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Self-assessed affective and cognitive empathy and it's predictors among medical students in a private institution in Malaysia

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ABSTRACT

Background: Empathy is considered a vital social and interpersonal skill that allows people to communicate their needs, wants, and experiences with one another. It also acts as an emotional bridge to encourage prosocial behaviour. The study aimed to assess the level of affective empathy and cognitive empathy of medical students and the predictors that influence the varying degrees of each type of empathy among medical students in a private medical institution in Malaysia.

Methods: The cross-sectional study was conducted in 2024. The respondents were recruited by convenience sampling method and data was collected with online questionnaires. The questionnaire included demographic variables and the Interpersonal Reactivity Index (IRI). Descriptive and inferential analyses were conducted by using SPSS (version 29) and P-value < 0.05 was considered statistically significant.

Results: A total of 154 students participated in this study. The association between the level of affective, cognitive, total empathy and factors such as gender and previous exposure to empathy workshops/talks were statistically significant (P < 0.05). Age, ethnicity, nationality, year of study, family income, and number of siblings were deemed not significant in regard to the level of empathy.

Conclusion: From this study, it is evident that women have higher levels of affective, cognitive, and total empathy compared to men. Moreover, those who have had previous exposure to empathy-related workshops/talks also cause an individual's levels of empathy to be higher.

Keywords: *Empathy, Affective, Cognitive, Medical students, Malaysia*

INTRODUCTION

The concept of empathy is a complicated and complex construct. Empathy is a multifaceted emotion and is often intermingled with terms such as sympathy and compassion, it is rather difficult to distinguish it as a unitary construct (Bruce, 2022). In 1873, Robert Vischer, a German philosopher, coined the term "Einfühlung" which directly translates to "feeling into" and depicts the ability to project oneself into another individual's body or environment to understand the life and environment of another person (Ganczarek, Hünefeldt and Olivetti Belardinelli, 2018). In recent works, empathy has been regarded as a link between being aware of the thoughts and emotions of others, vicariously experiencing them as their own, and responding to others in a kind, caring, and supportive way (Dvash and Shamay-Tsoory, 2014). Empathy is also described as a reaction of a person to observe experiences of another individual (Davis, 1983).

Cognitive empathy (CE) and affective empathy (AE) were often deemed interrelated as they seemingly possess similar qualities. Cognitive empathy is described as the type of empathy that demonstrates the ability to comprehend someone's feelings and to see things from their perspective. It is viewed as a conscious attempt to get "inside" someone's mind or intentionally try to form a connection with someone through intellectual efforts. Therefore, an individual displaying cognitive empathy actively participates in stepping out of one's feelings and into the experiences of another person by means of equipping the intellect (Dvash and Shamay-Tsoory, 2014). This system is highly complex as it involves higher cognitive functions. It was found that patients with ventromedial prefrontal (VM) lesions have severely impaired cognitive empathy which suggests that the VM may be the dominant site for the processing of this system(Shamay-Tsoory, Aharon-Peretz and Perry, 2009).

Affective empathy, also known as emotional empathy, is regarded as a group of relatively instinctive processes through which perceived social cues trigger an emotional response in a person that is shared with the person being observed. It is suggested that simply observing another's emotions can trigger the same brain mechanisms that cause one's own emotional experience, as well as the automatic activation of the motor response associated with the specific emotion because affective empathy is the induction of analogous emotions and respectively related behaviours in the observer (Shamay-Tsoory, 2011). This state-matching reaction is depicted in the stimulation theory and the mirror neuron system (MNS) which is a system involved in the inferior frontal gyrus (IFG) of the brain. Hence, it is believed that the ability to feel affective empathy is generated in this domain of the brain (Shamay-Tsoory, Aharon-Peretz and Perry, 2009).

Physicians from all over the globe value empathy as a pivotal aspect of healthcare, which is firmly bridged with more satisfied patients. The noble value of empathy displayed by doctors towards their patients is paramount to breaking bad news, to aid the patient in coping with an illness or health event (Rosenzweig, 2012). In the clinical context, empathy is a very strong and effective tool that enhances patient outcomes by reducing fear, fostering trust, and easing tension. Research has demonstrated empathy and compassion to relate to improved adherence to drugs, lower malpractice lawsuits, fewer blunders, and increased patient satisfaction. The ideal value of empathy serves as immunity against mental and psychological discomfort in medical and dental students, physicians as well as healthcare providers (Ardenghi et al., 2021). Therefore, empathetic communication increases humanism in healthcare (Stone, 2019).

A study conducted in Brazil compared the level of affective and cognitive empathy among university students from the health field, exact sciences, and humanities (Santos et al., 2023). In that study, students

of the health field recorded higher levels of total empathy compared to students of the exact science and humanities studies. Students in the health field also recorded higher levels of affective empathy compared to students of other programmes. This is believed to be so due to students in the health field tend to have more encounters with attitudes and actions that prioritise respecting and being considerate towards the needs of others as part of their curriculum centering around patient treatment and care. The students of the exact sciences were noted to have higher levels of cognitive empathy in contrast to those in the health and humanities studies. Which might be attributed by the nature of their academic course, the exact sciences are constantly engaging in disciplines and activities that require the development of knowledge (Santos et al., 2023).

Another study conducted among Chinese freshmen college students revealed that females scored higher on empathy than males. Furthermore, depressive symptoms among the respondents were negatively correlated with cognitive empathy and positively associated with affective empathy (Zhang et al., 2021). Empathy was also found to be developed throughout the study years. Among Portuguese medical students, final-year students exhibited better empathy scores than first-year students (Magalhães et al., 2011). The findings are consistent with previous studies conducted with 6-year undergraduate medical programmes using Japanese and Korean versions of the instrument(Kataoka et al., 2009).

Although previous studies have been conducted on the affective and cognitive empathy of medical and dentistry students across the globe, however limited literature on empathy in Malaysia setting to the best of our knowledge to demonstrate the degree of these traits and predictors of empathy. Therefore, this study aimed to assess the level of affective empathy and cognitive empathy of students and the associated factors that influence the varying degrees of each type of empathy among medical students in a private medical institution in Malaysia.

METHODS

Study design and study population

This cross-sectional study was conducted from January to February 2024. Study participants were recruited from the institution from the first year till the fifth year of the medicine program, regardless of nationality.

Sample size and sampling

The sample size for this study was calculated by using Open EPI (OpenEpi Version 3.01). The sample size was calculated based on the final year students' empathy score (Female: mean 22.05, SD 4.03, and Male: mean 19.53, SD 4.51, with 95% confidence interval and 90% power (Quince et al., 2016). While taking into consideration of 10% non-response rate, the final sample size calculated was 134 for this study. The respondents were recruited by using a non-probability sampling technique, convenience sampling.

Study Instrument

The study instrument consisted of demographic characteristics and Interpersonal Reactivity Index (IRI) (Davis, 1983). The demographics included gender, age, ethnicity, year of study, study programme,

previous exposure to empathy-related workshops/talks/education, family income, nationality, and number of siblings. Interpersonal Reactivity Index is a self-report instrument consisting of 28 items. The IRI is a tool used to assess the levels of affective and cognitive empathy as part of the construct of empathy. There are four subscales in IRI and each subscale is composed of seven items with scores ranging from 0-28. The four subscales are the "perspective taking", "fantasy scale", "empathic concern" and "personal distress".

Cognitive empathy included the "perspective taking" (PT) subscale and the "fantasy scale" (FS) subscale. "Perspective taking" subscale was used to measure the propensity to spontaneously take on the psychological viewpoint of others and it consisted of 7 items in which two are reverse items (Items number 3 and 15). "Fantasy scale" subscale was employed to assess inclinations to transpose oneself into the thoughts, emotions, and deeds of fictional characters in plays, movies, and books and had seven items in which two were reverse items (Item number 7 and 12). The affective component of empathy included the empathic concern (EC) subscale and "personal distress" (PD) subscale. The "empathic concern" subscale evaluated "other-oriented" emotions and worries for disadvantaged people and had seven items in which three were reverse items (Items number 4,14 and 18). The "personal distress" subscale gauged "self-oriented" emotions of discomfort and negative activation in emergencies and challenging interpersonal circumstances. It contained seven items in which two were reverse items (Items number 13 and 19).

The 28 items in the IRI were rated on a five-point Likert scale ("Does not describe me at all" to "Describes me very well"). Specific scores were allocated for each description in the five-point Likert scale while the scores were reversed for the reverse items. The description "Does not describe me at all" is allocated 0, "Does not describe me well" was given 1 point, "Neutral" was given 2 points, "Describes me well" is given 3 points, and "Describes me very well" was given 4 points. These scores were reversed for the reverse items. The maximum score obtained in each subscale is 28 points while the minimum was 0. Hence the range of scores that could be obtained by each participant in total is 0-112. Upon obtaining the scores, the total scores of all items were regarded as the level of empathy in general. The PT and FS scores were added up to find out the level of cognitive empathy and the EC and PD scores were added up to obtain the level of affective empathy in every participant (Davis, 1980).

Data collection

A google form was used to collect the data where a survey link was shared to friends, family members, this in turn circulated among their circle until the number of participants needed is achieved. The online survey link was shared via social media, WhatsApp, and Instagram.

Data processing and analysis

The demographic variables of the respondents were analysed with descriptive statistics frequency, mean and standard deviation. Each of the subscales of two main domains (CE and AE) along with Total empathy scores from the respondents was summed up and reported with the mean and standard deviation value. Furthermore, the association between CE and AE with the factors listed were analysed and reported with the mean and standard deviation value by using an independent sample T-test and one-way ANOVA. SPSS (Statistical Package for the Social Sciences, version 29) was used for analysis of the statistical data obtained where the level of statistical significance was 0.05.

Ethical consideration

An information sheet with all relevant and significant study facts were provided to the participants prior to responding to the questionnaire. Informed consent was obtained by the participants prior to responding to our questionnaire, where their approval was requested. Ethical approval for conducting this study was granted from the Research Ethics Committee, Manipal University College Malaysia (MUCM), Malaysia.

RESULTS

Table 1 shows demographic and socioeconomic characteristics of the respondents (n=154). 60.4% of the respondents are aged between 18-22 years old. Comparing the gender of the respondents, where 60.4% were male and 39.6% of the respondents were female. According to the study, the majority of the respondents (69.5%) were from year 4. 39.0% of respondents have previous exposure to empathy workshops/talks while 61.0% has no previous exposure to empathy workshops/talks (Table 1).

Table 1: Sociodemographic factors of respondents (n=154)

Variable	Frequency (%)
Age	
18-22 years	93 (60.4 %)
>22 years	61 (39.6%)
Gender	
Male	93 (60.4 %)
Female	61 (39.6%)
Ethnicity	
Malay	9 (5.8 %)
Chinese	40 (26.0 %)
Indian	81 (52.6 %)
Others*	24 (5.6 %)
Nationality	
Malaysian	140 (90.9 %)
Non-Malaysian	14 (9.1%)
Study year	
1st Year	9 (5.8 %)
2nd Year	3 (1.9 %)
3rd Year	30 (19.5 %)
4th Year	107 (69.5 %)
5th Year	5 (3.2 %)
Family Income	
< RM 4,849	30 (19.5 %)
RM 4,850 - RM 10,959	58 (37.7 %)
RM 10,960 or more	66 (42.9 %)
Number of siblings	
No siblings	20 (13.0 %)
Having sibling(s)	134 (87.0 %)
Previous exposure to empathy workshops/talks	
Yes	60 (39.0 %)
No	94 (61.0 %)

*Other ethnicities include Punjabi, Javanese, Dusun, Kadazan, Eurasian

The empathy scores were analysed, and the mean and standard deviation of affective empathy was 32.40 (6.15), cognitive empathy was 33.81 (7.28) and total empathy was 66.21 (12.17). Table 2 presents factors associated with cognitive empathy among the respondents. Among the factors, gender and previous exposure to workshops/talks regarding empathy were found to be significantly associated with the cognitive empathy level. Gender wise, males displayed a mean score of 31.41(SD=6.26) whereas females displayed a mean score of 35.37(SD=7.50), producing a negligible mean difference of 0.40(95%CI of 1.68,6.26) with a p-value of <0.001. Similarly, respondents who had precious exposure to workshops/talks regarding empathy in the past had a mean score of 36.38(SD=6.91), and those who

did not have previous explore had 32.16(SD=7.06), with a mean difference of 4.02(95%CI 1.95,6.50), and p-value <0.001 (Table 2).

Table 2: Cognitive empathy and the associated factors among the respondents (n= 154)

Socio demographic Variable	Mean (SD)	Mean difference	95% Confidence interval	P
Age				
18-22 years	34.12(7.39)	-	-	0.732
>22 years	33.33(7.14)	0.71	-1.57,3.15	
Gender				
Male	31.41(6.26)	-	-	0.001
Female	35.37 (7.50)	0.40	1.68,6.26	
Ethnicity				
Malay	35.33(12.12)	-	-	0.084
Chinese	33.10(5.98)	-	-	
Indians	33.01(5.27)	-	-	
Others	37.08(5.27)	-	-	
Nationality				
Malaysian	33.89(7.21)	-	-	0.605
Non-Malaysian	33.00(8.11)	0.89	-3.91,5.68	
Study Year				
Year 1	31.00(10.40)	-	-	0.411
Year 2	34.000(3.61)	-	-	
Year 3	32.17(6.68)	-	-	
Year 4	34.53(7.22)	-	-	
Year 5	33.00(6.74)	-	-	
Family income				
< RM 4,849	32.47(7.95)	-	-	0.276
RM 4,850 - RM 10,959	34.93(7.43)	-	-	
RM 10,960 or more	33.42(6.78)	-	-	
Number of siblings				
No Siblings	32.35(9.15)	-	-	0.097
Having sibling(s)	34.02(6.97)	-1.67	-6.09,2.74	
Previous exposure to empathy workshop/talks				
Yes	36.38(6.91)	-	-	0.001
No	32.16(7.06)	4.22	1.95,6.50	

Table 3 presents the affective empathy and its predictors among the respondents. Gender and precious exposure to workshops/talks regarding empathy were found to be significantly associated with the respondent's affective empathy level (Table 3).

Table 3: Affective Empathy and the associated factors among the respondents (n= 154)

Socio demographic Variable	Mean (SD)	Mean Difference	95% Confidence interval	P
Age				
18-22 years	32.68(6.40)	-	-	0.685
>22 years	31.98(5.94)	0.69	-1.30,2.69	
Gender				
Male	29.90(5.27)	-	-	
Female	34.04(6.26)	4.14	2.29,6.06	<0.001
Ethnicity				
Malay	35.33(12.12)	-	-	0.355
Chinese	33.10(5.98)	-	-	
Indians	33.01(5.27)	-	-	
Others	37.08(5.27)	-	-	
Nationality				
Malaysian	33.89(7.22)	-	-	0.575
Non-Malaysian	33.00(8.12)	-0.02	-3.43,3.37	
Study Year				
Year 1	4.51 (1.68)	-	-	0.857
Year 2	5.13 (1.79)	-	-	
Year 3	5.26 (1.86)	-	-	
Year 4	5.80 (2.12)	-	-	
Year 5	30.60(6.11)	-	-	
Family Income				
< RM 4,849	32.47(7.95)	-	-	0.461
RM 4,850 - RM 10,959	34.93(7.43)	-	-	
RM 10,960 or more	33.42(6.78)	-	-	
Number of siblings				
No Siblings	32.35(9.15)	-	-	0.678
Having sibling(s)	34.02(6.97)	-	-	
Previous exposure to empathy workshops/talks				
Yes	36.38(6.91)			
No	32.16(7.06)	3.30	1.33,5.27	<0.001

The respondents' total empathy score and the associated factors are presented in table 4. Similar to the previous findings, gender and precious exposure to workshops/talks regarding empathy were found to be significantly associated with the respondent's total empathy level (Table 4).

Table 4: Total Empathy and the associated factors among the respondents (n= 154)

Socio demographic Variable	Mean (SD)	Mean difference	95% Confidence interval	P
Age				
18-22 years	66.80(12.41)	-	-	
>22 years	65.31(11.84)	1.48	-2.45,5.42	0.955
Gender				
Male	61.31(9.83)	-	-	
Female	69.42(12.53)	8.11	4.35,11.85	<0.001
Ethnicity				
Malay	70.67(19.30)	-	-	
Chinese	65.08(11.37)	-	-	
Indians	64.99(12.42)	-	-	
Others	70.54(8.08)	-	-	0.144
Nationality				
Malaysian	33.89(7.21)	-	-	
Non-Malaysian	33.00(8.16)	0.86	-6.56,8.27	0.77
Study Year				
Year 1	64.56(16.40)	-	-	
Year 2	67.67(7.57)	-	-	
Year 3	63.83(11.66)	-	-	
Year 4	67.09(12.11)	-	-	
Year 5	63.60(12.10)	-	-	0.714
Family Income				
< RM 4,849	65.33(13.25)	-	-	
RM 4,850 - RM 10,959	67.91(12.67)	-	-	
RM 10,960 or more	65.11(11.20)	-	-	0.402
Number of Siblings				
No Siblings	65.45(12.78)	-	-	
Having sibling(s)	66.43(12.46)	-0.98	-6.55,4.56	0.655

Previous exposure to empathy workshops/talks				
Yes	70.80(11.93)	-	-	
No	63.27(11.45)	7.52	3.68,11.37	<0.001

DISCUSSION

This cross-sectional study was conducted among undergraduate medical students to assess the level of empathy among medical students. In this study, the total mean score based on the table for affective empathy is 32.40 and the value for standard deviation was 6.15. For cognitive empathy, the total mean score was 33.81 and the standard deviation was 7.28. The total mean score for total empathy for our study was 66.21 and the standard deviation value is 12.17. Based on a previous study on the mediating role of cognitive and affective empathy in the relationship of mindfulness with the engagement of nursing with a sample size of 1268 nurses in Spain which was done by IRI questionnaire, proves that the mean score for affective empathy was 13.36 and the standard deviation value was 3.02, whereas for cognitive empathy, the total mean score from this study was 19.36 and the value for standard deviation is 2.36. The value is lower than our study because the total mean score was taken and measured by the level of mindfulness which is the independent variable that influences cognitive and affective empathy. Thus, the factor in calculating the mean score was different than our study (Pérez-Fuentes et al., 2020).

Another study was conducted in New York University to investigate the balance between feeling and knowing affective and cognitive empathy which was done by IRI questionnaire with a sample size of 38 students. The mean score for affective empathy was 20.1 and the standard deviation was 4.5. For cognitive empathy, the mean score was 19.6 and the standard deviation value was 3.8 which is nearly similar to our study. For total empathy, the total mean score was 39.70, and the standard deviation was 0.41 (Cox et al., 2012). The total empathy value of the previous study is lower than our study because the sample size is differing in the previous study and the associated factor in the study is different.

Our cross-sectional study found out a significant association between cognitive empathy, affective empathy, and total empathy with gender. As per our collective findings, female medical students from the MBBS programme scored significantly greater male medical students. These gender disparities had taken place at all phases throughout the MBBS course. Our cross-sectional study successfully showcased our constant findings correlating with some studies that gender disparity, giving backing to women, prevails in conjunction with empathy (Elkin et al., 2021). According to a study done in the School of Medicine of Nuevo Leon, Mexico, the results showcased that woman had much greater empathy scores than men implying that female doctors may provide a different style of medical treatment. It has been reported that women are more sensitive to emotional cues than men, and that they dedicate more time and preventive care to their patients (Luna et al., 2022).

Another cross-sectional study was executed in a medical school in Iran, stating that the students' mean responses to items did not support the hypothesis, despite female students scoring slightly higher than males (Rahimi-Madiseh et al., 2010). Furthermore, previous exposure to empathy workshops/talks was significantly associated with cognitive, affective, and total empathy. These findings demonstrate that we cannot overlook the impact of empathy workshops/talks on students' empathy levels, and that

additional research, reflecting the entire population and contrasting to a control group, is warranted. An observational study done in Malaysia among first-year medical students describes self-reported empathy levels in first-year medical students in Malaysia before and after a 2-hour workshop on empathy. The results indicated that empathy levels improved significantly in the cohort, albeit mostly in female students, after the workshop. Whether the workshop was responsible for this increased level of empathy is difficult to determine, but previously published workshop-based activities have also suggested an improvement, indicating possible benefits from this form of teaching and learning (Williams et al., 2014).

Level of the empathy might change according to the year of study. According to a longitudinal study done in Maryland, USA determined that medical students' empathy swings throughout their undergraduate medical education, with empathy rising at the very beginning of the medical training, dipping to a low level in Year 3 of a 5-year MBBS degree, and then rebounding again in Years 4 and 5 (Mahoney, Sladek and Neild, 2016). Another study conducted in a medical school in Peshawar, Pakistan found that the empathy characteristic diminishes as we proceed through a medical school until the fourth year, at which point it improves slightly in the final year (Baig et al., 2023). This could be ascribed to the increased patient-student engagement during ward visits. The decline in empathy levels could be explained by a loss of idealism, a high level of stress, and a scarcity of outstanding role models. However, there is an improvement in empathy levels in the final year from the fourth year, but this is still lower than that of students in the first year. Students may have developed more compassion as they advanced in their education even despite the insignificant result of our study.

An assortment of internal and external factors can influence empathy. Some interventions have been demonstrated to not only stop the decline but even boost empathy. Promising tools include standardised patients (SP) and role-play activities. Exposure to patients' narratives and personal simulations in medical students' training sessions could enhance affective empathy among healthcare students (Beach, 1999). As with physical examination curricula, students who just get bedside instruction do poorly on Objective Structured Clinical Examinations than those who additionally participate in a clinical skills curriculum. We recommend a lecture and case-based approach that introduces students to a range of scenarios they may encounter in the hospital. There is substantial evidence that simulations, whether virtual or conducted by qualified personnel, are useful in enhancing student learning. Empathy, which is frequently necessary during a patient's most vulnerable times, is best developed in these mimicked contexts. In physical examination, this simulation enables the reproducibility and standardisation of learning opportunities in a student-centred environment. While both SPs and peer role-play exercises can improve empathy, the use of SPs may be the best strategy for providing formative feedback and reliable assessments of empathy. Role-playing can be beneficial since it allows students to comprehend both the patient and the physician (Moudatsou et al., 2020). The majority of institutions in the United States of America begin physical examinations within the first two months of education. Empathy training should be commenced at the same time and kept going to allow the students to improve their ability to empathise (Iman, Annemarie and Ian, 2017). Therefore, including empathy and compassion training in the healthcare programme curriculum could enhance their empathy in further management of the patients (Patel et al., 2019).

Strength and limitation

This research has a couple of strengths. This is the first study of the Level of affective, cognitive, and total empathy among undergraduate medical students to be performed in Malaysia whereas all others were done in foreign countries such as Scotland, the UK, Brazil, and many more. In addition, the data collected from the respondents were through a validated questionnaire (IRI- Interpersonal Reactivity Index) thus producing reliable findings and interpretations.

There were some limitations during the conduct of our study. Firstly, all the data collected were from undergraduate medical students in a single institution only thus this study cannot be generalised to other populations or settings as it might be inaccurate. This was a cross-sectional study and therefore we could only observe them at one point of time thus not enabling us to form a definitive cause-effect or even temporal relationship. Moreover, participation from preclinical year students was significantly lower than participation from clinical year students. This is because the preclinical students are in different states, where we could only find close contacts to send them the questionnaire.

Conclusion

With the rising importance of empathy in the healthcare sector, in order for increased efficiency and delivery of treatment with hopes of the best outcome for patients, this research was done to measure the level of affective and cognitive among undergraduate medical students. Their levels are associated with multiple factors such as gender and exposure to previous workshops/talks on empathy. From this research, we have found that females have a higher level of empathy (in both domains of empathy) than males. On the other hand, exposure to previous workshops/talks on empathy also played a role where students who attended it had higher levels of empathy compared to those who did not. Except for these two factors, no other independent variables were statistically significant in this study. However, this should not be stopped here as further research should be done extensively in a different setting and number of students. In conclusion, a high level of empathy is of utmost importance for medical students while treating and consulting patients, thus a practical approach should be constructed to improve the empathy levels of male students and more workshops/talks should be organised in the respective institutions.

Based on our study, we have clearly revealed that the levels of affective, cognitive, and total empathy are different only with gender and exposure to previous workshops/talks on Empathy. Students who have exposure to previous workshops/talks on empathy have statistically higher levels of empathy because of the acquired knowledge, understanding, and ability on how to accept this complex skill through the workshop/talk. Despite that a clear and validated study for this theory has yet to be performed same as to why females generally have higher levels of empathy (Affective, cognitive, and total empathy) has, thus it is recommended for future research to be done on that for a better understanding with a larger the sample size which can enable the researcher to generalise it to the population. It is also recommended to organize a workshop/talk on empathy in the respective institutions. In addition, empathy training should be embedded and incorporated into the healthcare programme curriculum.

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