



Changes in Empathy Levels on Dentistry's Students of Public University in Cartagena City, Colombia

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Abstract

Objective: To compare levels of empathy in dentistry students in the cohorts of 2013 and 2016 years, in a public university in Cartagena, Colombia. **Material and Methods:** The sample consists of 332 students from first to fifth academic year. The instrument used was the Jefferson Medical Empathy Scale (EEMJ), Spanish version for medical students (version S), validated in Mexico and Chile and adapted for students of dentistry in Colombia. Implementation was anonymous and confidential and informed consent was used. The scale was judged by judges in order to verify cultural validity and students' understanding of the scale was evaluated. The means and standard deviation were estimated. A bifactorial variance analysis, model III was applied to find differences of means between academic years, the genders and in the interaction of these factors. The comparison between empathic cohort data 2013 and 2016 was performed using the Wilks Lambda Statistician and the M Box test. The level of significance used was $\alpha \leq 0.05$ and $\beta < 0.20$. **Results:** The results were significant for the "academic years" factor ($p = 0.027$), gender ($p = 0.782$) and interaction ($p = 0.364$) were not significant. The size of the effect of the statistical differences found is not high. The value of R^2 corrected shows that the factors studied explain only 2.9% of all the variation of empathy. **Conclusion:** The empathy in the study subjects presents some fluctuations; however there are no statistically significant differences for the factors of interest among the cohorts evaluated.

Keywords: Empathy; Students, Dental; Physician-Patient Relations; Education.

Introduction

Empathy in health care can be understood as a cognitive and behavioral attribute that implies the ability to understand how the patient's experiences and feelings influence and are influenced by the illness and its symptoms and the ability to communicate that understanding to the patient [1,2]. It constitutes one of the elements necessary to develop a basic communicational ability for human relationship [3].

Research within the health area indicates that empathy has been related, theoretically or empirically, with various attributes, such as prosocial behavior, ability to obtain medical history, increased patient satisfaction, better therapeutic and good relationships clinical results [4,5].

For decades the human capacity to empathize has been studied [5]. This in practice is considered a broad construct and that it covers several components and there is total agreement in its definition. There is still discussion as to whether empathy consists in "putting oneself mentally in the place of the other" or whether it is associated with the condition of "feeling emotion vicariously." This theoretical discussion is not a minor matter, because depending on the different conceptions, different actions will be derived in relation to the existence of one or more components, the way of measuring them, the inferences made from the answers given to the instruments and the corresponding interpretations [3]. On the other hand, empathy can be considered a characteristic object of study influenced by many factors [7,8], among which highlight the age, gender, intentionality about the specialty to follow in the future, the academic year of student, family structure and climate, personality, empathic experiences, socio-cultural environment, scale of moral and ethical values, among others; which could act as independent or confounding "variables" and could in turn contribute to explain the observed variability in levels of empathic orientation found in some research [9-11].

In this sense, it is necessary to study the relationship of the future professional health with the patient, because it has been affected by all changes in society throughout its development, where the patient's decision regarding the quality of care is determined by more than the professional's scientific and technological knowledge. From this perspective, it is pertinent to study this construct to achieve a reorientation of the health curriculum towards the development of empathy as part of the humanization need of health service providers.

The objective of the present study was to compare the levels of empathy presented by dentistry students in the cohorts of the year 2013 with the students of the cohorts of 2016, in a public university in the city of Cartagena.

Material and Methods

Study Design

This is a longitudinal study type developed in two cohorts of dentistry students (year 2013 and 2016) of University of Cartagena in Colombia.

Population

The population is made up of students from first to fifth academic year of the career of dentistry of the University of Cartagena (Colombia) ($n = 332$ of an $N = 405$). The distribution of the study sample according to the academic year studied was as follows: first: $n = 85$; Second: $n = 71$; Third: $n = 68$; Fourth: $n = 65$ and Fifth: $n = 33$. In the gender factor, the sample distribution was as follows: female $n = 202$ and male $n = 120$.

Data Collection

The data collection was carried out between March of the year 2013 and March of the year 2016. The participants were given the Jefferson Medical Empathy Scale (EEMJ) in the Spanish version for medical students (version S), validated in Mexico and Chile [12, 10] and adapted for dentistry students in Colombia [13].

The application was anonymous and confidential (neutral operator). Before being applied the EEMJ was submitted to judges (three relevant physicians of the medical profession in order to verify cultural validity) [13]. The students' comprehension of the culturally adapted scale was carried out by means of a pilot test, selecting 50 Individuals of another university institution of the city of Cartagena.

Data Analysis

The data were subjected to normality tests (Kolmogorov-Smirnov) and equality of variance (Levene). The internal reliability of the data was estimated using the general Cronbach's alpha and the values of this statistician as they were eliminated each of the elements (questions), T2 of Hotelling and test of non-additivity of Tukey. We estimated the means, standard deviation.

A bifactorial analysis of variance (ANOVA), model III, was applied in order to find differences of means between the academic years, between the genders and in the interaction of these two factors. The data were described by simple arithmetic and box graphs and processed using the statistical program SPSS 20.0. The comparison between the empathy data observed in this study (2013-2016) was performed using a discriminant test, through of the statistic λ (Lambda de Wilks) to determine differences in each question from the instrument and the M test from Box to compare the variance-covariance matrices between the groups. The significance level used was $\alpha \leq 0.05$ and $\beta < 0.20$ in all cases.

Ethical Aspects

This research was regulated from the ethical declaration of Helsinki and the legislation for Colombia (Resolution No. 8430 of 1993, Ministry of Health). An informed consent was signed by all participants. Institutional Review Board approval was obtained from the Ethical Committee for Research in Humans of the University of Cartagena, Colombia.

Results

The Kolmogorov-Smirnov and Levene tests were not significant ($p > 0.05$), therefore the data were distributed in a normal way and with equal variances. Cronbach's alpha values were satisfactory (untyped = 0.835 and typified = 0.838), from which it is inferred that the data have internal reliability. The total Cronbach's alpha value, if an element (question) is removed, fluctuated between values $[0, 816; 0.840]$ and it is inferred that the test maintains a high reliability independently that one of them is eliminated in the estimation of this statistician. Hotelling's T^2 test ($F = 45.16$) and Tukey's non-additive ($F = 10.12$) were highly significant ($p < 0.005$). In the first case, it is inferred that the means of the questions are different from each other, which shows that not all questions contribute equally to the overall mean of the questions (Mean = 5.10) and, in the second case, It is inferred that it is necessary to raise the power of the tests to achieve the additive character of the data. The results of the estimation of means, standard deviation and sample size for each level of the two factors studied are shown in Table 1 and Figure 1.

Table 1. Results of mean and standard deviation estimates at the levels of each factor studied for the 2016 cohort.

Academic Year	Gender	Mean	Typical Deviation	n
First year	Female	104.43	15.071	51
	Male	105.79	13.089	34
	Overall	104.98	14.246	85
Second year	Female	97.94	17.912	48
	Male	96.91	15.641	23
	Overall	97.61	17.103	71
Third year	Female	107.60	18.144	42
	Male	101.65	14.366	26
	Overall	105.32	16.939	68
Fourth year	Female	103.77	14.902	39
	Male	99.46	13.966	26
	Overall	102.05	14.580	65
Fifth year	Female	94.68	22.783	22
	Male	101.82	16.296	11
	Overall	97.06	20.864	33
Overall	Female	102.36	17.698	202
	Male	101.46	14.479	120
	Overall	102.02	16.554	322

The Anova results were significant ($p = 0.027$) for the "academic years" factor, gender and interaction were not significant ($p = 0.782$, $p = 0.364$, respectively). The eta square values were 0.034, 0.001 and 0.014 for both factors and their interaction respectively and the power was 0.760; 0.059 and 0.341 respectively. From these results it can be inferred that the effect size of the statistical differences found is not high and that it is necessary to increase the sample size to reach the value of the accepted power (0.80). The value of R^2 corrected was 0.029, which means that the factors studied explain only 2.9% of all variation in empathy.

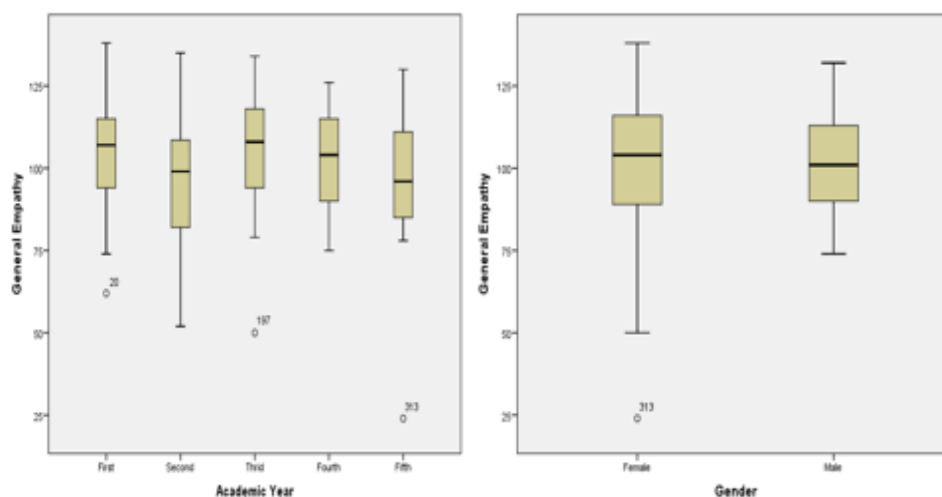


Figure 1. Results of means and standard deviations in the levels of both year and gender factors studied in box charts (including atypical data).

Finally, Figure 2 shows the distribution of the averages of the genres in each of the academic years. It was observed that the behavior is different in both genders and it is the female gender that, in absolute values, increases the empathy levels more as the academic year increases, with the exception of the fifth year; while in the first and second they have almost identical values of empathy.

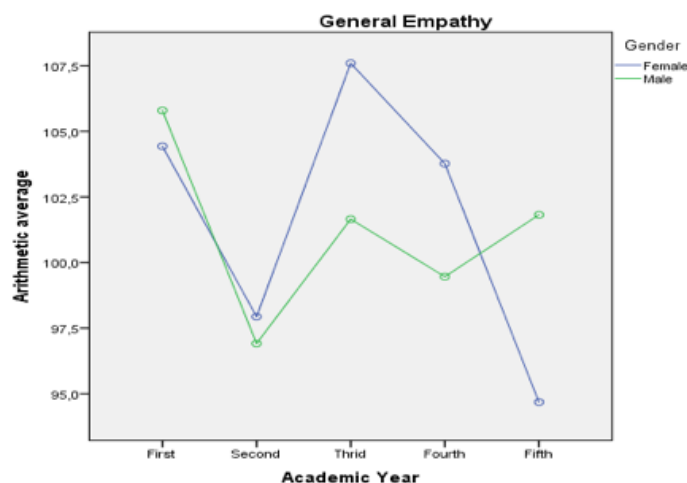


Figure 2. Results of means and standard deviations in the levels of the Factor Year Academically separated in each genre in simple arithmetic graphs for the 2016 Cohort.

The results of the estimation of the means and standard deviation of the means of each question in each period in each one of the measures of the empathy are presented in Table 2 and, in the Table 3 are shown the results of the comparison between both groups and it was observed that the statistician λ found significant and highly significant statistical differences ($p < 0.05$; $p < 0.001$) in

the questions 2,4,7,8,10,11,12,14,15,16,19 and 20. The Box M statistician was also highly significant ($p < 0.005$).

Table 2. Results of the value of means in each of the questions in the two comparisons (year 2013 and 2016).

Measurement Year	Mean	Typical Deviation
2016	P1	4.49
	P2	6.06
	P3	3.98
	P4	6.01
	P5	5.76
	P6	3.50
	P7	5.19
	P8	4.66
	P9	5.59
	P10	5.71
	P11	4.86
	P12	4.89
	P13	5.42
	P14	5.38
	P15	5.03
	P16	5.65
	P17	5.12
	P18	3.75
	P19	5.22
	P20	5.76
2013	P1	4.34
	P2	6.31
	P3	3.93
	P4	6.24
	P5	5.86
	P6	3.64
	P7	5.53
	P8	5.14
	P9	5.51
	P10	5.91
	P11	5.27
	P12	5.23
	P13	5.48
	P14	5.72
	P15	5.47
	P16	5.99
	P17	5.16
	P18	3.60
	P19	5.57
	P20	6.06
	P20	5.92

Table 3. Results of the comparison of the means of the empathy levels of each question (P) between the groups compared (years studied).

	Lambda de Wilks	F	Sig.
P1	0.999	0.851	0.357
P2	0.988	8.524	0.004
P3	1.000	0.199	0.656
P4	0.991	6.191	0.013
P5	0.999	0.786	0.376
P6	0.998	1.489	0.223
P7	0.993	5.071	0.025
P8	0.985	10.250	0.001
P9	0.999	0.496	0.482
P10	0.993	4.700	0.031
P11	0.985	10.080	0.002
P12	0.992	5.756	0.017
P13	1.000	0.262	0.609
P14	0.989	7.470	0.006
P15	0.981	12.958	0.001
P16	0.984	11.232	0.001
P17	1.000	0.134	0.715
P18	0.998	1.209	0.272
P19	0.990	6.588	0.010
P20	0.987	9.186	0.003

Discussion

The present study shows the longitudinal results of empathy levels in dental students taken at two points in time, that could contribute to the continuous reporting and effective knowledge of variations in empathy levels, both individual and group, which would allow an approximation to the identification of the effect generated by both the academic year and the gender within of the institution study center.

Regarding the overall empathy result, in the present study it is higher than the values reported in Peru [14] and very similar to the results obtained in India [15], while they differ greatly from those described for Australia [16], Costa Rica [17] and Chile [7,10]. All these differences in studies of different geographic areas could suggest the existence of another source capable of modifying the effect on the levels of empathy, culture and context, as it has been previously evidenced, the educational environment is not only restricted to the context University, clinical or hospital, but is mediated by family, social and even cultural development [18]. Regarding the latter, very few studies have been carried out with the purpose of determining how much effect culture has on the development of empathy [19].

In reference to the change in empathy levels in students university health programs and according with the year of academic training, the results of several authors [20,21], show some controversial explanations. Specifically, in 2005 it was found that first-year students have the highest values for their empathic orientation [22], which disagrees with the results in the present study, as the levels of empathy observed in the students of dentistry given the global average, they presented a higher value for the third academic year and then decline until the fifth year. This may be explained

maybe by that during the third academic year, the students enter their clinical practice and have for the first time contact with patients, assuming the stresses of the care service and experienced with the emotion of exercising their practice, which creates a space conducive to forging interpersonal relationships and developing social skills, which could influence the development of higher empathic perception [23].

According to some Brazilian authors [24] similar results were found among empathy levels of medical students during the first and fifth years. Having low values and increasing in the third year, coinciding this period, with the first contacts of students with patients. On the other hand, it explains the erosion in the levels of empathy due to failures in the formation processes, such as: the lack of suitable examples by the trainers; a large amount of technical information to be transmitted with the consequent typical limitation delineating the patient medical relationship; the tension that arises between the ideals of the student and the daily clinical practice in which arises the ethical doubt and the emotional overload that comes from the contact with the suffering.

Some authors also agrees that the highest levels of empathy are found in the first periods of interaction with patients and argues that the subsequent empathic decline occurs when experience of clinical relationship with disease and suffering [25]. Therefore, it is necessary to consider that the changes evidenced in the students after passing through the different years of university [24], not only correspond to the scientific and technical development, but also link the appearance of some humanistic competences as the attribute empathic, as a response to the challenge of exercising their practical activity, conditioned by the reality of patients and the search to meet their needs. In addition to the above, it is necessary to consider that the competences reached by students are closely related to their personal characteristics (intrinsic motivation and self-confidence) [26], variables that have not been considered in the present investigation.

When comparing the empathy results in the groups studied (period 2016 and period 2013), different measures of empathy are obtained. As the differences between the empathy scores determined to a greater extent by the questions that correspond to the compassionate care component (Item: 07, 08, 11, 12, 14, and 19) and the questions that correspond to the compassionate perspective take component (Item: 02, 04, 10, 15, 16, 20). This may possibly be justified by the fact that the groups compared not only differ in the year in which their empathy was measured (study cohort), but precisely this same factor involves other possible causes of variability.

Regarding this fact, when reviewing the curricular contents for the cohorts of the years compared, it is evident that curricular contents could be considered as modifiers of the empathy levels in students [27,28]. To the present study our could identify that the curricular contents and professors were not necessarily the same for both cohorts, which indicates that the developed theme by professors by virtue of their methodological strategies, the way students are evaluated and finally the learning atmosphere can generate variations in students' perception of the educational environment, which has a direct relation and relevance to their well-being and fulfillment of the

academic achievements [29], about the latter, within the academic achievements could emphasize the development of relevant and required humanistic and social skills for health care.

Therefore, it is not ruled out that the change of the subjects and their contents, will influence the level of empathy of the students. Another aspect to be considered corresponds to the effects of schooling in the youth, in this case the antecedents of the students in reference to the context and the school culture during the course of their secondary education. For this aspect, the present investigation does not know this antecedent, which perhaps can influence the levels of empathy, since previous authors, in 2010, postulates that the positive perceptions of the students in reference to the culture of their secondary school, were associated with higher levels of empathy with their peers and conditions prosocial behavior [30].

In addition to the above, it is also unknown how informal curricular space is (a space that refers to idiosyncratic, sporadic and casual learning that occurs when a student asks questions after class, or has a conversation with a classmate, professor or patient), which can be considered as a modifying factor of the academic context and condition social behaviors and possibly influence the empathic perception [31]. Because of the above, the findings of others researchers [32,33] are confirmed, after considering that levels of empathy can vary even in the same program, even though students retain similar sociodemographic characteristics, since there are other social and context factors that always present differences.

Regarding the levels of empathy and gender showed significant differences in relation to academic years and gender, the superior value was presented in the third year and for the female gender. Precisely multiple studies [24,34,35] have considered values of empathy and gender, without reaching conclusive results. For some authors, women present higher levels of empathy [36-38], perhaps because their nature makes them more emotional and this can influence how to approach and forge interpersonal relationships, in this case, the dentist-patient relationship [39].

Opposite results come from Malaysian authors [40] who report that for dentistry students, the highest values of empathy were presented in the male gender. For some authors, differences in empathy between genders are consistent with how they are socialized and stereotypes of the gender role [3,41,42], but have also been related to findings in morphological physiology. Individuals with more nerve fibers and areas connected between the two cerebral hemispheres, as in women, perform better tasks that require rapid information transfer (such as communication and empathy) [3]. Likewise, women tend to use mirror neurons more than males, which would explain why they can naturally synchronize with the emotions of others expressed in non-verbal language [3].

For all of the above and given that empathy is a determining attribute in the performance of professional practice, whose variability is due to multiple factors of social and emotional type both of the individual and the context. It is recommended to implement other studies to obtain information from other possible influential variables and identify those that have greater weight at the time of explaining the variable response.

Conclusion

It can be concluded that the fluctuation in the scores obtained cannot be attributed to a single study factor or considered of interest among the cohorts evaluated, showing significance for the factor "academic years", and gender .

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