of Academic and demographic factors with empathy scores.

Results: Female students secured empathy score of 87.54+ 13.9 with a mean total empathy score which was higher across all domains ($p<0.01$). Students of first year undergraduates showed greater empathy scores than their senior batches (OR-2.9; 95% 1.85-4.68). Older the age >23 yrs and especially male gender were predictors of low empathy with Odds Ratio (OR- 0.5 and 2.9 p= 0.0001 both). Total of 94.8% of participants needed empathy training.

Conclusion: As student's progress through their years in medical college, their level of empathy tends to decrease, and this change is influenced by their gender and the year they are in school. Interventions that are specifically focused, like reflexive exercises and faculty modelling, should be considered for inclusion in medical education programs. Female gender showed greater empathy compared to males, with an odds ratio of 0.32, a confidence interval between 0.168 and 0.64, and a p-value of 0.001. Batches with higher empathy levels had more than twice the chance of being observed compared to batches with lower empathy levels, with an odds ratio of 2.78, a confidence interval between 1.13 and 6.87, and a p-value of 0.026. Older ages showed higher results, and the way people see teaching empathy also changed a lot along with other important findings.

Keywords: Empathy, medical education, Interpersonal Reactivity Index, empathy decline.

INTRODUCTION

Empathy is essential to patient-centered care, in the medical field particularly, since it enables healthcare providers to effectively comprehend and attempt to patients emotional and physical needs.[1,2] However different studies done in past reveal that as medical undergraduates progress through their training, their empathy level may decline because of things like clinical exposure, academic stress and burnouts.[3]

Patients view emotionally empathetic physicians as more capable caregivers/professionals. Even with strong diagnostic skills, a physician may be perceived as ineffective if they show insufficient empathy, as it is crucial for encouraging patient satisfaction and cooperation with medical advice.[4,5] Sociologists and psychologists classify empathy into: Vicarious empathy and Imaginative empathy.

Various Empathy scales focus on measuring cognitive empathy, which involves the ability to intellectually understand other's perspectives. Studies on medical students' cognitive empathy during training have got mixed results, with studies finding no change, decrease, or even rise empathy levels.[6,7]

Clinical empathy increases overall patient satisfaction with adherence, leading to better clinical decisions. The Jefferson Scale of Empathy (JSE), mostly its student version (JSE-S), is utilized widely to measure clinical empathy in medical undergraduates, depicting high reliability (Cronbach alpha = 0.80) and applicable in cross-cultural evaluation.[8]

Burnout is a response generally to chronic workplace stress which involves mostly emotional exhaustion among the population with cynicism and a sense of individual success on decreasing side. Research shows us higher burn out levels among individuals, including depersonalization and exhaustion, across medical students who are in their final year of under graduation. Burnout is linked to less altruistic professional values and a greater risk of unprofessional behaviour.[9-16]

Sympathy and empathy are different but related concepts. Sympathy can be perceived as an emotional response to pain and suffering of a patient, while empathy mostly involves cognitive understanding of a patient's experiences in the healthcare setup. Even though both share some similar overlaps (about 25%) but differ significantly in their complications for patient care.[17-20]

Medical education should place a strong emphasis on empathy since it enhances patient satisfaction, boosts adherence to treatment regimens and lowers the risk of malpractice claims. Since empathy is based on understanding and cognition, it can be taught and improved, which has important implications for medical education.

Medical school frequently hinders moral development, decreases empathy, and increases cynicism.[2] The natural "gut reaction" to a patient's pain, known as vicarious (emotional) empathy, dramatically diminishes.[3] Mixed developments in cognitive empathy (learned perspective-taking) indicate that training may be a safe way to protect these elements.[2,3,21-24]

Aim of the current study was to assess and compare empathy levels between medical undergraduates in Central Odisha, a teaching medical college in, India. Evaluating empathy among various medical undergraduate batches will help to build targeted interventions to facilitate inculcate empathy in aspiring healthcare professionals and provide valuable insights into the factors affecting empathy.[4] Hence this study will contribute to the growing body of literature on empathy on medical education and to inform various strategies to increase empathetic care in clinical practice in day-to-day life. The primary objective of this current study was to assess empathy levels among medical students in a teaching hospital using standardized criteria, and the secondary objective that is to compare empathy levels among students from different academic years (batches) including intern doctors.

MATERIALS AND METHODS

Study Design and Setting: A cross-sectional study was conducted among undergraduate medical students in a teaching medical college located in Central Odisha, India. It aimed to assess the empathy level among medical students using standardized criteria and to compare and find out empathy scores across different academic years (batches) including interns. The duration of the study was fifteen months, from March 2023 to June 2024.

Study Participants and Sampling: Purposive sampling technique was used, as all students were enrolled under Bachelor of Medicine and Bachelor of Surgery (MBBS) program, and were considered eligible for participation. Data was collected from the students who consented for the study and completed the questionnaire. Out of 1250 students (including interns) complete responses were obtained from 879 due to logistical constraints.

Data collection tool and technique: Empathy was assessed using a structured questionnaire developed based on Interpersonal Reactivity Index (IRI) by Mark H Davis. (1980,1983) The IRI conceptualizes empathy as a multidimensional construct consisting of 28 items grouped into four subscales; Perspective Taking (PT), Fantasy (FS), Empathetic Concern (EC) and Personal Distress (PD) [6] Each item was rated on a 5-point scale Likert Scale, ranging from "Does not describe me well – 0 score to Describe me very well – 4 score. Negatively worded items were reverse scored. The questionnaire was made to adapt to the local context for relevance to the culture while maintaining the integrity of the original scale theoretically. Demographic and academic data such as age, gender and academic year were collected to examine their association with empathy levels. Data

entry and management was done using Microsoft Excel, and statistical analyses were performed. using IBM SPSS Statistics for Windows, Version 21.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (mean, standard deviation, and percentage) were used to find out and summarize participants characteristics and empathy scores accordingly. Independent T-tests and one way ANOVA were applied to compare empathy scores across demographic groups and academic years, which is Inferential statistics. To identify determinants of low empathy scores, Binary logistic regression analysis was used.

Ethical considerations: The study protocol was reviewed and approved by the Institutional Ethics Committee (IEC) SCB Medical College and Hospital, Cuttack, Odisha, India (IEC No: 1185; Approval Date: 07 February 2023). Witten informed consent was taken from all participants prior to data collection. Confidentiality and anonymity of responses were strictly maintained throughout the study.

RESULTS

In our study we examined 879 students' empathy score, and we got a mean score of 70.09 ± 12.17, 235 students (26.7%) were classified as poor empathy, while 243 students (27.6%) were classified as great empathy, with a mean score of 103.09 ± 8.06. In comparison to their male counterparts, female students showed better empathy ratings overall across all domains. Furthermore, compared to students in higher academic years, first-year medical students demonstrated higher levels of empathy across the board, suggesting that empathy decreased with training.

Table 1: Basic characteristics of the study participants (N=879)

Sl no	Characteristics		N	(%)
1	Batch	1st Year	236	26.8
		2nd Year	182	20.7
		3rd Year	234	26.6
		4th Year	203	23.1
		Interns	24	2.7
2	Gender	Girls	322	36.6
		Boys	557	63.4
3	Doctor by choice	Yes	626	71.2
		No	253	28.8
4	Doctor parent	Yes	82	10.5
		No	787	89.5
5	Nativity	Rural	380	43.2
		Urban	499	56.8
6	Sibling	No	145	16.5
		Yes	734	83.5
7	Current residence	Hostel	802	91.2
		Home	77	8.8
8	Experienced apathy from treating doctor	Yes	254	28.9
		No	625	71.1
9	Knew where sympathy is needed.	Yes	171	19.5
		No	708	80.5
10	Knew where empathy is needed.	Yes	376	42.8
		No	303	57.2
11	Perceived The Need to Teach Empathy Emphatically in MBBS.	Agree	833	94.8
		Disagree	46	5.2
12	Empathy Score	Fantasy scales (FS)	21.78(± 4.7)	
		Personal distress scale (PD)	21.38(±4.3)	
		Perspective taking scale (PT)	23.4 (± 5.0)	
		Empathic concern scale (EC)	20.97 (± 3.6)	
		Total empathy score (TOTEM)	87.54 (±)13.9	

Participants' Basic Information: This study included 879 undergraduate medical students in total. The Batchwise distribution included 236(26.8%) first year,182(20.7%) second year, 234 (26.6%) third year, 203(23.1%) fourth year and 24(2.7%) intern students, depicted in Table:1. The majority were male (63.4%, n = 557), while females constituted 36.6% (n = 322) of the sample. Regarding career choice, 71.2% (n = 626) of participants reported that becoming a doctor was their personal choice, whereas 28.8% (n = 253) indicated it was not.

10.5% of students had at least one parent who was a doctor. In terms of nativity 43.2%(n=380) were from rural areas and 56.8% (n=499) from urban areas. Most participants (83.5%, n = 734) had at least one sibling, while 16.5% (n = 145) were only children. A large proportion of students (91.2%, n = 802) resided in hostels, whereas 8.8% (n = 77) lived at home. Additionally, 28.9% (n=254) reported having experienced apathy from treating doctors, and an overwhelming 94.8%(n=833) agreed that empathy should be emphasized in the MBBS curriculum.

Empathy Scores Across Domains: The mean empathy score of the study participants across different domains of the Interpersonal Reactivity Index(IRI) was as follows : Fantasy Scale (FS) had a mean score of 21.78 ± 4.7, the Personal Distress(PD) Scale recorded 21.38 ± 4.3, the Perspective taking(PT)scale showed 23.40 ± 5.0,and the Empathetic concerned (EC)scale yielded 20.97 ± 3.6 shows in [Table 1] The total empathy score (TO TEM) among students was 87.54 ± 13.9, indicating a moderate overall level of empathy.

Comparison of Empathy Scores: When categorized by empathy levels, the low empathy group(n=235) had a mean score of 70.09 ± 12.17, whereas the high empathy group(n=234) scored103.09 ± 8.06, showing the marked difference between the two groups, depicted in [Table 2] Female students consistently scored higher than males across all four empathy domains. In terms of academic progression, first year student demonstrated significantly higher empathy score compared to students in senior batches, suggesting a decline in empathy with increasing years of medical training.

Table 2: Association of various factors with Low Empathy scores among the student participants

Sl no	Factor	Response	Low Empathy Score (N=235) n (%)	High Empathy Score(N=243) n (%)	P value	OR [95% CI]
1	Batch	Higher Batch	181 (56.7)	138(43.3)	0.001*	2.9[1.85-4.68]
		1st year Batch	33(30.8)	74(69.2)		
2	Gender	Girls	71(38.6)	113(61.4)	0.001*	0.5 [0.33-0.71]
		Boys	164(56.2)	128(43.8)		
3	Age	Higher quartile≥23	65(55.1)	53(44.4)	0.001*	2.9 [1.63-5.1]
		Lower quartile≤21	27(29.7)	64(70.3)		
4	Doctor by choice	No	158 (51.0)	152 (49.0)	0.34	1.09[0.91-1.3]
		Yes	77 (46.4)	89 (53.6)		
5	Doctor parents	No	212 (50.2)	210 (49.8)	0.29	0.73 [0.42-1.3]
		Yes	23(42.6)	31 (57.4)		
6	Hometown	Rural	103 (51.8)	96 (48.2)	0.37	1.18 [0.81-1.6]
		Urban	132 (47.7)	145 (52.3)		
7	Current residence	Hostel	217 (50.1)	216 (49.9)	0.30	1.4 [0.74-2.6]
		Home	18 (41.9)	25 (58.1)		
8	Experienced Apathy from treating doctor	Yes	65 (52.8)	58 (47.2)	0.371	1.2 [0.8-1.8]
		No	170 (48.2)	183(51.8)		
9	Know where Sympathy is needed.	Yes	51 (52.6)	46 (47.4)	0.48	1.17 [0.75-1.8]
		No	184 (48.2)	195 (51.5)		
10	Know where Empathy is needed.	Yes	101 (48.1)	109 (51.9)	0.621	0.913 [0.63-1.3]
		No	134 (50.4)	132 (49.6)		
11	I perceived the need to teach Empathy emphatically in MBBS.	Yes	218(48.2)	234(51.8)	0.03*	2.6 [1.06 – 6.4]
		No	17 (70.8)	7 (29.2)		

Association Of Factors with Low Empathy Scores: On multivariate analysis, several demographic academic variables were found to be significantly associated with low empathy scores. Batch: Students from higher batches (3rd year,4th year and interns) were more likely to exhibit to low empathy compared to 1st year students (OR = 2.9, 95% CI = 1.85–4.68, $p < 0.01$). Age: Student aged ≥23 was more prone to lower empathy than those aged ≤21 years (OR = 2.9, 95% CI = 1.63–5.1, $p < 0.01$. Other factors such as career choice, having doctor parents, nativity (rural/urban), current residence, and experience of apathy from doctors did not show a statistically significant association with low empathy scores ($p > 0.05$).

Age and Perceived need for Empathy Training: These factors were not significant for predictors of low empathy scores ($p > 0.05$).

Table 3: Determinants of Low Empathy Score (Binary Logistic Regression)

Factor	P Value	Odds Ratio (OR)	95% Confidence Interval
Gender (Male vs. Female)	0.001*	0.32	0.168 – 0.64
Batch (Higher vs. Lower Year)	0.026*	2.78	1.13 – 6.87
Age (Higher vs. Lower)	0.384	1.44	0.63 – 3.2
Perceived Need for Empathy Learning (No vs. Yes)	0.211	2.1	0.64 – 7.5

Note:

- OR > 1: Higher odds of low empathy (risk factor)
- OR < 1: Lower odds of low empathy (protective factor)
- *p < 0.05 indicates statistical significance

IRI scale divided people into two groups based on their empathy level. The group with low empathy had a mean score of 70.09 ± 12.17, and there were 235 people in this group. The high empathy group had a mean score of 103.09 ± 8.06, with 234 people in it. This shows a big difference between the two groups.

Girl students always got better scores than boy students in every area of empathy. First-year students showed much higher empathy scores than students in later years, which suggests that empathy tends to decrease as medical students progress through their training.

Students who are 23 years old or older were more likely to have lower empathy compared to those who are 21 years old or younger (OR = 2.9, 95% CI = 1.63–5.1, $p < 0.01$)

Figure 1: Odds Ratio comparison of low empathy scores

Note:

- OR > 1 = Higher odds of low empathy (risk factor).
- OR < 1 = Protective factor (lower odds of low
- empathy).
- Peaks (e.g., Factor 1, 3, 11) = Strong associations
- with increased risk.

Low dip (e.g., Factor 2) = Strong negative association (protective effect).

DISCUSSION

The present study assessed empathy levels among undergraduate medical students in a teaching medical college in Central Odisha, India, using the Interpersonal Reactivity Index (IRI).[6] The overall mean empathy score (87.54 ± 13.9) indicated a moderate level of empathy among participants. Consistent with the previous studies, female students demonstrated significantly higher empathy scores cross all domains compared to males, aligning with global findings that suggest women tend to exhibit stronger empathetic concern and perspective taking abilities than men.[21,24]

Empathy scores were seen reducing with increasing academic year, as first year students displayed higher scores than those in later batches. This downward trend reflects results reported by Hojat et al,[9] and Neumann et al,[3] who observed significant empathy decline during the clinical phase of medical training , often attributed to academic stress, emotional detachment and increased clinical involvement. Conversely, some longitudinal studies, such as Carrard et al,[22] have reported stable or improved empathy levels with targeted training, underscoring the influence of institutional learning environments and curricular design. Gender and academic year emerged as significant predictors of lower empathy scores. Similar patterns have been documented in prior studies across broad spectrum of circumstances, where effective empathy tends to be wane during clinical exposure.[9,3,22] The results highlight the necessity of carefully thought-out empathy-enhancement treatments in medical undergraduate programs.

Limitation: The cross-sectional, single-institution study's practical applicability and casual inference are limited. The Interpersonal Reactivity Index (IRI) was used to self-report empathy; response bias and social desirability may have affected the findings.[6]

CONCLUSION

The present study showed that empathy levels are moderate among medical students, higher empathy levels among female and junior students than their subordinates. Empathy was found to decline with more in advancing academic years of their education/training, identifying the potential impact of clinical exposure and training stress responsiveness on emotional basis. These findings show us the need to integrate more structured, reflective, and experiential learning approaches into the medical program to preserve and improve empathy throughout undergraduate years. Various studies like longitudinal and interventional studies are recommended to evaluate the long-term effectiveness of empathy promoting planned programs in medical education system.

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