

Association between empathy, anxiety and psychological well-being in Mexican medical students. Transversal study

Asociación entre empatía, ansiedad y bienestar psicológico en estudiantes mexicanos de medicina. Estudio transversal

David Luna¹, Ivette Vargas-de la Cruz^{2*}, Óscar A. Núñez-Gaytán², Rosa P. Figuerola-Escoto³,
Laura F. Barrera-Hernández⁴, Fernando Meneses-González¹, and Miguel A. Lezana-Fernández¹

¹Dirección General de Difusión e Investigación, Comisión Nacional de Arbitraje Médico, Ciudad de México; ²Unidad de Atención de Neurociencias, Centro Universitario de Ciencias de la Salud, Universidad de Guadalajara, Guadalajara, Jalisco; ³Sección de Estudios de Posgrado e Investigación, Centro Interdisciplinario de Ciencias de la Salud, Unidad Santo Tomás, Instituto Politécnico Nacional, Ciudad de México; ⁴Departamento de Ciencias de la Salud, División de Ciencias Biológicas y de la Salud, Universidad de Sonora, Ciudad Obregón, Sonora, México

Abstract

Background: The expression of empathy improves the quality of health care, which is why its instruction is suggested during the years of academic training of medical students. However, expressing empathy can also cause anxiety and impair psychological well-being. **Objective:** To identify profiles that describe the relationship between empathy, anxiety and psychological well-being in Mexican medical students. **Method:** Cross-sectional study in Mexican medical students completed the Multidimensional Empathy Scale, the Beck Anxiety Inventory, and the Psychological Well-Being Scale for Adults. **Results:** Women presented greater empathy and anxiety and lower psychological well-being ($p < 0.01$). Anxiety in students of the last year of training was lower compared to students of the first and second year ($p < 0.01$). Four profiles were detected: 1) men, minimal anxiety, low empathy; 2) first-year students, moderate to severe anxiety, low psychological well-being, high empathy; 3) last year of training, mild anxiety, adequate psychological well-being, medium empathy; 4) women, second and third year of training, very high empathy. **Conclusions:** Medical students in their first year of training constitute a population at risk. Attention strategies are necessary for this student group.

Keywords: Mental health. Multiple correspondence analysis. Medical students. Psychological profile.

Resumen

Antecedentes: La expresión de empatía mejora la calidad de la atención a la salud, y por ello se sugiere su instrucción durante los años de formación académica de estudiantes de medicina. No obstante, la expresión de empatía también puede ocasionar ansiedad y perjudicar el bienestar psicológico. **Objetivo:** Identificar perfiles que describan la relación entre empatía, ansiedad y bienestar psicológico en estudiantes mexicanos de medicina. **Método:** Estudio transversal en estudiantes mexicanos de medicina que completaron la Escala Multidimensional de Empatía, el Inventario de Ansiedad de Beck y la Escala de Bienestar Psicológico para Adultos. **Resultados:** Las mujeres presentaron mayor empatía y ansiedad, y menor bienestar psicológico ($p < 0.01$). La ansiedad en estudiantes del último año de formación fue menor que en los estudiantes de primer y segundo año ($p < 0.01$). Se detectaron cuatro perfiles: 1) hombres, ansiedad mínima, empatía baja; 2) estudiantes de primer año de formación, ansiedad moderada a grave, bienestar psicológico bajo, empatía alta; 3) último año de formación, ansiedad leve, bienestar psicológico adecuado, empatía media; 4) mujeres, segundo y tercer años de formación, muy alta empatía.

*Correspondence:

Ivette Vargas-de la Cruz

E-mail: ivette.vargas@academicos.udg.mx

2444-0507/© 2022 Academia Mexicana de Cirugía. Published by Permanyer. This is an open access article under the terms of the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Date of reception: 11-05-2022

Date of acceptance: 20-07-2022

DOI: 10.24875/CIRUE.M22000676

Cir Cir (Eng). 2023;91(5):667-671

Contents available at PubMed

www.cirugiaycirujanos.com

Conclusiones: Los estudiantes de medicina del primer año de formación constituyen una población de riesgo. Son necesarias estrategias de atención para este grupo estudiantil.

Palabras clave: Salud mental. Análisis de correspondencias múltiples. Estudiantes de medicina. Perfil psicológico.

Introduction

Empathy in health care presents multiple benefits, such as a better diagnosis¹ and improved clinical outcomes², greater treatment adherence, and higher patient satisfaction³, lower rates of medical complaints⁴, and lower levels of the burnout syndrome in physicians⁵. However, data suggest that its expression can cause anxiety and depression, resulting in the condition referred to as compassion fatigue^{6,7}.

Due to its benefits during professional practice, empathy has been evaluated^{8,9} and instructed¹⁰ during medical student training^{11,12}. However, the prevalence of anxiety is high in this population^{13,14}, and previous studies have reported a negative association between empathy and anxiety¹⁵. This implies that training empathy without resources to control associated anxiety may be counterproductive. Empathy can also impair other aspects of mental health, such as psychological well-being, which refers to a positive affective state that promotes optimal functioning in personal and social life¹⁶. Although this has been considered a critical aspect in medical education¹⁷, data demonstrate its decrease over the course of medical studies¹⁸, although unrelated to low empathy¹⁹.

Empathy can be a factor associated with high levels of anxiety and low psychological well-being in medical students, although few studies have investigated this relationship. This study identified profiles that describe the relationship between empathy, anxiety, and psychological well-being in Mexican medical students.

Method

This was a cross-sectional study in which, through non-probabilistic convenience sampling, from August through December 2019, medical students from a public university were recruited. The inclusion criteria were voluntary participation in the study and completion of a battery with three instruments. This battery included a letter of informed consent, a questionnaire on sociodemographic and academic variables, the Reduced Multidimensional Empathy Scale (MES)²⁰, the Beck Anxiety Inventory (BAI)²¹, and the Psychological

Well-being Scale for Adults (BWS-A)²², validated in the Mexican population^{20,23,24}. The MES consists of 10 items with five response options, explaining 59% of the variance ($\alpha = 0.77$), and a higher score indicates greater empathy. The BAI comprises 21 items with four response options, explaining 56% of the variance ($\alpha = 0.93$). Anxiety level was considered based on its score: minimal (0-5), mild (6-15), moderate (16-30), and severe (31-63). The BWS-A scale comprises 12 items with three response options, explaining 60% of the variance ($\alpha = 0.79$). Adequate psychological well-being was considered with scores ≥ 32 .

Two researchers requested the collaboration of the students in the study, explained the objectives, and clarified their doubts. Those who agreed to participate received a form of informed consent and the printed battery.

The sociodemographic characteristics of the sample were identified, and differences in empathy, anxiety, and psychological well-being between genders and year of training were analyzed using a two-way factorial ANOVA (gender $\times$ year of training), the post hoc test of Honestly Significant Difference (HSD), and η^2 as an index of effect size (small, medium, and large effect: $\eta^2 \geq 0.01$, 0.06, and 0.14, respectively). To identify subgroups with differentiated levels of empathy, a cluster analysis was performed using hierarchical clustering technique with squared Euclidean distance and Ward's clustering method. Subgroups were formed by inspecting the dendrogram and validated using one-way ANOVA tests, HSD, and η^2 . Prevalences for empathy level, anxiety, and psychological well-being were identified. A multiple correspondence analysis was conducted with a bidimensional structure identified by the value of discrimination measures (DM). SPSS v.20 software was used.

This study was approved by the Secretariat of Research and Postgraduate Studies of the National Polytechnic Institute, Mexico (registration No. SIP20195546).

Results

A total of 322 students participated, but the data from one student were excluded due to multivariate

Table 1. Mean scores obtained by men and women, year of training, for empathy, anxiety, and psychological well-being

	Gender		Years of training			
	Female	Male	1	2	3	4
MES, mean (SD)	39.22 (5.44)	36.87 (5.15)	38.37 (4.84)	39.08 (4.96)	37.87 (6.27)	37.75 (5.84)
BAI, mean (SD)	20.51 (12.68)	16.52 (12.38)	20.60 (12.31)	20.78 (12.85)	19.28 (13.21)	14.51 (11.62)
BWS-A, mean (SD)	30.75 (3.23)	31.60 (3.05)	31.06 (3.27)	30.92 (3.47)	30.71 (3)	31.62 (2.87)

BAI: Beck Anxiety Inventory; BWS-A: Psychological Well-being Scale for Adults; MES: Multidimensional Empathy Scale; SD: standard deviation.

outliers. The 321 retained students had a mean age of 20.60 years (standard deviation [SD], 4.33), with 196 (61.1%) females and 125 (38.9%) males. They were in their first ($n = 93$; 29%), second ($n = 84$; 26.2%), third ($n = 70$; 21.8%), or final ($n = 74$; 23.1%) year of training, attending morning classes ($n = 104$; 32.4%), evening classes ($n = 27$; 8.4%), or a mixed schedule ($n = 190$; 59.2%). The academic average ranged from 70 to 100/100 ($M = 93.01$; $SD, 4.35$), and 10 (3.1%) participants had between one and nine failed subjects ($Mdn = 0$). Medicine was the first choice of career for 284 (88.5%) students.

Table 1 shows the mean scores for MES, BAI, and BWS-A obtained by gender and year of training. ANOVA tests identified a main effect for gender, with females scoring higher in MES, $F(1, 313) = 15.28$, $p < 0.01$, and $\eta^2 = 0.04$, and in BAI, $F(1, 313) = 5.51$, $p = 0.02$, and $\eta^2 = 0.01$, and lower in BWS-A, $F(1, 313) = 4.89$, $p = 0.02$, and $\eta^2 = 0.01$. A main effect was also detected for the year of training factor, with lower BAI scores obtained by final-year students vs those in the first and second years, $F(3, 313) = 3.58$, $p = 0.01$, $\eta^2 = 0.03$, and DHS $p < 0.01$ (Table 1).

Four distinct levels of empathy possession were identified: low (19-34), medium (35-37), high (38-41), and very high (45-50), with $F(3, 317) = 575.76$, $p < 0.01$, $\eta^2 = 0.84$, and DHS < 0.01 .

Empathy was low in 70 (21.8%) participants, medium in 69 (21.5%), high in 92 (28.7%), and very high in 90 (28%) participants. Minimal anxiety was present in 51 (15.9%) participants, mild in 88 (27.4%), moderate in 119 (37.1%), and severe in 63 (19.6%). Psychological well-being was low for 154 (48%) and adequate for 167 (52%) participants.

Dimension 1 of the multiple correspondence analysis explained 31.28% of the variance and was defined by the anxiety level (DM, 0.47). Dimension 2 explained 23.21% of the variance and was defined by the empathy level (DM, 0.47). The identified profiles (Fig. 1) were:

- Profile 1: males, minimal anxiety, low empathy.

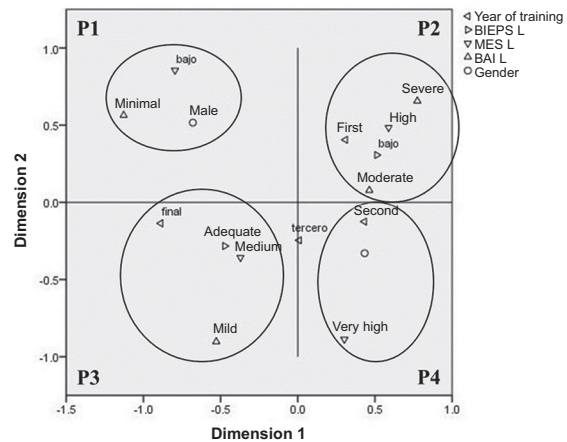


Figure 1. Profile of medical students regarding empathy, anxiety, and psychological well-being. BAI, Beck Anxiety Inventory; BWS-A, Psychological Well-being Scale for Adults; L, level; MES, Multidimensional Empathy Scale; P, profile.

- Profile 2: first-year students, moderate to severe anxiety, low psychological well-being, high empathy.
- Profile 3: final-year students, mild anxiety, adequate psychological well-being, medium empathy.
- Profile 4: females, second and third-year students, very high empathy.

Discussion

The main finding of this study was that a high level of empathy is associated to moderate-to-severe levels of anxiety and low psychological well-being in students of the first year of formation of the medical career.

Empathy was high or very high in 58.7% of the evaluated students, which may be attributed to the nature of the medical career, which requires contact with third parties and thus tends to be frequently chosen by individuals with greater empathic skills²⁶. Consistent with the literature, women obtained higher scores in the evaluation of empathy²⁷, which has been explained by evolutionary, neurobiological, and social influences that lead to different cognitive styles²⁸. The prevalence of moderate-to-severe anxiety is also within the

previously reported range^{13,14}, with women obtaining higher scores in their evaluation¹⁴. This may be due to sex-related differences in the hormonal response to stress²⁹. The low and adequate levels of psychological well-being were close to equivalence in the analyzed sample. However, the score obtained by women was lower. The latter may have been due to the higher anxiety detected in them. The level of empathy and psychological well-being was equivalent across years of formation. In the case of empathy, this is contrary to previous data^{30,31}. However, when changes in this skill are reported, the effect size is small, so the practical implication of this result is equally irrelevant³². In the case of psychological well-being, former studies have obtained the same result¹⁴ and may be due, among other factors, to the measurement instrument used. Lower anxiety levels in students of the last year of formation has also been reported in other studies and may be due to the acquisition of adequate coping strategies³³.

The most relevant aspect of this research is the integration of the profiles that describe the relationship between empathy, anxiety, and psychological well-being. Profiles 1 and 4 can be explained by differentiated cognitive styles that inhibit or promote empathic ability in men and women, respectively²⁸. Profile 3 may be due to the acquisition of adequate coping strategies; future research should verify this hypothesis. Profile 2 is new because it suggests an adverse reaction of empathy on the mental health of medical students, regardless of the student's gender. For the members of this profile, it is possible that higher empathy leads to greater emotional involvement with third parties, which, in turn, can generate anxiety and decrease their psychological well-being. A relationship of this kind among empathy, anxiety, and psychological well-being is consistent with the concept of compassion fatigue, mostly investigated in health professionals^{6,7}, but to a lesser extent in undergraduate students³⁴. In this regard, although patient care is not a common activity for first-year medical students, knowledge about the duration and mid- to long-term effects of possible compassion fatigue in this population is scarce.

Although the data found so far only indicate somatic symptoms of anxiety in the studied population, it would be interesting to identify if these findings could extend to specific anxiety disorders or other conditions. In such case, it could affect the work of health care professionals, as suggested in the literature^{35,37}. Paradoxically, empathy, which has been pointed out

as a beneficial factor in health care, could also bring drawbacks to clinical care and reinforce a possibly pre-existing psychopathology. Therefore, we need to delve into the study of this relationship to develop specific programs in this population.

A limitation of this study is its cross-sectional design, which does not allow establishing or evaluating causal relationships between the variables of interest. Additionally, only students from a public university participated, which limits the generality of its results to students from private schools or other regions of the country. Future studies should address the relationship among empathy, anxiety, and psychological well-being in larger and more diverse samples, and use designs to identify the mechanisms involved and propose relevant intervention strategies.

Conclusions

A high level of empathy is associated with moderate-to-severe levels of anxiety and low psychological well-being. These characteristics are independent of gender and are mainly found in first-year students, who can be considered a population at risk. Intervention strategies are necessary for this student sector to avoid harm to their quality of life and learning, while maintaining the benefits that empathy can generate in their future professional practice.

Acknowledgments

The authors would like to thank the University of Guadalajara for their collaboration while conducting this study.

Funding

This study was funded by the National Polytechnic Institute through a scholarship (registration No. SIP20195546) granted to RPFE.

Conflicts of interest

None declared.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

References

1. Derksen F, Bensing J, Lagro-Janssen A. Effectiveness of empathy in general practice: a systematic review. *Br J Gen Pract.* 2013;63:e76-e84.
2. Stansfield RB, Schwartz A, O'Brien CL, Dekhtyar M, Dunham L, Quirk M. Development of a metacognitive effort construct of empathy during clinical training: a longitudinal study of the factor structure of the Jefferson Scale of Empathy. *Adv Health Sci Educ Theory Pract.* 2016;21:5-17.
3. Mahmoudian A, Zamani A, Tavakoli N, Farajzadegan Z, Fathollahi-Dehkordi F. Medication adherence in patients with hypertension: does satisfaction with doctor-patient relationship work? *J Res Med Sci.* 2017;22:48.
4. Stepien KA, Baernstein A. Educating for empathy: A review. *J Gen Intern Med.* 2006;21:524-30.
5. Derksen F, Bensing J, Lagro-Janssen A. Effectiveness of empathy in general practice: a systematic review. *Br J Gen Pract.* 2013;63:e76-e84.
6. Duarte J, Pinto-Gouveia J. Empathy and feelings of guilt experienced by nurses: a cross-sectional study of their role in burnout and compassion fatigue symptoms. *Appl Nurs Res.* 2017;35:42-7.
7. Hunt P, Denieffe S, Gooney M. Running on empathy: relationship of empathy to compassion satisfaction and compassion fatigue in cancer healthcare professionals. *Eur J Cancer Care.* 2019;28:e13124.
8. Wellbery C, Barjasteh T, Korostyshevskiy V. Medical students' individual and social empathy: a follow-up study. *Med Teach.* 2019;41:656-61.
9. Yeo S, Kim KJ. A validation study of the Korean version of the Toronto empathy questionnaire for the measurement of medical students' empathy. *BMC Med Educ.* 2021;21:1-8.
10. Yun JY, Kim KH, Joo GJ, Kim BN, Roh MS, Shin MS. Changing characteristics of the empathic communication network after empathy-enhancement program for medical students. *Sci Rep.* 2018;8:1-11.
11. Ogle J, Bushnell JA, Caputi P. Empathy is related to clinical competence in medical care. *Med Educ.* 2013;47:824-31.
12. Passi V, Doug M, Peile JT, Johnson N. Developing medical professionalism in future doctors: a systematic review. *Int J Med Educ.* 2010;1:19-29.
13. Sarkar S, Gupta R, Menon V. A systematic review of depression, anxiety, and stress among medical students in India. *J Mental Health Hum Behav.* 2017;22:88-96.
14. Luna D, Urquiza-Flores DI, Figuerola-Escoto RP, Carreño-Morales C, Meneses-González F. Academic and sociodemographic predictors of anxiety and psychological well-being in Mexican medical students. A cross-sectional study. *Gac Med Mex.* 2020;156:40-6.
15. Brunfentrinker C, Gomig RP, Grosseman S. Prevalence of empathy, anxiety and depression, and their association with each other and with sex and intended specialty in medical students. *Rev Bras Educ Med.* 2021;45:e182.
16. Udhayakumar P, Illango P. Psychological wellbeing among college students. *J Soc Work Educ.* 2018;3:79-89.
17. Dunn LB, Iglewicz A, Moutier C. A conceptual model of medical student well-being: promoting resilience and preventing burnout. *Acad Psychiatry.* 2008;32:44-53.
18. Park CL, Adler NE. Coping style as a predictor of health and well-being across the first year of medical school. *Health Psychol.* 2003;22:627-31.
19. Roling G, Lutz G, Edelhäuser F, Hofmann M, Valk-Draad MP, Wack C, et al. Empathy, well-being and stressful experiences in the clinical learning environment. *Patient Educ Couns.* 2020;103:2320-7.
20. Lozano RG. Actitudes y estrategias de persuasión hacia la donación de órganos y tejidos. [Tesis de pregrado]. México: Universidad Nacional Autónoma de México; 2002. Disponible en: <http://132.248.9.195/pdtest-df/0309346/Index.html>.
21. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol.* 1988;56:893-7.
22. Casullo M. Evaluación del bienestar psicológico en Iberoamérica. Buenos Aires: Paidós; 2002.
23. Robles R, Varela R, Jurado S, Páez F. Versión mexicana del Inventario de Ansiedad de Beck: propiedades psicométricas. *Rev Mex Psicol.* 2011;8:211-7.
24. Luna D, Figuerola Escoto RP, López Cruz H. Propiedades psicométricas de la Escala de Bienestar Psicológico para Adultos (BIEPS-A) en universitarios mexicanos. Trabajo de investigación presentado en: 3.º Congreso Internacional de Psicología. La psicología ante los desafíos de construir vertientes para el mejoramiento de la sociedad. 15 de febrero de 2019, Ciudad de México, México.
25. Aron A, Aron EN. Estadística para psicólogos. México: Prentice Hall; 2001.
26. Varella MAC, Ferreira JHBP, Pereira KJ, Bussab VSR, Valentova JV. Empathizing, systemizing, and career choice in Brazil: sex differences and individual variation among areas of study. *Pers Individ Dif.* 2016;97:157-64.
27. Blanco JM, Caballero F, García FJ, Lorenzo F, Monge D. Validation of the Jefferson Scale of Physician Empathy in Spanish medical students who participated in an Early Clerkship Immersion programme. *BMC Med Educ.* 2018;18:209.
28. Kidron R, Kaganovskiy L, Baron-Cohen S. Empathizing-systemizing cognitive styles: effects of sex and academic degree. *PloS One.* 2018;13:e0194515.
29. Olff M, Langeland W, Draijer N, Gersons BP. Gender differences in posttraumatic stress disorder. *Psychol Bull.* 2007;133:183-204.
30. Wang Q, Wang L, Shi M, Li X, Liu R, Liu J, et al. Empathy, burnout, life satisfaction, correlations and associated socio-demographic factors among Chinese undergraduate medical students: an exploratory cross-sectional study. *BMC Med Educ.* 2019;19:341.
31. Ulloque MJ, Villalba S, Varela DVT, Fantini A, Quinteros S, Díaz-Narváez V. Niveles de empatía en estudiantes de medicina de Córdoba, Argentina. *Arch Argent Pediatr.* 2019;117:81-6.
32. Ferreira-Valente A, Monteiro JS, Barbosa RM, Salgueira A, Costa P, Costa MJ. Clarifying changes in student empathy throughout medical school: a scoping review. *Adv Health Sci Educ Theory Pract.* 2017;22:1293-313.
33. Steiner-Hofbauer V, Holzinger A. How to cope with the challenges of medical education? Stress, depression, and coping in undergraduate medical students. *Acad Psychiatry.* 2020;44:380-7.
34. Chachula KM. A comprehensive review of compassion fatigue in pre-licensure health students: antecedents, attributes, and consequences. *Curr Psychol.* 2022;41:6275-87.
35. Sochos A, Bowers A, Kinman G. Work stressors, social support, and burnout in junior doctors: exploring direct and indirect pathways. *J Employ Couns.* 2012;49:62-73.
36. Thomas I, Nicol L, Regan L, Cleland J, Maliepaard D, Clark L, et al. Driven to distraction: a prospective controlled study of a simulated ward round experience to improve patient safety teaching for medical students. *BMJ Qual Saf.* 2015;24:154-61.
37. Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med.* 2002;136:358-67.