

Original research

Changes in the decline on empathy levels of dental students in Costa Rica



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ABSTRACT

Objectives: Based on recent curriculum changes at the University of Science and Technology in Costa Rica (ULACIT) it is of great academic interest to verify the impact of this new approach on courses with respect to the development of empathy, thus compare previous results with a new collection of information.

Methods: The levels of empathy and matrices of empathy construct are estimated by dental students by using the Jefferson Scale of Physician Empathy, the Spanish version for students (S version) previously culturally validated. Cronbach α was estimated and compared with data previously published. A two-way analysis of variance (ANOVA), model III, in order to find differences in the average between academic years and gender, and the interaction between these two factors was applied.

Results: There continues to remain a gender difference in the attribute of empathy in dental students of ULACIT, greater in females than males, however with a smaller difference than before. Students continue to show higher levels of empathy at the start of the academic career, however with a decline among fourth year students.

Conclusions: New curriculum changes that involve greater integration of students with their patients, consistent with the greater inclusion of clinical activities and community visits continue to show the development of empathy. Differences among genders, variation in years, and how empathy levels change in the professional field should be further explored.

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Mudanças na diminuição dos níveis de empatia de estudantes de Odontologia na Costa Rica

R E S U M O

Palavras-chave:

Currículo
Odontologia
Educação
Empatia

Objetivos: Baseado em mudanças recentes no currículo na Universidade de Ciências e Tecnologia da Costa Rica (ULACIT), é de grande interesse acadêmico avaliar o impacto desta nova abordagem nas disciplinas, considerando o desenvolvimento de empatia e comparando os resultados prévios com as novas informações coletadas.

Métodos: Os níveis de empatia e matrizes de construção de empatia foram estimados pelos estudantes de Odontologia usando a Escala Jefferson de Empatia Médica, versão em Espanhol para estudantes (versão S), validada culturalmente previamente. O teste de Cronbach α estimou e comparou os resultados com dados publicados previamente. Foi aplicada a análise de variância de dois fatores (ANOVA), modelo III, com o objetivo de encontrar diferenças na média entre o ano acadêmico e o gênero, e a interação entre estes dois fatores.

Resultados: Ainda existe diferença entre os gêneros para a empatia dos estudantes de Odontologia da ULACIT, maior em mulheres do que em homens, com menor diferença do que comparados com os resultados anteriores. Os estudantes continuam demonstrando altos níveis de empatia no início da carreira acadêmica, com declínio entre os estudantes de último ano.

Conclusões: As mudanças curriculares que envolvem maior integração dos estudantes com seus pacientes, com maior inclusão de atividades clínicas e visitas à comunidade, continuam demonstrando o desenvolvimento de empatia. As diferenças entre gêneros, variação em ano acadêmico e o quanto os níveis de empatia modificam o campo profissional, devem ser ainda melhor avaliados em estudos futuros.

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Introduction

Empathy is a fundamental component of therapeutic efficacy in professionals of Health Sciences and is associated with improved patient outcomes.¹ Empathy is considered of great benefit to the processes of adherence to medical protocols, patient satisfaction and therefore improves the ability to provide quality care.^{2,3}

In 2012, this phenomenon was first studied to measure the impact on the educational process in students of Dentistry at the University of Science and Technology (ULACIT, Costa Rica), in order to evaluate the potentiation of empathy during the academic career, as well as to verify the existence of gender differences in the expression of this attribute.³ The results obtained at that time indicated that although students generally showed greater empathy levels in advanced stages of the academic career, there was a significant difference between genders, in which women exhibited a more steady growth throughout their academic career.

In 2013, ULACIT as a result of self-evaluation and the process of accreditation of the academic career, the curriculum was updated, strengthening the humanities and basic sciences, and incorporating a greater and earlier clinical experience in both university facilities and communities. Based on these changes it is of great academic interest to verify the impact of

this new approach on the curriculum with respect to the development of empathy, thus comparing previous results with a new collection of information.

Our hypothesis is that with the new curricula the decline will be reduced, and that the students will not show the drop on empathy during the pursuit of their degree.

Materials and Methods

This is an exploratory and cross-sectional study that met the standards of Helsinki. The sample population formed by students of Dentistry at the University of Science and Technology (ULACIT, Costa Rica) was divided into five academic years (2.4 quarterly cycles per year) (n= 159 of n= 225). Based on this, population stratifications were found per year: first: 22; second: 35; third: 39; fourth 35 and fifth: 28. In regard to the gender factor, the sample composition was as follows: female= 108 and male= 51. Data collection was conducted in November 2015. Participants were administered the Jefferson Scale of Physician Empathy (JSPE), the version in Spanish for medical students (S version), validated in Mexico and Chile^{5,6} and adapted for dental students in Costa Rica.³ The application was anonymous and confidential (neutral operator). Before being applied the

JSPE, it was subjected to the discretion of judges (three relevant academic professional dentists) in order to verify validity and cultural content.^{4,5} The students understanding of the scale was culturally adapted during a pilot study, as well as a comparison of data published in 2012 by Sánchez et al.³

Statistical analysis of data was submitted to normality tests (Kolmogorov-Smirnov) and equal variance (Levene). Internal reliability of the data was estimated by Cronbach's alpha test and the values of this statistic measured were eliminated with each of the elements (questions), Hotelling T² and Tukey nonadditivity tests. The means were estimated, with standard deviation. A two-way analysis of variance (ANOVA), model III, in order to find differences in the average between academic years and gender, and the interaction between these two factors was applied. The data were described by graphic boxes and simple arithmetic, processed using the SPSS 20.0 statistical program. The comparison between the results of empathy seen with the previous curriculum (2012) obtained in a previous study⁴ with those observed in the present study were performed by a discriminant test, using the statistic λ (Lambda Wilks) to determine differences in each question of the instrument and Box's M test to compare matrices of the variance-covariance between groups. The level of significance used was $\alpha \leq 0.05$ and $\beta < 0.20$ in all cases.

Table 1. Results of estimation of mean, standard deviation and sample sizes in each of the studied factors and each of its levels of the empathy variable.

Academic year	Gender	Mean	Standard Deviation	n
First Year	Feminine	91.69	16.03	16
	Masculine	91.00	13.19	6
	Total	91.50	15.01	22
Second Year	Feminine	102.75	18.66	24
	Masculine	96.91	12.41	11
	Total	100.91	16.98	35
Third Year	Feminine	110.15	14.99	27
	Masculine	101.58	17.22	12
	Total	107.51	15.99	39
Fourth Year	Feminine	106.83	15.39	23
	Masculine	98.33	20.28	12
	Total	103.91	17.41	35
Fifth Year	Feminine	107.89	16.31	18
	Masculine	108.90	11.00	10
	Total	108.25	14.42	28
Total	Feminine	104.69	17.11	108
	Masculine	100.00	15.96	51
	Total	103.18	16.84	159

Results

The Kolmogorov-Smirnov and Levene test were not significant ($p > 0.05$) therefore the data were normally distributed with equal variances. The Cronbach's alpha values were satisfactory (without typifying = 0.821 and typified = 0.827), which infers that the data has internal reliability. The total value of Cronbach alpha, if eliminated per item (question), fluctuated between values [0.802; 0.820] and inferred that the test remains highly reliable regardless the elimination of one of the items in the estimation of this statistic. The Hotelling T² test ($F = 21.61$) was highly significant ($p < 0.005$) and infers that the means of the questions are different, showing that not all contributed equally to the overall average of the questions (mean = 5.16). The nonadditivity Tukey test ($F = 2.28$) was not significant ($p > 0.05$), which infers that it is not necessary to raise the power of the test due to the additive nature of the data. The results of the estimate of the mean, standard deviation and the sample size for each level of the two factors studied are shown in Table 1. Also in the same Table the results are presented in the combined means of the levels of both factors.

ANOVA results were highly significant ($p = 0.009$) for the factor "Academic Year" and the Tukey test (Table 2, Figure 1) which allowed two distinct groups: a) the first is constituted by the means of the first and second academic year and b) the second by the means of the second, third, fourth, and fifth year in ascending order. Between these two groups there were significant differences ($p < 0.05$). Gender and interaction were not significant ($p = 0.111$; $p = 0.736$ respectively). The values of η^2 (eta-squared) were 0.086, 0.017 and 0.013 for both factors and their respective interaction and the power was 0.856; 0.356, and 0.167, respectively.

From these results it can be inferred that the effect size of the statistical differences found is of the medium type for the Academic Year and low for the remaining factors. Regarding the power the same occurs as was described for the effect size and does not require increasing the size to show the reached value of the accepted power (0.80) in the factor of Academic Year. The R² value corrected was 0.084, which corresponds that the studied factors explain only 8.4% of the variation of empathy.

Table 2. Results of application of test of the multiple comparisons of the means.

Academic year	Groups or Subgroups of the means	
	1	2
First Year	91.50	
Second Year	100.91	100.91
Fourth Year		103.91
Third Year		107.51
Fifth Year		108.25
Sig.	.157	.391

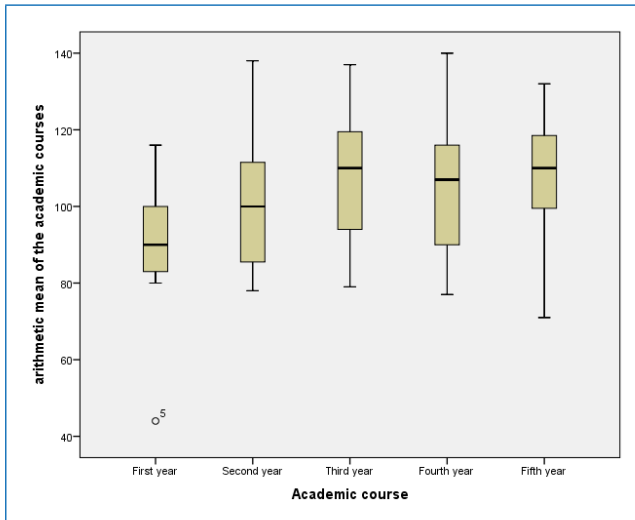


Figure 1. Chart boxes with the means and standard deviations of the levels of empathy for the factor of academic year.

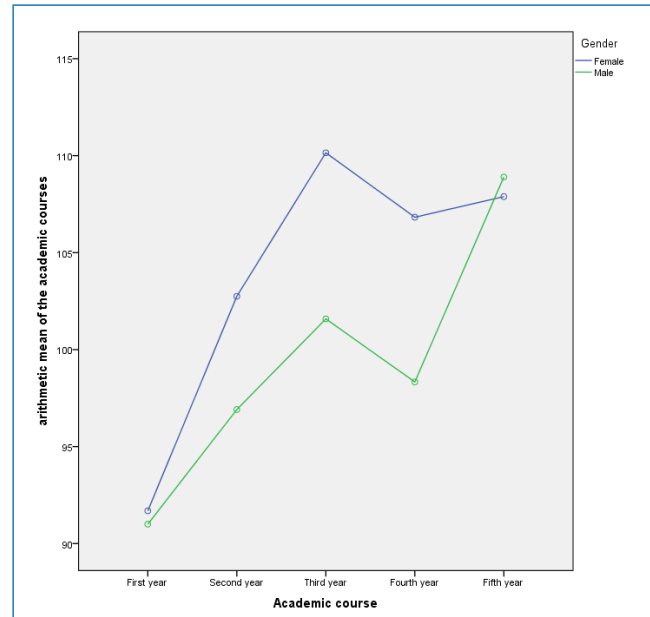


Figure 3. Simple arithmetic graph with the means of levels of empathy on both factors and at each level of these factors.

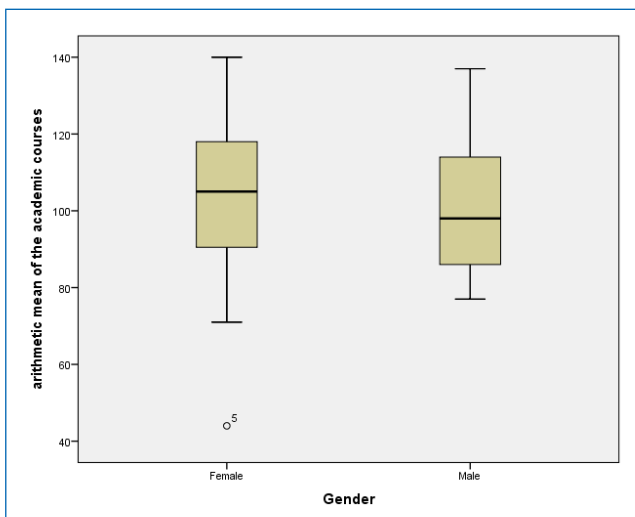


Figure 2. Chart boxes for the means of genres with their respective standard deviations.

Finally, Figure 3 shows the distribution of means of genders in each of the academic years shown. It was observed that the behavior is different in both genders and in women there where a greater increase in levels of empathy in the increase of academic years. There was an exception of the fifth year where similar values occur in both genders.

The results of estimation of means and standard deviation of the mean of each question in each period of the empathy measurements are presented in Table 3. In Table 4, the results of the comparison between the two groups are shown and observed that the λ statistic found statistically significant differences, highly significant ($p < 0.05$; $p < 0.001$) in questions 3, 6, 7, 9, 10, 12, 13, 14, 16 and 20. The M Box statistic (15.44) was also highly significant ($p < 0.005$).

Discussion

Consistent with our previous results and the work of other researchers, there is a gender difference in the attribute of empathy in students of Dentistry.^{3,5-7} This difference is reflected only in absolute terms, but it is noteworthy that there are points of greater separation between the two groups in the third and fourth academic year. In the previous study³, we explained the gender difference as a result of a possible greater emotion in females; however, instruments were not included in the previous or current study that could validate this assertion. What we can affirm is, by the end of the degree, both genders show similar levels of empathy, although there are times when it seems that the male does not exhibit that trait in their profile. The female representation is doubled compared to males in this sample, with a ratio of 2.1:1, a more balanced sample than in 2012 (3:1). Having a predominantly female population favors the empathetic character in the student body during the career, but does not hinder the development of this attribute generally in the majority of graduates, regardless of gender.

It has not yet been studied the behavior of empathy in professionals, in order to determine if this is higher among females, which could be a determining factor in the type of leadership that the health sector could experience, if this is the case.^{8,9} Another explanation for not finding significant gender differences among students, as in other studies in health sciences¹⁰⁻¹², is the possibility that cultural attitudes influence empathy. While other studies in health sciences show that the female gender has greater empathic levels, and explains how females have a greater identification with positive feelings of patients,

Table 3. Results of the value of means in each of the questions of the two measurements (periods) compared.

Year Measured and Period	Mean	Stand. Deviation	
2015	P1	4.33	2.25
	P2	6.30	1.18
	P3	4.35	1.67
	P4	6.36	1.16
	P5	5.84	1.54
	P6	3.88	1.63
	P7	5.27	2.24
	P8	4.77	2.22
	P9	5.58	1.62
	P10	5.81	1.55
	P11	4.72	1.96
	P12	4.60	1.98
	P13	5.19	1.79
	P14	5.17	2.01
	P15	5.21	1.63
	P16	5.82	1.44
	P17	5.38	1.62
	P18	3.75	1.79
	P19	5.30	1.90
	P20	5.57	1.62
2012	P1	4.37	2.37
	P2	6.86	4.80
	P3	2.24	2.07
	P4	6.36	1.16
	P5	5.82	1.53
	P6	3.36	1.66
	P7	5.76	2.07
	P8	4.94	2.20
	P9	6.04	1.31
	P10	6.24	1.10
	P11	4.91	1.78
	P12	5.17	1.97
	P13	5.76	1.55
	P14	5.60	1.70
	P15	5.44	1.64
	P16	6.16	1.24
	P17	5.47	1.73
	P18	3.49	1.87
	P19	5.44	1.90
	P20	6.06	1.40

as well as argue that there is a greater empathetic stress, when they identify more with suffering patients.¹³

With respect to the behavior during the career, there is generally an upward trend, because students in advanced stages of dentistry show higher levels of empathy than those who start the course, except for the fourth academic year, in which there is a decline in value. This year corresponds to the quarters of the career, in which students take subjects such as Ethics and Relationship to Patients, Gerontology and Geriatric Medicine, Clinical Internship, Dentistry for Children and Adolescents, and Rehabilitation of the Partial Edentulous, which is an unexpected finding in this study. Although the present study is cross-sectional, which imposes significant limitations

Table 4. Results of the comparison of the average levels of empathy for each question (P) between the compared groups (years studied).

	Lambda of Wilks	F	Sig.
P1	1.000	.022	.882
P2	.994	2.125	.146
P3	.774	111.819	.001
P4	1.000	.002	.968
P5	1.000	.008	.928
P6	.976	9.464	.002
P7	.988	4.778	.029
P8	.999	.516	.473
P9	.976	9.260	.003
P10	.974	10.327	.001
P11	.997	1.019	.313
P12	.980	7.609	.006
P13	.972	10.955	.001
P14	.987	5.227	.023
P15	.995	1.955	.163
P16	.984	6.227	.013
P17	.999	.262	.609
P18	.995	1.795	.181
P19	.999	.572	.450
P20	.975	9.784	.002

on measuring the change in levels of empathy during career development, the decline of empathy could be explained by a distraction from the social component of the educational process that the student faces with the need to complete their career requirements, temporarily depersonalizing the patient.

This same decline is observed in studies in Venezuela, where it was attributed to fatigue and emotional stress of students.¹⁴ This should be further explored, because if it is correct, it is a situation that must be corrected in a timely manner and generate appropriate preventive strategies. In a study of medical students in the Dominican Republic, it shows a drop in the level of empathy (in both genders), at the end of the career, that is explained as a result of requirements in the curriculum and the need to focus on standardized testing at the end of the career.¹⁵

Compared with the results previously collected,³ this time a smaller gap is observed between genders, as well as a more regular behavior in males, that now experiences a decline in the fourth year and not in the third. This decline in empathy, not present in any of the two previous studies in the female gender, deserves further discussion. Hoffman has suggested that men are less likely to imagine themselves in the place of another, because they are more instrumental or pragmatic, with fewer tendencies to worry.¹⁶ This study does not address the issue of emotional expressions, but one possible explanation for the difference obtained in this study is that the male feels more comfortable expressing their emotions, something that could be of interest in future research.

When analyzing specific questions, it is worth noting, in the previous study,³ the highest value was obtained with the statement "my patients feel better when I understand their feelings";

while in this study, it was “I believe that the non-verbal language of my patient is as important as verbal communication in the doctor-patient relationship”. This finding is of great importance because it reflects an evolution from the perspective abstract (feeling) to a pragmatic (communication). There is also a change in the lower value, when compared to the previous study “it is hard for me to see things from the perspective of my patient” and in this occasion is “I do not allow myself to be affected by intense emotional relationships between my patients and their families”, reflecting greater integration of students with their patients, consistent with the greater inclusion of clinical activities and community visits in the new curriculum. The link with communities during the career is a strategy to promote, in addition to disciplinary and soft skills, such as effective communication with patients and self-confidence.^{17,18}

Conclusions

Since curriculum changes were implemented, there remains a gender difference in the attribute of empathy in students of Dentistry, however with a smaller gap than previously observed. It is also noted that as one advances in dentistry, students continue to show higher levels of empathy than those who start the career, except for the fourth academic year, a phenomenon that should be further explored. The development of empathy, as other values that favor the clinician-patient relationship should be considered to be a part of the professional profile in the career of Dentistry, in that it promotes a better understanding of the needs of people that benefits in the end those that work as health care providers. The new curricula in ULACIT impacted the empathy decline during dental education, but how these empathy levels change with professional experience should be further explored.

Ethical disclosures

Protection of human and animal subjects. The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

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.

Conflicts of interest

The authors have no conflicts of interest to declare.

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