Empathy level among Saudi medical students using the Toronto empathy scale

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Abstract

Background: Empathy is a crucial component of professionalism in medicine, having a solid relationship with improved patient outcomes. The current study aims to examine the factor structure of the Toronto Empathy Questionnaire (TEQ) with a sample of Saudi medical students and to assess the differences in empathy scores by gender, year of study, and future career preference.

Methods: A cross-sectional study was performed using anonymous self-administered online questionnaires. The study tool targeted a random sample of medical students in public and private Saudi medical schools in five regions (North, South, East, West, and Central) of Saudi Arabia.

Results: 941 Saudi medical students enrolled in the study. 52.3% were male students, and 30.6% of the students were from the central region of Saudi Arabia. The most desired specialties were general surgery (19.2%), internal medicine (12.5%), and family medicine 8.2%. The average TEQ score was 42.31%, with 67.1% scoring low to average empathy levels. About one-third (32.9%) scored high empathy levels; females scored a higher average on the empathy score compared to males (43.48 vs. 41.24) P-value <0.001. The never-married students also scored higher empathy than married students 42.53 vs. 38.78) P-value <0.00. The region with the highest empathy scores was the central province, 44.72%.

Conclusion: Different factors could influence empathy scores, such as gender, marital status, GPA, and study year. Female students had a higher empathy score compared to male students. Senior medical students scored lower on the scale than younger students, and could be associated with a higher level of burnout. Further empathy-based discussions should be inserted into the Saudi medical curricula.

Keywords: professionalism, Toronto empathy scale, medical students, Saudi Arabia.

Introduction

Empathy is a crucial component of professionalism in medicine, having a solid relationship with improved patient outcomes (1–3). The leading indicator of an excellent physician is clinical skills and a good character, with empathy as the main element (4,5). Empathy is the "objective awareness of and insight into other people's feelings, emotions, and behavior and their meaning and significance" (6,7). Based on the available literature, empathy is significantly related to patient outcomes, better compliance, clinician and patient satisfaction, and reduced medical-legal difficulties or litigation (8). The revised Kuwaiti medical curriculum for undergraduates includes several educational training sessions on communication skills and ethics, aiming to develop an excellent doctor-patient relationship, training that is expected to guarantee pre-graduates not only have clinical skills but also an emotional capacity to connect them with their patients, such as, what is the patient-facing and going through, and to optimize the feeling of comfort for the patients with a bad prognosis (9). Maternal bonding and their personality impact the level of empathy of medical students and are equally important (10–12). Studies have shown that Doctor's empathy for patients improves patients' gratification, well-being, and trust (13,14). Doctors who established good trust with their patients were found to have very cooperative patients who would be more open to giving detailed information about their condition, thus enabling a better clinical diagnosis and having the patients more involved in the decision-making (15,16). Empathy given by doctors to patients would make them believe in their ability to cope in a specific situation, thus facilitating adherence to their therapy (17,18).

Doctors being empathic with their patients and making them feel better can be therapeutic (19,20). Four schools in the UK and one in New Zealand scored an average response of 55% (n=652) for fresh students who started medical school and 48% (n=487) for senior students in their final years; students revealed no significant differences in the level of empathy scores for students reaching the last years of their medical school with new students who are just starting. On the other hand, the gender variable showed a significant empathy score, with females outperforming males in the scoring (21). In a recent study published in 2020 by Sadia Riaz in Lahore-Pakistan, they reported a statistically significant link between the levels of empathy and their academic year, a significant difference in mean empathy scores between first and third-year students, the fourth and second-year students, fourth-year and third-year students, and fourth-year and final-year students. Gender was also substantially related to empathy, with women having higher mean Toronto Empathy Questionnaire (TEQ) scores than males. The permanent residence of students and their relationship with empathy were also significant (22).

As future medical leaders, empathy levels have been the focal point of instructional activities and educational efforts (23). However, no previous studies have evaluated the empathy levels of Saudi medical students. The current study aims to examine the factor structure of the TEQ with a sample of Saudi medical students and to assess the differences in empathy scores by gender, year of study, and future career preference.

Methods

Study design and setting:
This was a cross-sectional study of a random sample of medical students in public and private Saudi medical schools in five regions (North, South, East, West, and Central) of Saudi Arabia, using the Toronto Empathy Questionnaire (TEQ) to determine empathy levels among students. TEQ scores were calculated. We evaluated the association between the mean Toronto empathy score and sociodemographic variables.

Study subjects:
Inclusion criteria: Medical students in public and private Saudi medical schools from all regions of Saudi Arabia (North, South, East, West, and the center).
Exclusion criteria: Post-graduate students and incomplete questionnaires.

Sample size:
The sample size was estimated using the sample size formula, assuming that 50% is the response distribution, 95% confidence level, and 5% margin of error, resulting in a sample size of 379.

Data collection methods, instruments used, measurement, and sampling technique:
An electronic questionnaire was sent to Saudi medical students using the SurveyMonkey. Toronto empathy questionnaire (TEQ) was included with additional sociodemographic variables that were part of the questionnaire to determine the association between it and the sociodemographic variables.

Data Management and Analysis Plan:
Means and standard deviations were used to describe continuous variables and the frequencies and percentages for categorically measured variables. Histograms and the Kolmogorov-Smirnov test were used to assess the statistical normality assumption of the continuous variables, and the Levine test of equal variance for determining the homogeneity of variance assumption of continuous variables across categorically measured variables. The Cronbach's alpha test was used to assess the reliability of measured constructs/scales. The TEQ score was calculated by adding the student's perceptions to the sixteen indicators after reverse-coding the negatively worded statements within the questionnaire. The Independent samples t-test and the one-way ANOVA tests were used to test the statistical significance of mean differences in the total empathy score across the levels of categorically measured variables. Multivariate linear regression analysis assessed combined and individual associations between medical students' measured sociodemographic and academic characteristics with their mean perceived empathy score. Associations between

predictor variables with the analyzed outcome were expressed as the Beta coefficient with its associated 95% confidence interval. The IBM SPSS Statistical computing program Version 21 was used for statistical data analysis, and alpha significance was considered at the 0.050 Level.

Results

Nine hundred and forty-one (941) Saudi medical students enrolled in the study and completed and returned the online survey. Table 1 displays the medical students sociodemographic and academic characteristics of medical students. More than half (52.3%) of the students were males, and the majority never married. About one-third (30.6%) of them resided in the Central Province of Saudi Arabia. Around half (46%) were senior medical students.

Medical students were asked to indicate their desired general future specialty, and the findings showed that 24.9% dreamed of being medical specialists. However, most of them wanted general surgical specialties. Figure A shows the medical students desired future subspecialties; it is evident that most of them preferred general surgical specialties. However, many chose other subspecialties, including dermatological and neurological subspecialties, emergency medicine, psychiatry, pediatrics, and ophthalmology. On the contrary, few medical students preferred to specialize in urology, radiation oncology, physical and Rehabilitation, and preventive and nuclear medicine. The academic GPA achievement scores were as follows: 2.3% of the students had a GPA <=2.99 points, another 19.2% of them had a GPA between 3-3.99 points, and 27.9% had a GPA of between 4-4.49 points but 23.4% of them had a GPA between 4.50-4.74 points and 27.1% had a GPA >=4.75 out of five points.

The Cronbach's alpha test of internal consistency showed that the TEQ was read, understood, and rated equally reliably by the Saudi medical students, Cronbach's alpha= 0.76.

Table 2 displays the medical student's perceptions of the indicators of empathy measured by the Toronto Empathy Questionnaire. The column is labeled. The rank denotes the descending rank (from the highest mean score to the minor mean score) for the TEQ indicators. The top perceived indicators of empathy of medical students were: Enjoying making others happy (mean score = 3.37/4), then feeling upset to see someone being treated with disrespect (mean score = 3.27/4), and getting a strong urge to help others when seeing someone else upset (mean score= 2.69/4) then feeling protective over others who are taken advantage of (mean score =2.56/4) then getting excited when seeing other persons excited too (mean score = 2.55/4).

On the contrary, the lowest perceived indicators of empathy by the medical students were the following: Not feeling pity for others who are maltreated (mean score = 1/4), then steering the conversations away toward other subjects when friends talk about their problems (mean score = 1.16/4), and remaining unaffected when someone else who is close to them is unhappy (mean score = 1.19/4) then finding it silly to see people cry out of happiness (mean score = 1.25/4) and disinterest in how others feel (mean score = 1.29/4). However, the remainder of indicators of empathy (lack of sympathy for people who cause themselves illness, lack of affection for people's misfortunes, and feeling irritated by other's tears and crying as well as finding oneself in tune with others' moods as well as tenderness toward the misfortune people) were rated midway between these top and bottom perceived empathy indicators.

The overall Toronto Empathy scale score of medical students was measured with a mean score of 42.31/64 points, SD= 7.86 points, denoting a level of widespread substantial empathy perceived by medical students. When considering the median value for medical students (Median=43 points) as a value cut, the dichotomized medical students' empathy score showed that most of them, 67.1%, had low to moderate empathy levels, and 32.9% of them were considered to have relatively high levels of empathy.

The descriptive analysis of the student's overall perceived empathy score is shown in Table 3.

Table 4 displays the resulting bivariate analysis of the mean perceived empathy score across the levels of their demographic and academic characteristics. An independent t-test showed that female medical students had significantly higher empathy (Mean empathy = 43.48) than male medical students, p<0.001. Furthermore, the independent samples t-test showed that the never-married medical students perceived a significantly higher mean perceived empathy (mean empathy = 42.53) compared to medical students who were married (Mean score=38.78), p-value=0.001. Additionally, a one-way ANOVA test showed that the medical students residing in different Saudi Arabian provinces measured significantly different perceived empathy levels, f(4,936)=15.10, p-value<0.001, but a Bonferroni adjusted post hoc pairwise comparison test showed that medical students of the central regions had measured significantly higher mean empathy when pairwise compared to medical students residing in all other Saudi provinces, p<0.040 each respectively, also medical students perceived significantly higher mean empathy compared to those from Northern regions, p-value =0.001. Likewise, Western medical students had a significantly higher empathy score than those from the Northern provinces, p-value= 0.003. The medical student's study levels and years did not converge significantly on their mean perceived empathy score. Also, medical students' desired future general and subspecialties did not correlate significantly with their mean perceived empathy.

However, another one-way ANOVA test showed that the medical students' academic achievement was significantly correlated with their mean perceived empathy score, f(4,936)=4.60, p-value=0.001. However, a Bonferroni

adjusted post hoc pairwise test comparing the students with different GPA levels on their mean perceived empathy scores showed that medical students with a GPA >=4.75 had perceived significantly higher mean empathy compared to those with a GPA between 4.4 and 4.49 points, p-value= 0.004, also the medical students with a GPA >=4.75 had perceived significantly higher empathy compared to students with a GPA between 3-3.99 points, p-value =0.002. Moreover, the other pairwise comparisons between the other medical students with different GPA scores showed that these students might not differ significantly in their mean perceived empathy scores compared to pairwise.

The multivariate linear regression analysis is shown in Table 5. The medical student's sex had correlated significantly with their total empathy score. Male students perceived significantly lower mean empathy scores compared to females, with beta coefficient= —1.835, p<0.001. Furthermore, the medical students who were ever married perceived significantly lower mean empathy than their never-married peers, with a beta coefficient = -3.546, p-value =0.001. Moreover, the analysis model showed that medical students with a GPA academic achievement score between 4.75-5 points had measured significantly higher than the other medical students whose GPA was <=4.74 in general, with a beta coefficient= 1.736, p-value= 0.003. Additionally, the results of the multivariate analysis showed that the medical students residing in the eastern, western, northern, and southern Saudi provinces had significantly lower mean empathy than those living in the central Saudi Arabian region, p<=0.004 each, respectively. Not unexpectedly, junior medical students (preparatory year + first-year level) had a significantly lower empathy when compared to sophomore and senior medical students on average, with a beta coefficient = -1.434, p-value = 0.038.

	Frequency	Percentage
Sex		
Female	449	47.7
Male	492	52.3
Marital state		
Never married	886	94.2
Ever married	55	5.8
Living region		
Central Region	288	30.6
Eastern Provinces	195	20.7
Western Provinces	166	17.6
Northern Provinces	109	11.6
Southern Provinces	183	19.4
Study year		
Preparatory	51	5.4
1st Year	107	11.4
Second Year	144	15.3
Third Year	206	21.9
Fourth Year	140	14.9
Fifth Year	226	24
Interns & Graduates	67	7.1
Study Level		
Junior: preparatory 1st year	158	16.8
Sophomore: 2nd-3rd year	350	37.2
Senior: 4th-5th year	433	46
The intended future primary specialty		
Medical	234	24.9
Surgical	707	75.1
Intended future specialty		
Allergy and Immunology	15	1.6
Anesthesiology	15	1.6
Dermatology	70	7.4
Diagnostic Radiology	17	1.8
Emergency Medicine	60	6.4
Family medicine	77	8.2
Internal medicine	118	12.5
Medical genetics	10	1.1
Neurology	60	6.4
Nuclear medicine	1	0.1
Obstetrics and Gynecology	32	3.4
Ophthalmology	50	5.3
Other specialties	97	10.3
Pathology	11	1.2
Physical medicine and rehab	6	0.6
Preventive medicine	5	0.5
Psychiatry	55	5.8
Radiation Oncology	7	0.7
General Surgery	181	19.2
Urology	7	0.7
Academic GPA score		
2.99 or less	22	2.3
3 - 3.99	181	19.2
4 - 4.49	263	27.9
4.50 - 4.74	220	23.4
4.75 - 5	255	27.1

Table 1: Descriptive analysis of the medical student's sociodemographic and academic characteristics.

Table 2: Descriptive analysis of medical students' perceptions of the indicators of the Toronto empathy scale

	Mean	SD	Rank
1. When someone else is feeling excited, I tend to get excited too.	2.55	1.01	6
2. Misfortunes of other people do not disturb me a great deal	1.85	0.94	10
3. It bothers me to see someone being treated disrespectfully.	3.27	1.04	2
4. I remain unaffected when someone close to me is happy	1.19	1.07	14
5. I like to make other people feel better	3.37	0.91	1
6. I have tender, concerned feelings for people less fortunate than me	2.36	1.06	7
7. When a friend starts to talk about their problems, I try to steer the conversation towards something else	1.16	1.09	15
8. I can tell when others are sad even when they do not say anything	2.6	0.99	4
9. I find that I am 'in tune with' other people's moods	2.27	0.92	8
10. I do not feel sympathy for people who cause serious illnesses	1.42	1.13	11
11. I become irritated when someone cries	2.2	1.17	9
12. I am not interested in how other people feel	1.29	1.08	12
13. I have a strong urge to help when I see someone who is upset	2.69	1	3
14. When I see someone being mistreated, I do not feel very much pity for them	1	1.11	16
15. I find it silly for people to cry out of happiness	1.25	1.22	13
16. When I see someone being taken advantage of, I feel kind of protective toward them	2.56	1.04	5

Table 3: Descriptive analysis of the student's overall perceived empathy score

	Mean	SD
The total score of the Toronto Empathy questionnaire total score	42.31	7.86
Empathy score Level, n(%)		
Low to Average Empathy	631	67.1
High Empathy	310	32.9

Table 4: Bivariate analysis of the perceived total empathy score

	Mean (SD) -Perceived Empathy score	test statistic	p-value
Sex			
Female	43.48 (7.75)	**t(939)=4.40**	<0.001
Male	41.24 (7.81)		
Marital state			
Never married	42.53 (7.79)	**t(939)=3.45**	0.001
Ever married	38.78 (8.02)		
Living region			
		f(4,936)=15.1	
Central Region	44.72 (7.84)	**0**	<0.001
Eastern Provinces	42.37 (7.36)		
Western Provinces	42.06 (8.10)		
Northern Provinces	38.66 (6.79)		
Southern Provinces	40.86 (7.65)		
Study year			
Preparatory	42.69 (7.42)	**f(6,934)=1.60**	0.146
1st Year	41.69 (7.96)		
Second Year	42.85 (7.89)		
Third Year	42.74 (8.29)		
Fourth Year	43.46 (8.07)		
Fifth Year	41.29 (7.62)		
Interns & Graduates	41.55 (6.61)		
Study Level			
Junior: preparatory $ 1st year	42.01 (7.79)	**f(2,938)=1.02**	0.361
Sophomore: 2nd-3rd year	42.79 (8.12)		
Senior: 4th-5th year	42.03 (7.67)		
The intended future primary specialty			
Medical	42.99 (7.64)	**t(939)=1.53**	0.126
Surgical	42.08 (7.92)		
Academic GPA score			
2.99 or less	43.45 (9.07)	**f(4,936)=4.60**	0.001
3 - 3.99	41.10 (7.39)		
4 - 4.49	41.46 (7.96)		
4.50 - 4.74	42.39 (7.89)		
4.75 - 5	43.88 (7.72)		

Table 5: Multivariate Linear Regression Analysis of the Medical Student's Perceived Mean Empathy (TEQ) score.

	Unstandardized Beta Coefficients	95.0% CI for B Lower Bound	95.0% CI for B Upper Bound	p-value
(Constant)	45.316	44.256	46.376	<0.001
Sex=Male	-1.835	-2.824	-.847	<0.001
Marital state= ever married	-3.545	-5.634	-1.456	.001
Academic GPA=5 4.75 - 5	1.736	.584	2.888	.003
Residence= Eastern Region	-2.063	-3.452	-.673	.004
Residence= Western Region	-2.369	-3.817	-.921	.001
Residence= Northern Region	-5.351	-7.031	-3.670	<0.001
Residence=Southern Region	-3.104	-4.535	-1.673	<0.001
Study level = junior students (preparatory + 1st year)	-1.434	-2.786	-.083	.038

Dependent outcome variable = Total Toronto empathy scale score. Model R=0.31, Adjusted R-squared=0.10

Discussion

This study aimed to measure the level of empathy among medical students and to determine the association between the level of empathy and different sociodemographic variables. The mean empathy score in Saudi medical students was 42.31. This is similar to the reported findings of Sadia Riaz et al. in Lahore-Pakistan (22). However, it is lower than the mean score of Turkish medical students at Akdeniz University (24) and in other studies from Malaysia, Serbia, and The Caribbean (25–27). This variation in empathy scores could be explained by the cultural differences between countries and regions. Our study's differences in empathy levels were consistent with other studies in that female medical students were more empathetic (21,22,24,28). In the current study, there was no significant correlation between the intended future medical specialty and the mean empathy score, this finding is in line with what S. Hasan et al. reported at Kuwait University (28); in contrast to studies from Malaysia and the US reported otherwise (10,25).

Furthermore, a significant correlation was found between academic achievement and the mean empathy score. Medical students with a GPA between 4.75-5 points had a higher empathy score than medical students with a GPA <=4.74. This is in contrast to the finding reported at Kuwait University (28). However, it is consistent with earlier research in the US (11). Furthermore, we found that Sophomore and senior medical students have higher empathy scores than junior medical students, with a peak in the mean empathy score during the fourth year. Studies in Kuwait, Pakistan, and the Caribbean reported similar findings [15,17,21]. However, studies in Turkey, Malaysia, and Serbia showed no significant correlation between the study year and the mean empathy score [18,19,20]. The peak of empathy scores during the sophomore years was explained in the literature by several factors, including implementing subjects such as ethics, professionalism, and doctor-patient communication. Another factor is the increased contact with patients, which requires students to develop critical social skills and be more empathetic towards patients to perform a physical examination and establish excellent history skills [15,17].

The association of differences between empathy scores in married and non-married students is controversial. The previous literature did not find a statistically significant correlation between the two [24,25]. However, our results show a statistically significant difference between the two, with non-married students scoring higher than married students. Additionally, senior medical students had a lower score than sophomores, which was hypothesized to be the result of exhaustion and burnout [15,17].

Concluion

This study concludes that different demographics and academic characteristics, such as gender, marital status, region, and GPA, can affect empathy levels. Female scores were statistically significantly higher than males on the scale, and non-married students have a higher perceived empathy score compared to married students; study year also contributes to fluctuations in the score, as interns and fifth-year medical students scored the lowest, which could be linked to exhaustion and burnout. Also region is a factor that affects the empathy score, with the central province being the highest scoring region and the northern province scored the lowest. Based on these results, the authors agree that further emphasis on empathy should be instilled in the curriculum of medical students.

Limitations

One limitation of this study is the use of a self-reported scale; the extent to which scales measure empathy in clinical practice is controversial, as empathy is subjective towards cultural ideals and upbringing to the extent that a slight deviation of demographics can cause drastic changes. However, evidence supports the validity and

reliability of the Toronto Empathy questionnaire [26,27]. Another weakness is the low response rate from different provinces, such as the northern and southern provinces. A further weakness was the low response rate of preparatory and first-year students compared to seniors and the low response rate of medical interns.

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