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Decline in empathy levels and sex differences in medical students from the Caribbean

Declinación empática y diferencias según el sexo en estudiantes de medicina del Caribe

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Abstract

Introduction: Empathy is an important trait in the training of medical students, as it has been shown that it improves the doctor-patient relationship.
Objective: To evaluate the decline of empathy levels and possible sex differences in undergraduate medical students from the Universidad Central del Este, Dominican Republic.
Materials and methods: Exploratory cross-sectional study. A Spanish version of the Jefferson Scale of Empathy for Medical Students (S-version) Scale was administered in September 2018 to 1144 1st-year to 5th-year medical students (887 women and 257 men). Data reliability was verified using the Cronbach's alpha and the intraclass correlation coefficient (ICC). A generalized linear equation model (Type III) was applied to analyze data and the Wald chi-squared test was used to determine differences in overall empathy levels and the mean scores obtained in each of its three components based on the year of medical training and sex.
Results: Cronbach's alpha was satisfactory (0.839), and the ICC was 0.834 (F=5.68; p=0.005). The variability of the estimated curves in relation to empathic behavior by course (year of medical training) and sex was observed using linear and non-linear regression equations: Wald χ^2=115.6, p=0.0001 between courses; and Wald χ^2 =12.85, p=0.001 between men and women.
Conclusions: Sex differences were observed regarding empathy levels in the study population. Moreover, a decline in empathy levels (overall empathy and Compassionate Care component in men and Walking in the Patient's Shoes component in men and women) was also observed as students progressed in their medical training. The behavior of these data raises questions regarding the need to determine the factors causing these differences and the decline in empathy levels.
Keywords: Empathy; Medicine; Students, Medical; Sex; Dominican Republic (MeSH).

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Resumen

Introducción. La empatía es un rasgo importante en los estudiantes de medicina, ya que se ha demostrado que mejora la relación médico-paciente.
Objetivo. Evaluar la declinación empática y las posibles diferencias según el sexo en los niveles de empatía en estudiantes de pregrado de Medicina en la Universidad Central del Este, República Dominicana.
Materiales y métodos. Estudio exploratorio transversal. La versión en español de la Escala de Empatía de Jefferson adaptada para estudiantes de medicina (versión S) fue aplicada a 1144 estudiantes de medicina de 1° a 5° año (887 mujeres y 257 hombres). La confiabilidad de los datos se verificó mediante el alfa de Cronbach y el coeficiente de correlación intraclase (CCI). Los datos se analizaron utilizando un modelo de ecuación lineal generalizada (Tipo III) y se utilizó la prueba χ^2 de Wald para determinar las diferencias en los niveles globales de empatía y los puntajes promedio de sus tres componentes según el año de formación y el sexo.
Resultados. El alfa de Cronbach fue satisfactorio (0.839) y el CCI fue de 0.834 (F=5.68; p=0.005). Mediante ecuaciones de regresión lineal y no lineal se observó variabilidad de las curvas estimadas en relación con el comportamiento empático según el curso (año de formación médica) y el sexo: entre cursos: χ^2 de Wald= 115.6; p=0.0001, y entre hombres y mujeres: χ^2 de Wald= 12.85; p=0.001).
Conclusiones. Se observaron diferencias en los niveles de empatía según el sexo; también se evidenció una declinación en los niveles de empatía (empatía global y componente Cuidado con compasión en los hombres, y en el componente Ponerse en los zapatos del otro en hombres y mujeres) a medida que los estudiantes avanzaban en su formación. El comportamiento de estos datos genera interrogantes relacionados con la necesidad de determinar los factores que causan estas diferencias y dicha declinación empática.
Palabras clave: Empatía; Medicina; Estudiantes de Medicina; Sexo; República Dominicana (DeCS).

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Introduction

Empathy is a human attribute resulting from the synthesis of cognitive and emotional elements,[1,2] as well as of evolutionary processes[3] and the lifelong development of the subject.[2] In fact, research has associated the development of empathy with multiple factors, including the mother-child relationship,[3] family relationships,[4,5] complex social networks,[6] individual psychological factors,[7,8] morals,[9] stress,[10] and heredity,[11] among others. Thus, it is clear that the development of empathy in individuals is the consequence of a complex system of multifactorial origin. At a societal level, anthropological and sociological research on empathy emphasizes its parallel and interactive development in the process of socialization of humans as a species and its important role in both verbal and nonverbal communication.[12]

Due to its relevance in communication, empathy is an important trait that medical professionals should cultivate. Empathy is not fully developed until the young adult stage (approximately 25 years of age), so health science students can still learn empathy during their medical school years.[13-15] Actually, the undergraduate years may be critical and a final opportunity for aspiring clinicians to receive training in empathetic skills that are useful in clinical care.

Empathy in clinical care is defined as the combination of Compassionate Care (CC), Perspective Adoption (PA) and Walking in the Patient's Shoes (WIPS).[16] Therefore, the academic study of empathy consists of examining its components separately, while keeping a focus on its structure and manifestations as an integral character trait.[17,18] Most empirical studies that have measured clinical empathy in undergraduate medical students have assessed two factors: sex and academic courses or school years.[16,19,20] In the United States, behavioral testing of empathy in medical students over time has enabled researchers to observe a phenomenon known as "decline in empathy," which usually occurs in the third year of school[13-21] and is preceded by a systematic increase in empathy levels between the first and third years; this observed decline begins in the third year and continues from the fourth year onwards. The (observable) effect is the decline and its cause is the erosion of empathy. However, a problem that has not yet been fully elucidated is the fact that it is still unclear whether this phenomenon is widespread or only affects certain groups of medical students and other health professions.[22] Hence, the question emerges: Is empathy decline a local or a global phenomenon? The answer to this question is not trivial since pedagogical strategies (interventions) for empathy training differ depending on whether students are developing empathy or losing it. Another question not yet fully answered is whether women are more empathetic than men in terms of discipline and professional activity.

In Latin America, where medical students are, on average, younger than in the U.S., multiple studies have found that the model of empathy decline is not observed in all cases, that empathy levels increase after the third year of training, or even that empathy is maintained without significant changes regardless of the training year in students of different health disciplines.[3,21-24] Several studies have found that these three scenarios are also possible when comparisons between men and women are made: female students with higher, equal, or lower levels of empathy than male students.[2,17,18,25,26]

Incorporating empathy in the teaching-learning processes of medical students is widely recognized as essential,[2] and understanding different patterns of empathic behavior is necessary to fully characterize clinical empathy and its components.[2,17,18] Consequently, any intervention aimed at improving empathic training in a specific population must first be rigorously defined in terms of how empathy manifests in that population group. In this context, the objective of the present work was to evaluate the decline in empathy levels and possible sex differences in undergraduate medical students from the Universidad Central del Este, Dominican Republic.

Material and methods

Study type and population

An exploratory, cross-sectional study was conducted in 1st to 5th year medical students from the School of Medicine of Universidad Central del Este, who were administered the Jefferson Scale of Empathy for medical students (S-version) (JSEMS) in September 2018. All students who voluntarily agreed to participate in the study and complete the instrument were included, while those who did not attend classes when the scale and a supplementary questionnaire were administered were excluded. Thus, the study population consisted of 1 144 students out of 1 308 enrolled in the MD program offered by the university in 2018, representing 87.46% of the universe population.

Instrument

The JSEMS is an instrument that measures empathy and is characterized by very stable reliability values that fluctuate between 0.79 and 0.89 measured by Cronbach's α and intraclass correlation coefficients.[1,2,11,12] It has 20 items and a factor structure made up of three latent factors (dimensions): Compassionate Care, Perspective Adoption, and Walking in Patient's Shoes. Numerous works have exhaustively described the characteristics of this instrument and have confirmed its factorial structure, which is considered very stable.[1,2,11-14,17-19,21-24] The Spanish version of this scale, which has been previously validated and culturally adapted in the Dominican Republic for medical students, was used.[26] During the validation and adaptation process, 6 judges (5 relevant academicians from the medical profession and a psychologist, all experts in higher education) examined the translated version of the instrument to confirm its cultural validity and the understanding of its contents by medical students in this country. Further details of the validation and adaptation of this scale can be found in several studies.[2,3,8,11]

Procedures

First, a pilot test was performed to confirm that the students understood the questions of the instrument. For

this purpose, 30 first- to fifth-year medical students from another university were randomly chosen and asked to complete the Spanish version of the JSEMS. Once they completed the questionnaire, they were asked if they clearly understood all its items or if some of them could have had a double interpretation. All the students stated that they had no problems understanding the instrument. The pilot test has already been described in detail in other studies.[12,17,18,26]

Then, the project was submitted to the Medical School of Universidad Central del Este, which approved its implementation in all medical students from the School who agreed to participate in the study voluntarily. After explaining the purpose of the study, students were informed that their data would be kept confidential at all times and that they could withdraw from the study at any time.

The questionnaire was administered by a neutral operator who received specific training for the proper administration of the scale. The scale was administered to students over a two-week period, beginning in the second week of September 2018, and this process was carried out prior to the start of their classes and after obtaining the permission of the professor. Before handing over the instrument to students, the operator explained the objective of the study, and once the questionnaires were completed and handed in by the students, they were immediately reviewed to ensure that there were no missing data and that all questions had been answered correctly, always maintaining the anonymity and confidentiality of students. In addition to the JSEMS, students were also asked to fill out a supplementary questionnaire in order to collect their sociodemographic data (sex, year of education, age, etc.). The average administration time of both instruments was 30 minutes.

Statistical analysis

The reliability of the data obtained through the Jefferson Medical Empathy Scale was confirmed using the Cronbach's alpha test and the intraclass correlation coefficient. Differences between the mean scores of the questions of the instrument (20 in total) were estimated using the Hoteling's T2 test. Subsequently, these data (mean scores of each component) were analyzed using a generalized equation model (Type III) for main effects only.

A generalized linear model (GLM) was used with the Gamma function with logarithmic link (where the dependent variable, multinomial in nature, is linearly related to the factors through the above-mentioned link function) and parameters were estimated using the Newton-Raphson method (maximum likelihood). The Quasi-likelihood under Independence Model Criterion (QIC), was used as a goodness-of-fit test to select the best subset of predictors. Medical training year (1^{st}-5^{th}) and sex were considered as predictor factors and response variables to each of the empathy components.

The Wald Chi-Squared Test was used to determine differences in overall empathy levels and the scores obtained in each of its three components (dependent variable) based on the year of medical training and sex. The modified Breusch-Pagan test (BPM) was used to estimate heteroscedasticity between sexes. The distribution form of the standardized averages of the dependent variable in each of the factors studied was evaluated using adjusted regression curves, before performing a sequential analysis of variance to determine the best fit model. The standard deviation of the regression curve (S), its confidence interval (CI), and the unadjusted and adjusted determination coefficients (R) were estimated. All statistical analyses were performed using the statistical software packages SPSS 23.0® and MINITAB 14.0®. A significance level of $\alpha \leq 0.05$ was considered.

Ethical considerations

The study followed the ethical principles for conducting biomedical research involving human subjects outlined by the Declaration of Helsinki,[27] as well as the provisions of the General Law on Health Research in Dominican Republic (Chapter VI), article 33.[28] The project was submitted to the Research Coordination of the Universidad Central del Este and was approved by the Ethics Committee of this office through Resolution CI/01/2018, dated 02 July 2018. Likewise, all participants signed an informed consent form before taking part in the study.

Results

The analyzed sample was made up of 887 women (77.5%) and 257 men (22.5%). The general mean age was 20.46 (M) with a standard deviation (SD) of 2.46 years. Women had an M=20.31 and SD=2.23 years, while men had an M=21.01 and SD=3.06 years. More details about the mean scores obtained for the students, as well as their corresponding standard deviations by year of training and sex for the entire instrument and its CC, PA and AUA subcomponents, are shown in Table 1.

Cronbach's α values were satisfactory (0.824 and 0.839; untyped and typed respectively), and its total values, if an item of the instrument was removed, fluctuated between 0.806 and 0.838, while intraclass correlation was 0.824 (F=5.68; p=0.005; CI=0.809; 0.839); thus, it is inferred that the test has high internal reliability. Hoteling's T2 was 3114.8 (F=161.2, p=0.005), indicating variability in the response to the instrument questions. The BPM test yielded the following results: χ^2=4.0, p=0.045; χ^2=8.8, p=0.003; χ^2=14.2, p=0.005; and χ^2=0.17, p=0.68, for Empathy, CC, PA and WIPS, respectively; this suggests that there are differences in the variances of both sexes in the Empathy and CC variables. The results of the goodness-of-fit (QIC) test, the significance of the model effects, and the totals of the individual effects are presented in Table 2.

QIC values were acceptable, so the data fit the model used. Wald χ^2 was highly significant in Empathy and in all components when comparing each of these variables across courses. However, regarding sex, significant differences were found only in Empathy and Perspective Adoption. The total Wald χ^2 values had the same results described above.

The results of the type of curves in each of the empathy variables studied (i.e., Empathy (E), Compassionate Care (CC), Perspective Adoption (PA) and Walking in the Patient's Shoes (WIPS) by sex are shown in Figure 1.

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Table 1. Estimated means and standard deviations for empathy and its components by year and sex.

	Year	Sex	Mean	Standard deviation	n
Empathy (JSEMS total score)	First	Female	104.42	15.6	301
		Male	100.97	22.966	74
		Total	103.74	17.322	375
	Second	Female	104.91	15.582	164
		Male	106.29	14.858	51
		Total	105.24	15.39	215
	Third	Female	106.3	16.738	114
		Male	104.03	16.348	35
		Total	105.77	16.62	149
	Fourth	Female	104.17	17.595	175
		Male	99.77	13.753	43
		Total	103.3	16.969	218
	Fifth	Female	105.38	17.491	133
		Male	100.39	16.91	54
		Total	103.94	17.428	187
	Total	Female	104.84	16.421	887
		Male	102.12	18.032	257
		Total	104.23	16.827	1144
Compassionate Care Component	First	Female	33.54	9.576	301
		Male	33.3	10.283	74
		Total	33.49	9.706	375
	Second	Female	34.18	9.822	164
		Male	35.55	8.857	51
		Total	34.5	9.599	215
	Third	Female	36.13	9.17	114
		Male	37.03	8.322	35
		Total	36.34	8.958	149
	Fourth	Female	34.76	9.856	175
		Male	31.26	11.541	43
		Total	34.07	10.277	218
	Fifth	Female	36.12	10.97	133
		Male	31.35	13.285	54
		Total	34.74	11.849	187
	Total	Female	34.62	9.879	887
		Male	33.5	10.837	257
		Total	34.37	10.108	1144
Perspective Adoption Component	First	Female	60.11	9.502	301
		Male	56.77	14.683	74
		Total	59.45	10.783	375
	Second	Female	59.38	8.21	164
		Male	59.43	11.619	51
		Total	59.39	9.104	215
	Third	Female	58.99	10.032	114
		Male	54.77	13.059	35
		Total	58	10.92	149
	Fourth	Female	5.18	12.6	175
		Male	57.7	12.184	43
		Total	58.09	12.493	218
	Fifth	Female	59.08	10.487	133
		Male	59.65	9.777	54
		Total	59.25	10.264	187
	Total	Female	59.3	10.191	887
		Male	57.79	12.548	257
		Total	58.96	10.778	1144
Walking In Patient's Shoes Component	First	Female	10.77	3.449	301
		Male	10.91	3.57	74
		Total	10.79	3.468	375
	Second	Female	11.35	3.358	164
		Male	11.31	3.803	51
		Total	11.34	3.459	215
	Third	Female	11.18	3.34	114
		Male	12.23	3.532	35
		Total	11.42	3.403	149
	Fourth	Female	11.23	3.877	175
		Male	10.81	3.8	43
		Total	11.15	3.856	218
	Fifth	Female	10.17	3.982	133
		Male	9.39	3.305	54
		Total	9.95	3.807	187
	Total	Female	10.93	3.604	887
		Male	10.83	3.674	257
		Total	10.91	3.619	1144

Source: Own elaboration.

Table 2. Results of the goodness-of-fit test (QIC), significance of the model effects, and totals of individual effects.

Variable response	Wald χ^2			Wald χ^2	
	QIC	Year	Sex	Year	Sex
Empathy	36.4	114.8 (p=0.001)	12.6 (p=0.001)	115.6 (p=0.001)	12.85 (p=0.001)
Compassionate Care	136.6	26.2 (p=0.001)	2.24 (p=0.134)	24.8 (p=0.001)	2.31 (p=0.129)
Perspective Adoption	62.91	15.7 (p=0.003)	5.04 (p=0.025)	15.65 (p=0.004)	5.15 (p=0.023)
Walking In Patient's Shoes	151.4	163.9 (p=0.001)	0.14 (p=0.71)	182.1 (p=0.001)	0.139 (p=0.709)

Source: Own elaboration

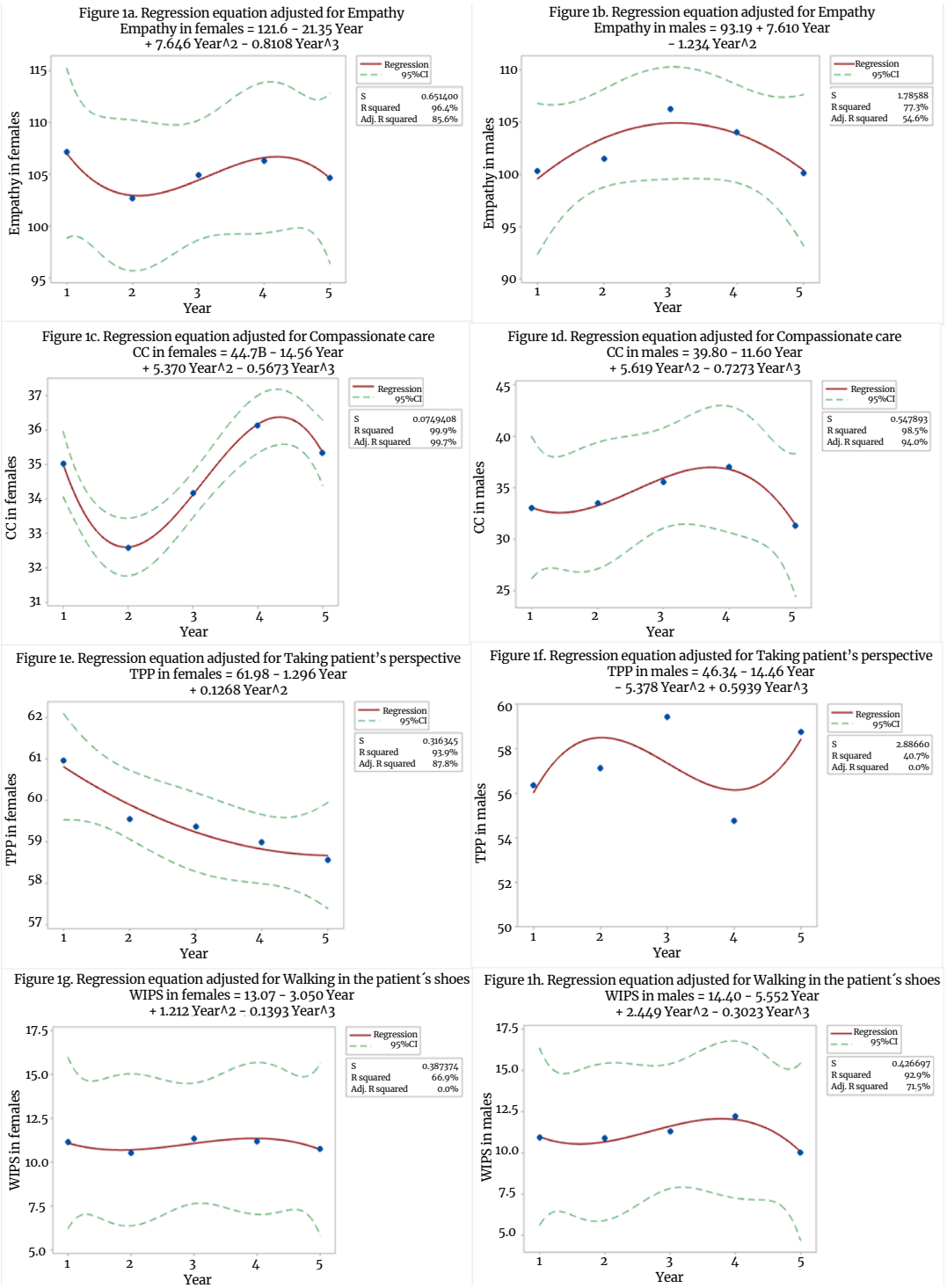

Figure 1. Equation and form of regression for Empathy and its components in females and males: E: Figures 1a and 1b; CC: Figures 1c and 1d; TPP: Figures 1e and 1f; WIPS: Figures 1g and 1h.
Source: Own elaboration.

In relation to empathy levels, the total score obtained in the JSEMS in women showed a consistent trend from the 1st to the 4th year of medical school (Figure 1a) but a decline in the 5th year, whereas a significant decline was observed in men beginning in the 3rd year (Figure 1b). Regarding the CC component, scores in women showed an upward trend, that is, mean scores increased each year since the 2nd year and declined in the 5th (Figure 1c); the same happened in men (Figure 1d), but the mean scores tended to decrease in different way.

In female students, TPP mean scores had a downward trend from the 1st to the 5th year (Figure 1e). In contrast, mean scores in this component in males showed an upward trend in the 2nd year (Figure 1f); however, a downward trend was observed from the 3rd year, with an increase in the 5th.

Regarding the WIPS component, mean values are distributed in similarly in both sexes (Figures 1g and 1h).

Finally, sex differences in empathy levels could be attributed to sex differences in TPP, since women's means are higher in this component and, consequently, in empathy levels; however, in absolute terms, such differences do not exceed more than 3 points between both sexes.

Discussion

The findings of the present study show that the values of empathy and its components are relatively low in both sexes regardless of the academic year. These consistent empathy values over time could be attributed to the way how each of the three components of empathy is expressed in this population (medical students): CC increases as training progresses, while PA decreases around the middle terms before increasing again in the subsequent terms. In males, the lower level of empathy advanced training years could be related to two of its components, which show classical decline values (CC and WIPS).[21]

On the other hand, these results are consistent with the variability found in PA, which is actually one of the forms of expression of this variability. In this case, females had a more empathetic expression than males. Similar results have been found in other studies,[17,18] and some researchers have attempted to explain the differences between males and females on neurological grounds (anatomical and physiological). However, these differences do not explain the cases in which males have had equal or greater values of empathy.[12,24]

Consequently, it could be suggested that there are factors other than the evolution of this attribute throughout the program and sex, which could explain this behavior and should be studied further. These findings support the need to carry out other studies to determine the positive and negative factors that influence the behavior of empathy and the possible interaction between empathy itself and its components.

Regarding decline in empathy levels, several studies have described its occurrence and have assumed, as working hypotheses, different factors that would influence its process, including unrealistic expectations of students regarding the behavior of doctors; elitist thinking of students and teachers; anguish; exhaustion; depression; reduced quality of life; hidden curriculum; mistreatment by superiors and mentors (harassment, contempt, humiliation, gender discrimination); vulnerability of students (due to idealistic values, enthusiasm and humanity at the beginning of their study programs); educational requirements that lead them to use technology and objectivity, neglecting the human aspects of medicine; lack of social support; heavy academic and clinical workload; among other aspects.[12,17,18,21,22,24,25,29] This has prompted researchers to investigate whether the reduction of empathy is a normal process,[25] and some authors have raised arguments that support or refute the existence of this phenomenon,[30–33] thus creating controversy that has not been resolved and requires more empirical information to reach a solution.[21]

The outcome of such controversy is not a minor issue because its theoretical derivations would have a direct impact on the form of intervention in medical education in order to increase/preserve empathy. In this sense, some studies carried out in Latin America[1,12,17,18,21,24,30,32,34,35] have found various forms of empathy distribution, revealing a decline as well as constant values and increases throughout the courses. These studies included the behavior of components, sex, and the interaction between empathy (and its components) and sex. Thus, to date, the best conclusion that can be drawn from the empirical evidence observed is that empathic behavior in Latin America is highly variable, including variations by age and sex. These results contradict approaches that suggest that decline is a universal phenomenon; therefore, it can be stated that there is a well-founded tendency for decline to be a particular event.

The anguish hypothesis, based on studies carried out from a neurophysiological point of view in mirror neurons, would help to explain the decline in empathy when it occurs, but it cannot do so in the presence of the increase of empathy levels in medical students observed in Latin America. On the other hand, it is very unlikely that medical students will not be subjected to constant stress, given the characteristics of the discipline studied by them.[36,37]

Therefore, a working hypothesis could be that the increase in the levels of empathy and its components (including a constant distribution of empathy values throughout the courses) is caused not by the absence of stress, but by the presence of certain factors in the students that may have a neutralizing function of the negative effect of stress on empathy. If this premise is correct, future research should focus on identifying negative and positive factors and on determining how the negative can be neutralized by the positive in Latin America specifically.

Although the objective of this work is not to analyze the derivations that can be done based on the characterization of empathy for planning an intervention given its complexity,[2,3,10,11,15–17] it is important to emphasize that the characteristics of the phenomenon must determine the type, form, and contents of an intervention. As a result, the purposes of such intervention should be to increase empathy levels in the students and make the changes in students' brains last over time. To that end, the teaching-learning process should operate throughout the entire undergraduate program, as it has been proposed that empathy, due to its characteristics, can develop until

the young adult age[2,17,18] and is a window to which universities should appeal.

In fact, some works have tried different methods to positively change the levels of empathy.[34,38-41] Nonetheless, there seems to be two opposing points of view. The first entails experimental work in which pre-experimental and quasi-experimental designs are tested and the results are evaluated before and after an intervention.[38-40] These studies have reported an increase in empathy levels, but have some limitations: a) the research is generally conducted in small groups of students who are in some stage of clinical training; b) the intervention is applied for short periods of time and its programs do not target specific aspects of its components based on the level of empathy; and c) it cannot be proven whether the intervention results in a permanent change in students' empathy. The second approach recognizes the need for systematic curricular changes and specific teaching-learning processes in accordance with the students' development over their years of study, as well as the characteristics of empathy, in general terms, and its constituent components.[34,41-43] Furthermore, this last type of intervention allows for long-term and longitudinal evaluation, while incorporating corrections guided by partial evaluations.

The findings of the present study could serve as the foundation (empathy level diagnosis)[11,17,18,26] for carrying out future studies that measure empathy in the same cohort over time (longitudinal design) with the goal of observing with greater precision the shape of the curve that empathy and its components may have. On the other hand, studies involving intervention processes could also be carried out by applying strategies that allow for the positive modification of factors that hinder the development of empathy and its components, while reinforcing those that strengthen them.[29,31,32,34-36,38,41-43]

These actions are necessary for the training of future professionals in order to provide better patient care, with the understanding that the treating physician should not influence the disease, but the patient. Therefore, universities have a social and moral obligation to implement a curriculum that continuously stimulates students' empathy development throughout their training.

Conclusions

Empathy levels varied depending on the sex of the study population. Moreover, a decline in empathy levels (overall empathy and Compassionate Care component in men and Walking in the Patient's Shoes component in both men and women) was observed as students progressed in their medical training. The behavior of these data raises concerns regarding the need to identify the factors causing these differences and the decline in empathy levels.

Conflicts of interest

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