

ORIGINAL RESEARCH

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Levels of empathy in dental students at Universidad San Sebastián in Concepción, Chile

Niveles de empatía en estudiantes de Odontología de la Universidad San Sebastián, Concepción, Chile

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| Abstract |

Introduction: The training of future dentists should consider developing empathy while they are still students. The first step to consider such training is to assess empathic behavior.

Objective: To measure levels of empathy in dental students of Universidad San Sebastián in Concepción, by gender and academic year.

Materials and methods: The Spanish version of the Jefferson Scale of Physician Empathy (JSPE) for medical students (S version) was adapted and validated for the dental students of Universidad San Sebastián (Concepción, Chile) in 2016. The sample consisted of 462 students from first to fifth year. The data was compared by a trifactorial variance analysis (Model III).

Results: The “Academic Year” factor showed that the average in the second year is relatively lower than in the first. However, beginning in the third year, levels tend to increase and remain relatively constant for the next academic years. The “gender” factor revealed that women had higher average empathy values compared to males.

Conclusion: The factors studied (academic year and gender) shortly explain the variation of empathy in the sample of students analyzed. There are probably other factors that influence levels of empathy and that would explain better the behavior of estimated values of empathy.

Keywords: Empathy; Students, Dental; Dentistry (MeSH).

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| Resumen |

Introducción. La formación de los futuros odontólogos debe estar en sintonía con el desarrollo empático del alumno, por tanto, es necesario realizar un diagnóstico del comportamiento de la empatía.

Objetivo. Medir los niveles de empatía en los estudiantes de Odontología de la Universidad San Sebastián, sede Concepción, Chile, según género y año académico.

Materiales y métodos. Se aplicó la Escala de Empatía Médica de Jefferson (EEMJ) para estudiantes de medicina (versión en español), adaptada y validada para estudiantes de odontología en 2016. La muestra estuvo constituida por 462 estudiantes de primero a quinto año. Los datos fueron comparados mediante un análisis de varianza trifactorial (modelo III).

Resultados. En el factor “años académicos” se observó que las medias en el segundo año son menores que en el primero, pero a partir de tercer año aumentan los niveles de empatía manteniéndose constantes en los restantes años académicos. En el factor “género”, el femenino tuvo valores medios de empatía superiores al masculino.

Conclusión. Los factores estudiados (año académico y género) poco explican la variación existente en la empatía de los estudiantes analizados. Es probable que existan otros factores que influyen sobre los niveles de empatía y que permitirían explicar mejor el comportamiento de los valores estimados.

Palabras clave: Empatía; Estudiantes; Odontología (MeSH).

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Introduction

Empathy in health care can be considered as a cognitive and behavioral attribute that involves the ability to understand how the experiences and feelings of the patient influence and are influenced by the disease and its symptoms, as well as the ability to communicate such understanding to the patients (1), which is transversal to all

health careers. Authors have concluded that, in relation to clinical care, patients value not only the knowledge and technical skills of the dentist, but also the human factor, directly related to the attitude of health professionals (2-3).

Research in health professionals indicates that empathy has been associated, theoretically or empirically, with various attributes such as prosocial behavior, the ability to obtain medical records, increased patient and physician satisfaction, better therapeutic relationships and good clinical results (4-6). Literature indicates that empathic orientation is influenced by many factors, such as psychological or sociological matters, which explains the inconsistent results in different studies among dental and medical students (7-11).

With this in mind, the training of future dentists should be in tune with the development of empathic reactions from students. In order to broaden observations on the behavior of empathy and to improve the dentist-patient relationship, training on communicational abilities is necessary to foster the development of attitudes and aptitudes with a humanistic emphasis during the professional training process of dental students. However, the first step to engage in this type of training is to diagnose the behavior of empathy. Therefore, the aim of this study is to measure levels of empathy in dental students of the Universidad San Sebastián, in Concepción (Chile), based on gender and academic year.

Materials and Methods

This was an exploratory and cross-sectional study, conducted in accordance with the bioethical standards of the Declaration of Helsinki, and approved by the Ethics Committee of the Faculty of Dentistry.

The population consisted of dental students from the first to the fifth academic year from Universidad San Sebastián (USS) (Concepción, 2016), which were randomly selected for a total sample of 462 students (51.4% of the total population; n=899).

In this sample, the following stratifications were found by year: first year 79; second year: 112; third year: 88; fourth year: 93 and fifth year: 90. Regarding the gender factor, the sample composition was 189 males and 273 females. Data were collected by two neutral operators in one week (from May 9 to May 13, 2016), and each day of the week was dedicated to a determined year. The application of the Spanish version of the Jefferson Scale of Physician Empathy was anonymous and confidential.

The Spanish version of the Jefferson Scale of Physician Empathy (JSPE) for medical students (S version), adapted and validated in Mexico and Chile (10,12-13), was culturally adapted before being applied to Chilean dental students, using the judging criterion method (14). It was designed specifically for dental students, and five experts examined the questions to verify their validity and cultural content. To confirm if the cultural adapted scale was understandable, a pilot test was applied among dental students (14).

The final version of the applied scale was the result of the agreement of the aforementioned experts after confirming that it did not include confusing terms and that it could not be manipulated in a way that distorted the answers (14).

This instrument includes 20 items answered on a 7-point Likert scale, which has relevant content that allows assessing empathy between students and their patients (15). The JSPE scores can range from a minimum of 20 to a maximum of 140; the higher the score, the more empathetic will be the study population. This scale has shown stability in groups of students of different health programs. The reliability of the instrument by Cronbach's alpha is equal to or greater than 0.80 in some cases, with convergent and divergent validity confirmed by the significant correlation coefficient between

JSPE scores and conceptual measures of compassion, and the lack of significant association with irrelevant conceptual measures such as self-protection (15).

Regarding statistical analysis, the data was tested for normality (Kolmogorov-Smirnov) and equal variance (Levene). The internal reliability of the data was estimated by Cronbach's alpha and statistical values, which eliminated each of the elements (questions). Hotelling's T-squared distribution test and Tukey's test of non-additivity test were also applied. The average and standard deviation were estimated. A Model III two-way variance analysis (ANOVA) was conducted to find differences in average between academic years and gender, and their interaction. The data was described by graphics and simple arithmetic, and processed using the SPSS 20.0 statistical program. The level of significance used was $\alpha \leq 0.05$ and $\beta < 0.20$ in all cases.

Results

Kolmogorov-Smirnov test and Levene's test were not significant ($p > 0.05$), therefore, data are normally distributed with equal variances. The Cronbach's alpha values were satisfactory (without typing: 0.809 and typed: 0.825), so data had internal reliability. The total value of Cronbach's alpha, if an item (question) was deleted, fluctuated between 0.786 and 0.812, which leads to infer that the test had a high reliability, regardless of whether one of them is eliminated in the estimation.

Hotelling T2 ($F=103.4$; $p < 0.005$) and Tukey's non-additivity ($F=9.04$) were highly significant ($p=0.003$). In the first case, it is presumed that the means of the questions were different, which showed that not all questions contributed equally to the overall mean (mean 5.65); in the second case, it is inferred that the characteristics of the data required an increase to obtain its additive character.

The results of the estimation of the mean and standard deviation, and the sample size for each level of the two factors studied, are shown in Table 1 and Figures 1 and 2, respectively. Table 1 also presents the results of the means in combined levels for both factors.

Table 1. Results of the estimation of means and standard deviations at each level of the factors studied and combination of both factor levels.

Academic year	Gender	Mean	Standard Deviation	N
First year	Female	113.15	15.989	46
	Male	109.48	16.722	33
	Total	111.62	16.295	79
Second year	Female	108.48	14.333	66
	Male	108.17	12.210	46
	Total	108.36	13.444	112
Third year	Female	114.31	13.950	49
	Male	114.92	11.384	39
	Total	114.58	12.809	88
Fourth year	Female	119.69	10.164	54
	Male	110.13	13.201	39
	Total	115.68	12.409	93
Fifth year	Female	116.40	11.765	58
	Male	112.84	11.816	32
	Total	115.13	11.841	90
Total	Female	114.21	13.783	273
	Male	110.99	13.191	189
	Total	112.89	13.622	462

Source: Own elaboration based on the data obtained in the study.

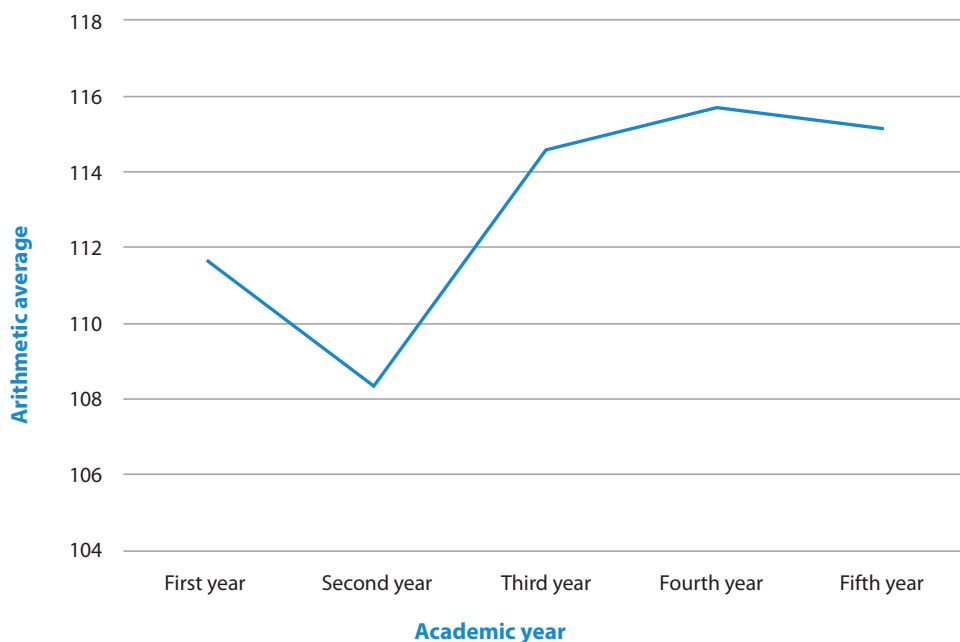


Figure 1. Averages of the “Academic Year” factor, including outliers.
Source: Own elaboration based on the data obtained in the study.

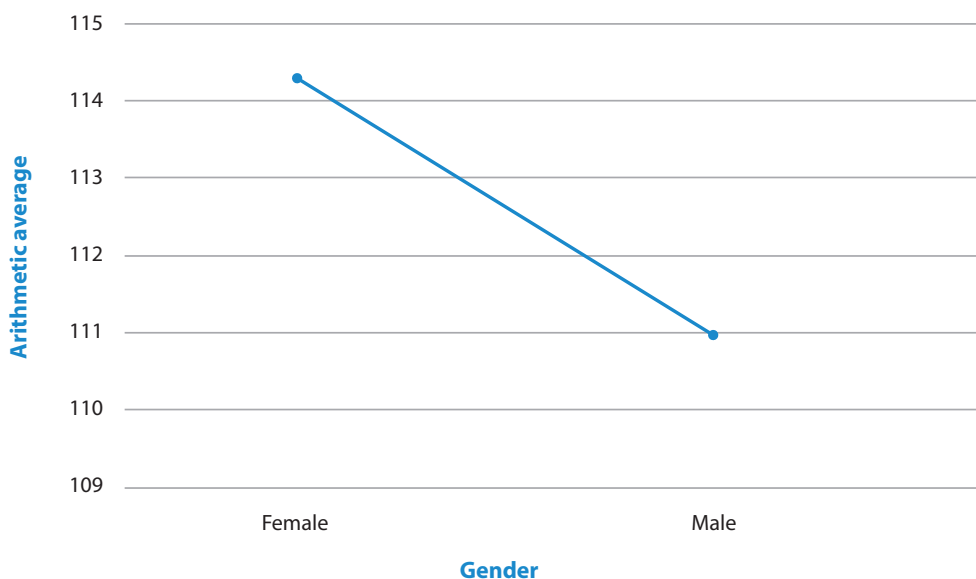


Figure 2. Averages in the “gender” factor, including outliers.
Source: Own elaboration based on the data obtained in the study.

ANOVA results were significant for “Academic Years” (Figure 1) and “Gender” (Figure 2): ($p=0.001$ and $p=0.009$, respectively), but their interaction was not significant ($p=0.081$).

Furthermore, eta-squared values were 0.04 —0.015 and 0.018 for both factors and their interaction—, while the power was 0.949–0.74 and 0.662 for both cases, respectively. Based on these results, it can be inferred that the effect size of the statistical differences is not high, and that a bigger sample size in the gender factor and interaction is necessary to achieve the value of the accepted power (0.80). The corrected value of R^2 was 0.057, which means that the studied factors explain only 5.7% of the variation of empathy.

In the “Academic Year” factor, it was observed that the mean in the second year was relatively lower than in the first; however, from the

third year onwards, empathy levels increased and remained relatively constant. Table 2 shows that, according to Tukey’s test, there are two groups of means: the first is made up of the means obtained for the first and second years (no statistical differences between them, therefore, they can be considered equal), and the second group with the means of the first, third, fourth and fifth year (with no statistical differences, therefore, they can be considered equal to each other).

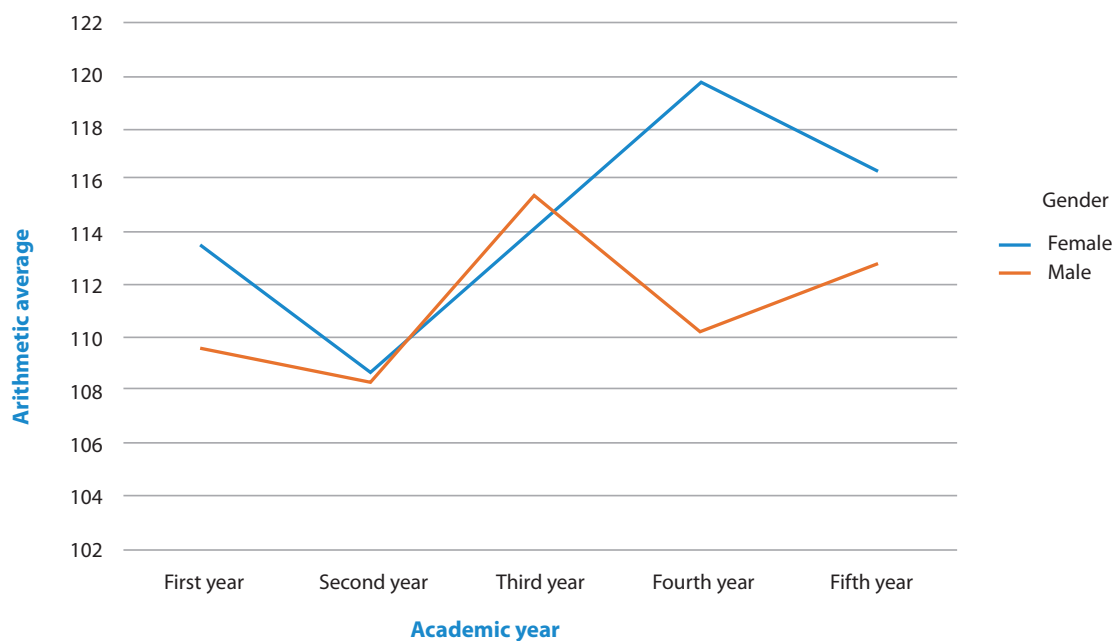
The essential differences were statistically evident between the second year and the third, fourth and fifth years. Given the absolute value of each of the means presented in Table 2, it can be clearly seen that the third, fourth and fifth year averages are higher than the second year average, and that absolute values are higher for the fourth and fifth years.

Table 2. Results of multiple comparisons of means between academic years.

Academic year	N	Subset	
		1	2
Second year	112	108.36	
First year	79	111.62	111.62
Third year	88		114.58
Fifth year	90		115.13
Fourth year	93		115.68
Sig		0.456	0.234

Source: Own elaboration based on the data obtained in the study.

In the gender factor, females had higher mean values of empathy than males, with highly significant differences, as noted earlier ($p=0.009$). Although interaction was not significant, the representation of the behavior of means in both genders among academic years

**Figure 3.** Behavior profile of estimated means in both genders among academic years.

Source: Own elaboration based on the data obtained in the study.

However, these results differ from another research (9) that reported that variable empathy does not change substantially between the different levels of the academic program, possibly due to a defensive position observed along with fear and insecurity in students when they treat patients for the first time. Moreover, other authors (16,18) argue that empathic orientation levels decrease as the students advance in Dental and Medical programs.

All these differences may be explained by the fact that first year students of USS must take the course "Clinical Basic Integration Cycle" (Ciclo de Integración Básico Clínico in Spanish), in which students have a first approach to dental practice through interviews to patients, other dentists, visits to clinical centers and counseling in schools, in order to apply the knowledge of the current level of study and resolve clinical cases. This allows to eliminate or reduce fear and insecurity usually experienced during the first confrontation with patients. This also would allow them to understand how patients view the world and their perspective.

(Figure 3) showed that, in absolute values, both had the same value in the first, second and third year, but different values in the fourth year, where females increased and males decreased. Then, in the fifth year, the opposite occurred, although the levels of both genders maintained the difference in favor of females.

Discussion:

The results obtained through this research do not coincide with Hojat *et al.* (16), since the average (general) values of the academic year factor tend to increase until the third year and then steadily decline. Nevertheless, the results observed show that there is a tendency of increased levels of empathy until the third year (with a slight decrease in the second year), and that these remain constant as students advance. This agrees with the results obtained by other studies (10,13,17) that attribute this tendency to the implementation of courses that address the acquisition of communication skills, cultural competences and management of the medical history.

Additionally, several studies have shown that the distribution of means in academic years obeys to different models, including the one proposed by Hojat *et al.* (1,7,16,19). Based on these results, the hypothesis of empathic erosion (16) has been found to have a particular character instead of a general one. For example, Diaz *et al.* (20) have shown that differences in gender are subject to variability, perhaps because of the pressure of factors that have not been studied yet. Other authors have empirically found, in what can be summarized, that all possible events occur because a) women are more empathetic than men; b) equal levels between both genders (in absolute values and statistically), and c) men have higher levels of empathy. As a result, empirical evidence shows that there are no fixed or absolute empathy distribution in the factors studied (academic year and gender) consistent with this study (1,19-21). Nevertheless, the differences found in both studied factors (gender and academic years) are not significant (according to eta-squared parameter).

In addition, the determination coefficient only explains a small fraction of the total percentage of the variation in the data. Both

empirical findings found by the cited authors point to the presence of other factors that could influence differentially the empathy behavior and explain it better, such as economic, cultural, moral, educational and sociological conditions, among others (7).

The behavior of empathy in the first three academic years (tendency to increase by slight score fluctuations) could be explained because most of the basic science subjects involve different activities that require teamwork. This generates a sense of belonging to a community, and lead to create or activate support networks among students so that they can maintain their identity group, thus achieving a community of students that interact and know their strengths and weaknesses.

Newcomers face a new stage as college students and start to shape their future life. These events imply that students must get involved in their learning process and, at the same time, pursue the career of their choice. This requires high motivation and could influence the development of empathy.

During the third year, an increase of empathy in both genders occurs, which is consistent with the study conducted at Universidad de Concepción (21). One of the reasons for this finding may be associated with more complex subjects that are directly related to the profession, such as Pre-clinical Practice and Pharmacology and Pathology, which could contribute to intellectual maturity and sense of responsibility. Another possible cause could be related to the subject Biomaterials, which students take during the second semester of the second year, and is the first branch that allows students to have a more genuine approach to their future work. In other words, that is a subject clearly linked to the discipline, which should produce greater enthusiasm and motivation for the profession.

Those three years of training will help modeling students, allowing their development in the discipline and enhancing soft skills such as teamwork, responsibility, interpersonal relationships, among others. In consequence, understanding each other's feelings—empathy—(22) plays an important role, because of the inherent interaction that must occur with patients.

The observed increase in empathy cannot only be explained by the curriculum, since students score 113 (women) and 109 (men) points at the beginning of their academic process, and show scores of 116 and 112 points, respectively, by the end of their studies. This means that the potential for women is 27 points (140-113) and for men 31 points (140-109), which leads to infer that the growth potential of women is 11.11% (3/27) and of men is 9.67% (3/31) on a scale of 100%. In conclusion, only attending a university does not imply a significant development of empathy in students, since other factors, such as biological and environmental, are more relevant. With this in mind, the selection process of students entering universities should not only consider knowledge but also their initial empathy level.

In the fourth year, students must work in a clinical environment where they adopt the role of dentists, so a significant increase in the values of empathy should be expected, as reported by some authors (10,23). However, the results show that levels do not increase and remain constant instead, which may be caused because, at this stage, students must apply the knowledge previously acquired. Their work takes place in separate dental cubicles that encourage individualism and competition (curriculum), leading them to lose their identity group and the teamwork skills that had been developed so far.

In our study, that empathy values do not increase at this stage could be explained by two possible factors that are not mutually exclusive. First, students enter the university with a level of empathy determined and formed in stages prior to their university experience, which could be difficult to change with actions that do not consider the essence of the conceptual meaning of empathy. Second, the structure

of the subjects, the teaching methods, and the correlation between subjects are not designed to produce a positive impact on a possible development of empathy, especially in terms of finding a dynamic balance between “hard” and “soft” skills.

If these explanations are logical inferences of the results observed, not only in this work but also in relation to those that have found different or contradictory manifestations of these results, it means that the teaching-learning process has not been fully studied in such a way that all factors that influence what is currently considered as an “appropriate professional” are included. Consequently, the university (in general) is still responsible for creating all possible conditions to contribute to the potential development of empathy that students theoretically have.

Regarding empathy differences between genders in the fourth year, women increase their levels of empathy while a decrease is observed in men. Perhaps, women have greater maturity levels and are more receptive, besides having greater interpersonal skills and being more prone to perceive and understand emotions (24). In contrast, men are often more inclined to offer rational solutions, while women tend towards understanding and emotional support that help strengthen their empathic relationships (25).

It is also noteworthy that women have a more sensitive empathic system that is useful for fostering the care system. Additionally, higher levels of oxytocin produce reactions that inhibit fear of intruders, increases aggression to defend their children and develop an emotional attachment to them. Furthermore, the cultural trend suggests that family and social education teach women and men to express their emotions differently (26). In fact, since childhood, a close relation between female gender and emotional competition is developed (27) because their socialization is more in touch with feelings and its nuances (28).

Finally, the results of fifth-year students show an increase in the empathy levels of men, while women show a decrease (not statistically significant); in general, the empathy levels of women remain constant since the third year. The decline, as Marcus (29) argued, could be attributed to the development of a sense of belonging to a select and privileged group, like physicians or dentists. This could generate a change in the dentist-patient relationship resulting in an asymmetrical relation, decreasing the understanding of the feelings of patients and the importance of interpersonal relationships. These results oppose to those of Erazo *et al.* (22). Taking all these finding into account, as well as the results obtained, beginning to work with patients may allow students to realize that patients are not always willing to change their high-risk behaviors for successful treatment, and that this lack of commitment could make it harder to empathize with them (29).

It is important to remark, by analyzing every academic year, that the empathy values for females are higher than for males, which agrees with other studies (9,10,17), whose authors point that women are more receptive than men to emotional signals, a quality that can contribute to a better understanding and, therefore, to a better empathic relationship. This, however, differs from other studies (22,30) that did not find differences between genders.

The gender difference may be caused by additional motivational factors related to the stage of training in which each student is, and by the individual behavior linked to the human quality of each person. In addition, women are more expressive, have a greater understanding of emotions and often show more interpersonal skills: they are better at recognizing emotions in others and are more perceptive and empathetic (24). Female socialization develops in close touch with feelings and its nuances, which generates the need to reflect on one's own emotions and those of others. Another important concept to mention is emotional intelligence (EI). Mayer *et al.* (31) reported that people with higher EI scores also have higher levels of empathy.

This concept includes a set of skills related to the emotional processing of the information, the ability to perceive, assimilate, understand and regulate their own and others emotions, promoting emotional and intellectual growth (32). Emotionally intelligent people will not only be better to perceive, understand and manage their own emotions, but also better to extrapolate their perception skills, understanding and managing the emotions of others. Therefore, people with higher EI have higher quality levels in their relationships and, accordingly, in empathy (28). Numerous studies (33-35), report higher levels of EI in women and this could explain the results.

All this reflects that there are several factors involved in the development of empathy, and delivering dental care to another human being does not necessarily increase such development.

Finally, the factors studied (academic year and gender) do not provide a complete explanation on the variation of empathy in the analyzed sample, which seems to be common and consistent with other Latin American works (36-38). There may be other factors that influence empathy levels and that would explain better the behavior of estimated empathy values. Workplace and stress have been cited as a cause of ethical erosion, and increasing the levels of clinical responsibility with fatigue secondary to workload are possible drivers of empathy decline (39). These aspects should be addressed early by the Dentistry Faculty through activities that bring the students closer to their clinical role, ideally in all the subjects of the academic program.

The observed results do not support the hypothesis of empathic erosion and the differences between genders were not significant, which concurs with the results of other studies and shows a consistent tendency regarding their particular character, rather than universal. This study was limited by its cross-sectional nature, which prevented tracking the students, and also by the exclusion of other factors that could influence empathy levels in dental students.

Future studies should be longitudinal and follow the same group of students since the first days until graduation to evaluate if there are changes in the empathy levels throughout their career. It is also important to conduct new research to establish the factors involved in the structuring of empathy.

Conflict of interests

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