Original Article

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Assessment of the Level and Determinants of Empathy in Moroccan Medical Students: A Cross-sectional Study

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Introduction: Empathy is a key element in the doctor-patient relationship. Despite its recognized importance for both patient and physician. Several studies have reported a decline in empathy during medical training. However, few studies have been carried out in this regard in the Arab world, particularly in Morocco. This study aimed to assess the level of empathy in Moroccan medical students and to identify the factors associated with its variation.

Methods: A cross-sectional study was carried out among medical students at various Moroccan medical faculties. Data were collected using a questionnaire that included socio-demographic data on the students and their parents, clinical and academic data and satisfaction with the relationship with parents, and the validated version of the 10 items Perceived Stress Scale (PSS 10) for stress assessment. Empathy was assessed using the Jefferson Scale of Empathy– student version (JSE-S) in its Arabic version validated in Morocco. Data were analyzed using descriptive statistics, bivariate analysis and multivariable linear regression to determine the factors associated with empathy. The significance level was considered 0.05. All statistical analyses were performed using SPSS Version 26.

Results: A total of 565 students were enrolled. The mean JSE-S score was 106.15±13.65, with a significant drop observed during the third cycle (the 6th and 7th year) (p=0.002). Female students scored higher than males (p=0.003). Higher satisfaction with parental relationships was positively associated with empathy (p=0.02), while chronic disease was linked to lower scores (p=0.048).

Conclusion: Empathy in Moroccan medical students appears to decline during medical training, which may affect future physician–patient interactions. These findings underscore the importance of implementing educational interventions and curricula designed to foster empathy, ultimately improving communication, patient satisfaction, and quality of care in clinical practice.

Keywords: Empathy, Medical students, Medical education

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Introduction

Modern medical practice is increasingly adopting the principles of patient-centered care, which places the individual, rather than the disease, at the core of clinical attention. This approach values patients' experiences, preferences, and active participation in decision-making processes (1). Centered medical practice can provide health care benefits including reduced service costs, improved chronic care outcomes, and increased patient satisfaction. This concept also reduces complaints against healthcare professionals and leads to fewer malpractice suits (2).

Within this framework, empathy emerges as a fundamental interpersonal skill that enables physicians to understand and respond appropriately to their patients' emotions and perspectives (3). It plays a key role in establishing successful doctor-patient relationships, improving clinical outcomes, contributing to patient satisfaction, and enhancing professional well-being (4, 5). However, empathy may also present challenges. For instance, excessive emotional involvement can increase physicians' risk of compassion fatigue, particularly in resource-limited or high-stress healthcare environments. In addition, maintaining empathy requires time, training, and supportive institutional environments, which may not always be available (6-8).

Medical students are future doctors. Indeed, they must develop this skill during their training. However, studies suggest that empathy tends to decline progressively during medical training, particularly in the later, more clinically demanding years (9). This trend raises concerns about the future quality of the physician-patient relationship and the humanistic dimension of care. Identifying and understanding the factors associated with empathy among medical students is, therefore, crucial. Such knowledge may help educators design strategies to nurture and preserve empathy throughout medical education.

Empathy has been widely studied among medical students across different regions of the world, showing variable trends in its level and determinants (10, 11). However, in the Arab region, the literature remains scarce and fragmented**.** A recent systematic review evaluating empathy levels and associated determinants among medical students has highlighted that this topic remains insufficiently explored in the region. The review revealed that empathy levels tended to be low, and the findings regarding its determinants were heterogeneous and sometimes contradictory (12). Such findings make it difficult to draw clear conclusions and to identify context-specific determinants, highlighting the urgent need for further research to better understand the factors influencing empathy in this context. In response to this gap, the present study was conducted with to assess the level of empathy among Moroccan medical students and identify its determinants.

Methods

Study and population

A cross-sectional study was conducted during a period of 12 months.

Eligibility criteria

The study included Moroccan medical students enrolled from the 1st to the 7th year at various Faculties of Medicine and Pharmacy in Morocco to ensure representativeness of the Moroccan medical student population. Students of other nationalities, as well as those enrolled in pharmacy or dental programs, and those who declined to participate, were excluded.

Sample size and sampling method

The required sample size was estimated using the formula $n = (\frac{z^{\alpha} \times \sigma}{d})^2$, with a margin of error d=5, a 95% confidence level (Zα/2=1,96), and the maximum variance assumption for a bounded variable (13). For the Jefferson scale of empathy (range 20-140), this corresponds to σ max=60, yielding a minimum sample size of 553. A convenience sampling method was applied to select the participants.

Data collection

Data collection was carried out using an online questionnaire. It included:

Personal sociodemographic characteristics: age, gender, marital status, and housing.

Parental sociodemographic characteristics: marital status, educational level, monthly income of the family, and history of a sick family member.

Satisfaction with relationships with parents was assessed from the student's point of view based on two separate questions on satisfaction with relationships with mother and father. We created a numerical score to assess the overall satisfaction with parental relationships. A numerical value was assigned to each category: dissatisfied=0, neutral=1, and satisfied=2. The overall satisfaction score was then calculated as the average of the two individual scores (mother and father). The score varied from 0 to 2. A score of 0 indicates dissatisfaction with the relationship with parents, while a score of 2 reflects complete satisfaction. To assess the construct validity of the newly created score, an exploratory factor analysis was conducted using the two underlying

variables. The analysis demonstrated an excellent model fit, with SRMR=0.0001, TLI=1.019, and CFI=0.98, all of which largely exceed the commonly accepted thresholds for good fit (SRMR<0.08, TLI and CFI≥0.95) (14). These findings support the adequacy of the proposed score structure and indicate that the two variables combined into a single score provide a valid representation of the underlying construct.

Clinical characteristics and behavior: History of chronic or psychiatric disease, smoking status, alcoholism, or other addictions.

Academic characteristics: Year of the study and preferred specialty (medical, surgical, general medicine). Information regarding the year of the study was categorized into the three main stages of medical training: first cycle (1st and 2nd years), second cycle (3rd to 5th years), and third cycle (6th and 7th years).

Level of stress: The measure of stress level was performed using the classic Arabic version of the 10-item Perceived Stress Scale (PSS10) questionnaire validated in Morocco. This version demonstrates good psychometric properties in the Moroccan population, indicating its validity and reliability for measuring perceived stress (Cronbach's alpha=0.72 and 0.85 for paper and electronic versions, respectively) and high test-retest reliability (0.91) (15). The PSS 10 questionnaire consists of 10 Likert scales asking about feelings and thoughts during the last month. Each question varied from 0 to 4. The total stress score is obtained by summing the different responses and ranges from 0 to 40. A high score indicates a high level of perceived stress.

Measure of empathy: Empathy was measured using the Jefferson scale of Empathy (student version) (JSE-S) in its Arabic version, validated in Morocco. The questionnaire contains 20 items. Each item is rated from 1 to 7 (1=strongly disagree, 7=strongly agree). These items represent three factors: perspective-taking (10 items), compassionate care (8 items), and standing in the patient's shoes (2 items). The total score is the sum of all items. The total score ranges from 20 to 140, with higher scores indicating a higher degree of empathy. The perspective-taking subscale varies from 10 to 70, compassionate care from 8 to 56, and standing in patients' shoes from 2 to 14. The scale was validated in a sample of Moroccan medical students, demonstrating acceptable psychometric properties, including good internal consistency (Cronbach's alpha 0.76) and satisfactory construct validity (16).

Statistical analysis

For the scoring of the empathy scale (JSE-S), the guidelines of scoring provided by Thomas Jefferson University were used. Score of stress (PSS 10) was calculated using the scoring manuals (17).

Descriptive analysis was used to summarize population characteristics; qualitative data were expressed as percentages and quantitative variables as means and standard deviations.

Bivariate analysis was performed to determine the factors associated with total empathy score and three subscales ("perspective-taking," "compassionate care," and "standing in the patient's shoes"). Student's t and ANOVA tests were used to compare the means of empathy score and three subscales according to the various factors. The association between the empathy score, subscales and the perceived stress and the score of satisfaction with the relationship with parents were determined using Pearson correlation. The correlation coefficient (r) ranges from -1 to 1. A value of 0 indicates no correlation, while a value of 1 represents a perfect positive correlation. The sign of r indicates the direction of the relationship: a negative value signifies an inverse relationship between the variables. The closer r is to either +1 or −1, the stronger the correlation (18).

Three multivariate models were built using multiple linear regression and using a backward stepwise elimination method. Variables with a p-value less than 0.2 were included in the models, and non-significant variables were progressively excluded at each step. The final model, therefore, retained only the factors that remained statistically significant. The significance level was set at 0.05. All statistical analyses were performed using SPSS Version 26.

Ethics statement

Hasan II University Hospital Ethics Committee N 10/22 approved this study. Anonymity and confidentiality of data are guaranteed throughout the study.

Results

Description of population

A total of 565 students were included in the study. Their mean age was 22.43±2.48 years, 78.8% were female, 97.3% were single, and 72.4% lived with their families. Only 4.2 % of students were smokers, 3.2% were alcoholics, 14.5% had a history of chronic illness, and 11.9% were being treated for psychiatric illness.

The majority of students' parents were married (88.7%). The level of education was university for 68.8% of fathers and 56.3% of mothers and 72.4% of families had a monthly income more

than 6000 Moroccan dirhams. The mean score of satisfaction with the relationship with parents was 1.68±0.48.

Among the participants, 49.0% were enrolled in the 3rd cycle**.** The 2nd cycle accounted for 32.4%**,** while the 1st cycle represented 18.6% of the respondents. Regarding specialty preference, 40.0% of the students preferred medical specialty, 21.8% surgical specialty, and 7.4% preferred general medicine. The average stress level was 22.36±6.80. Table 1 shows the descriptive population data.

Level and factors associated with empathy

The mean empathy score was 106.15±13.65 with a minimum of 56 and a maximum of 140. The results show several factors significantly associated with empathy scores among medical students.

Females reported a significantly higher mean empathy score (107.02±13.17) compared to males (102.91±14.93) (p=0.003). The multivariable analysis

Table 1. Demographic features of the population (N=565)

Variables	**N (%)**
Age (Mean±SD)	22.43±2.48
Gender	
Female	445(78.8)
Male	120 (21.2)
Marital status	
Single	550(97.3)
Married	15(2.7)
Housing	
Family home	409(72.4)
University residence	19(3.4)
Collective/individual housing	137(24.2)
Marital status of Parents	
Divorced	36(6.4)
Married	501(88.7)
Dead parent	28(5.0)
Educational level of father	
Illiterate	33(5.8)
Primary	42(7.4)
Secondary	101(17.9)
University	389(68.8)
Educational level of mother	
Illiterate	64(11.3)
Primary	67(11.9)
Secondary	116(20.5)
University	318(56.3)
Monthly income of parents	
<2000	25(4.4)
[2000-4000[	53(9.4)
[4000-6000]	78(13.8)
>6000	409(72.4)
Cycle	
1st cycle	105(18.6)
2nd cycle	183(32.4)
3rd Cycle	277(49.0)
Preference of specialty	
Medical specialty	226(40.0)
Surgical	123(21.8)
General medicine	42(7.4)
Undecided	147(30.8)
Chronic diseases	82 (14.5)
Psychiatric disease	67 (11.9)
Presence of a sick person in the house	193(34.2)
Smoking	24(4.2)
Alcohol	18(3.2)
Other addictions	26(4.6)

confirms this association, with females showing an average increase of 4.15 points in empathy score (95% CI: 1.46–6.83) compared to males.

Students in the 1st and 2nd cycles had higher empathy scores (108.2±13.98 and 108.04±13.90, respectively) compared to those in the 3rd cycle, whose mean score was 104.12±13.11 (p=0.002). The regression analysis showed that students in the 1st and 2nd cycles scored significantly higher, with increases of 4.14 (95% CI: 1.15–7.13) and 4.04 (95% CI: 1.54–6.53) points, respectively, compared to the 3rd cycle.

Students without chronic diseases had a higher empathy score (106.62±13.68) compared to those with chronic diseases (103.39±13.26) (p=0.048). High satisfaction in the relationship with parents was also associated with a higher empathy score in the multivariate analysis (β=2.89; 95 %CI: 0.59–5.19). Non-smokers had a higher empathy score (106.36±13.61) than smokers or ex-smokers (101.25±14.00) (p=0.07), but the difference did not reach statistical significance.

Table 2. The factors associated with total empathy score and different subscales: Results of bivariate analysis

Variables	Total empathy score	p-value	Perspective taking	p-value	Standing in patient shoes	p-value	Compassion	p-value
Gender		0.003		NS		NS		<0.001
Female	107.02±13.17		54.92±11.17		6.82±3.03		45.27±6.38	
Male	102.91±14.93		52.80±12.54		7.28±3.19		42.82±7.88	
Marital status		NS		NS		NS		NS
Single	106.10±13.66		54.54±11.44		6.88±3.06		44.67±6.82	
Married	108.06±13.67		52.00±13.38		8.26±3.23		47.80±5.11	
Cycle		0.002		<0.001		NS		NS
1ST cycle	108.20±13.98		57.35±9.77		6.08±2.97		44.04±6.98	
2nd Cycle	108.04±13.90		55.71±10.95		6.90±3.23		45.42±6.5	
3rd cycle	104.12±13.11		52.56±12.13		6.97±3.00		44.58±6.89	
Chronic disease		0.048		NS		0.005		NS
No	106.62±13.68		54.73±11.46		7.06±3.07		44.81±6.84	
Yes	103.39±13.26		52.93±11.63		6.04±2.93		44.40±6.55	
Psychiatric disease		NS		NS		0.002		NS
No	106.14±13.60		54.73±11.46		7.06±3.08		44.81±6.84	
Yes	106.20±14.16		52.93±11.63		5.85±2.75		44.40±6.55	
Smoking		NS		NS		NS		NS
No smoker	106.36±13.61		54.60±11.37		6.93±3.06		44.82±6.70	
Smoker / ex-smoker	101.25±14.00		51.58±14.01		6.50±3.37		43.16±8.61	
Alcohol		NS		NS		NS		NS
No	106.27±13.58		54.59±11.32		6.93±3.05		44.74±6.82	
Yes	102.50±15.77		50.83±15.77		6.38±3.61		45.27±6.03	
Other addiction		NS		NS		NS		NS
No	106.31±13.51		54.53±11.38		6.59±3.06		44.81±6.74	
Yes	102.80±16.34		53.15±13.75		6.11±3.20		43.53±7.89	
Housing		NS		0.048		NS		NS
Individual or collective apartments	107.91±13.10		56.12±10.59		6.79±3.10		44.99±6.38	
Family home	105.69±13.87		54.12±11.56		6.92±3.04		44.63±7.02	
University residence	103.36±12.03		50.00±14.79		7.73±3.38		45.63±4.57	
Satisfaction with parents relationship	0.09*	0.029	0.093*	0.027	0.11*	0.006	-0.025*	NS
Perceived stress (PSS)	0.041*	NS	0.06*	NS	-0.096*	0.023	0.022*	NS

* Correlation coefficient (r) NS : non- significant (p-value ≥0.05)

Table 3. The factors associated with total empathy score and different subscales: Results of multivariate analysis

Variables	Total empathy score Adjusted ß (95%CI)	Perspective taking Adjusted ß (95%CI)	Standing in patients shoes Adjusted ß (95%CI)
Gender			
Female	4.15(1.46-6.83)		
Male	1		
Marital status			
Single			-1.59((-3.14)-(-0.36))
Married			1
Cycle			
1ST cycle	4.14 (1.146-7.13)	4.76(2.22-7.29)	
2nd Cycle	4.04 (1.54-6.53)	3.35(1.22-5.44)	
3rd cycle	1	1	
Chronic disease			
No			0.80(0.078- 1.53)
Yes			1
Psychiatric disease			
No			1.05(0.27-1.86)
Yes			1
Satisfaction with parents relationship	2.89 (0.59-5.19)	2.35(0.41-4.29)	

Tables 2 and 3 show the factors associated with the total empathy score.

Factors associated with perspective-taking subscale

Bivariate and multivariable analyses identified several factors associated with scores on the Perspective Taking subscale. Students in earlier years of study had significantly higher scores compared to those in the 3rd cycle (p=0.0001). Specifically, students in the 1st cycle showed the highest mean score (57.35±9.77), with an adjusted β of 4.76 (95% CI: 2.22–7.29), followed by those in the 2nd cycle (55.71±10.95; β=3.35; 95% CI: 1.22–5.44). Gender differences approached statistical significance (p=0.07), with females reporting slightly higher perspective-taking scores than males (54.92±11.17 vs. 52.80±12.54).

Housing conditions also showed a significant association (p=0.048), with students living in individual or shared apartments reporting the highest scores (56.12±10.59), and those in university residences reporting the lowest (50.00±14.79). Moreover, satisfaction with the relationship with parents was positively associated with perspective taking in the multivariable model (β = 2.35; 95% CI: 0.41–4.29) (Tables 2 and 3).

Factors associated with the standing in patient shoes subscale

Bivariate and multivariable analyses revealed several significant associations with the Standing in Patients' Shoes subscale. Students without chronic disease had significantly higher scores compared to those with chronic diseases, with an adjusted β of 0.80 (95% CI: 0.078–1.53). Similarly, the absence of psychiatric illnesses was associated with a higher mean score, with a significant adjusted β of 1.05 (95% CI: 0.27–1.86).

Married students reported higher scores (8.26±3.23) compared to single ones (6.88±3.06), with a negative β of –1.59 (95% CI: –3.14 to –0.36), indicating lower scores among singles.

Higher satisfaction with parental relationships was significantly linked to greater ability to stand in patient's shoes (r=0.11, p=0.006). Additionally, perceived stress (PSS score) was negatively associated with this subscale (r=–0.096; p=0.023), suggesting that higher stress may impair this ability (Tables 2 and 3).

Factors associated with the compassion subscale

The compassion subscale was associated with gender. Females reported higher scores than males (45.27±6.38 vs 42.82±7.88) (p=0.0001) (Table 2).

Discussion

This study aimed to measure the level of empathy and its determinants in Moroccan medical students. The results showed a decline in the level of empathy over the course of the medical curriculum, especially during the 3rd cycle. Various factors were found to affect empathy, including gender, marital status, housing conditions, presence of chronic or psychiatric disease, satisfaction with relationship with parents, and stress.

The level of empathy in Moroccan students was 106.15±13.65, which is in line with the studies conducted in Arab countries (12). This score is lower than those obtained in Western

countries (19-21). The score is higher than that found in Turkey (22), India (23) and Iran (24). These variations in empathy scores may be the result of cultural, educational, and social factors specific to each country.

A significant drop in empathy levels was observed among third-cycle medical students, which is in line with the literature (9, 11). This decline can be explained by several factors specific to the Moroccan medical education context. In their later clinical years, students are more involved in hospital environments, where they face increased responsibilities, high workloads, frequent exposure to suffering, serious illness, and death (9). In addition, third cycle studies often coincide with increasing academic pressure linked to clinical examinations, thesis writing, and uncertainty about professional future or choice of specialization, all of which can contribute to increased stress and reduced emotional availability (25). In Moroccan faculties, the absence of structured empathy training during the clinical years may further exacerbate this decline. Some research (11) has shown the opposite trend, with empathy scores increasing as students progress through their studies. This improvement may be linked to the integration of communication skills training into the curriculum in certain contexts.

Female medical students demonstrated significantly higher empathy scores compared to their male counterparts. This finding is consistent with numerous previous studies conducted across different cultural and educational contexts (10-12). Genetic, biological, and cultural factors may explain this difference (26). Other investigations found no significant sex differences (27-29). This inconsistency may reflect variations in cultural context, study design, or measurement tools, indicating that the relationship between sex and empathy is not universal.

Our results showed a positive relationship between empathy and satisfaction with the relationship between the parents. These results are similar to those in the literature (30-32). Previous research has shown that secure early attachments and emotionally supportive parental relationships foster the development of empathic concern and prosocial behavior (33, 34). In addition, conflicting or unsatisfactory parental relationships can generate stress, which can reduce the ability to engage emotionally in a doctor-patient relationship (25, 35).

A negative correlation between stress and empathy, especially the "standing in the patient's shoes" subscale component, has been demonstrated. The study of Park, et al. (25) and Tiwari, et al. (35) showed a negative correlation between empathy and stress. On the other hand, other studies found no association between stress and empathy (36, 37). This discrepancy can be explained by differences in the study design, sample characteristics, or the tools used to assess these two concepts, as well as cultural and educational context.

Students with psychiatric illnesses showed lower levels of empathy, particularly on the "putting yourself in the patient's shoes" subscale. Other studies have shown that impaired mental health has a negative impact on empathy (38, 39).

Medical students suffering from a chronic illness had lower empathy scores than their peers. This result may seem illogical, as we would expect personal experience of illness to foster a better understanding of patients' suffering. However, several factors may explain this association: first of all, chronic illness can increase students' stress and alter their physical and psychological quality of life, thus impacting their level of empathy (9). The illness-related fatigue can limit the student's availability for emotional engagement with others, leading to a form of emotional distancing (40).

Medical students living in university residences have a significantly lower empathy score than those living with a family or in individual housing. Living conditions in Moroccan university residences are often marked by promiscuity, lack of privacy, noise, and even insecurity. Data from the literature have shown that housing conditions can affect the mental and physical well-being of students (41), which has a negative impact on the expression of empathy towards patients.

To summarize, these factors (academic stress, chronic illness, psychiatric disorders, and poor living conditions in university halls of residence) contribute to compassion fatigue, a state of emotional exhaustion that impairs a person's ability to establish an empathic bond. Compassion fatigue often occurs when individuals are repeatedly exposed to suffering without adequate support or space for recuperation (42).

Our study assessed the level of empathy using a scale validated in the Moroccan context, which increases the reliability of the results. It also explored a variety of factors related to empathy (socio-demographic, behavioral, academic, familial, and psychological). The study sample was heterogeneous, including students from different regions of Morocco, which is another strength of the study. However, the assessment of empathy levels throughout the years of medical study was based on a cross-sectional design, which captures empathy levels at a specific

point in time for different groups of years of study, without tracking the students' individual development over time. This limitation underlines the importance of future studies adopting a longitudinal methodology to better understand empathy trajectories throughout medical training.

In conclusion, this study provided a better understanding of the levels and determinants of empathy in Moroccan medical students. Based on the factors identified in this study, as being significantly associated with empathy levels in medical students, several targeted recommendations can be proposed. The decline in empathy over the course of the 3rd cycle onwards highlights the need for early and ongoing integration of empathy-focused curricula, particularly in the clinical years. Given the observed gender differences, empathy-training programs should consider tailored strategies that improve emotional communication skills, particularly for male students. Furthermore, as stress was negatively associated with empathy, institutions should prioritize mental health and implement stress management programs and psychological support services. The association between empathy and the presence of chronic or psychiatric illnesses among students calls for specific support for students with chronic or psychiatric illnesses, including listening and guidance. In addition, the quality of family relationships seems to influence empathy; therefore, fostering social ties and making advice on interpersonal skills among medical students seem to be important. Implementing these recommendations may help preserve and enhance empathy in medical education, ultimately leading to improved patient care.

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Authors' Contribution

S.B: methodology, formal analysis and writing original draft, C.M: data collection, I.E.H: formal analysis, K.E.R: investigation, conceptualization and review. All authors contributed to the discussion, read and approved the manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated resolved.

Conflict of interests

The authors declare that they have no competing interests.

Declaration of AI

The authors of this manuscript declare that no artificial intelligence (AI) was used during the writing process.

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