

Empathy Gender in Dental Students in Latin America: An Exploratory and Cross-Sectional Study

Víctor Patricio Díaz-Narváez^{1,2*}, Ana María Erazo Coronado³, Jorge Luis Bilbao⁴, Farith González⁵, Mariela Padilla⁶, Madeline Howard⁷, María Guadalupe Silva⁸, Mirian Bullen⁹, Fredy Gutierrez¹⁰, Teresa Varela de Villalba¹¹, Mercedes Salcedo Rioja¹², Joyce Huberman¹³, Doris Carrasco¹⁴, Robert Utsman¹⁵

¹School of Dentistry, Universidad San Sebastián, Santiago, Chile

²Associate Investigator, Universidad Autónoma de Chile, Santiago, Chile

³Universidad Metropolitana, Barranquilla, Colombia

⁴School of Medicine, Universidad Libre Seccional Barranquilla y Fundación Universitaria San Martín Sede Puerto Colombia, Barranquilla, Colombia

⁵School of Dentistry, Universidad de Cartagena, Campus de la Salud Barrio Zaragocilla, Cartagena, Colombia

⁶School of Health Sciences, Universidad Latinoamericana de Ciencia y Tecnología, San José, Costa Rica

⁷School of Dentistry, Universidad de Costa Rica, San Pedro de Montes de Oca, San José, Costa Rica

⁸Institute for Scientific Research, Universidad Central del Este, San Pedro de Macorís, Dominican Republic

⁹School of Dentistry, Universidad de Panamá, Panama City, Panama

¹⁰Facultad de Estomatología Roberto Beltrán, Universidad Peruana Cayetano Heredia, Lima, Peru

¹¹School of Medicine, Universidad Católica de Córdoba, Córdoba, Argentina

¹²Department of Pediatric Dentistry, School of Dentistry, Universidad Nacional Mayor de San Marcos, Lima, Peru

¹³School of Dentistry, Faculty of Clinical Medicine, Universidad del Desarrollo, Santiago, Chile

¹⁴School of Dentistry, Universidad de Concepción, Concepción, Chile

¹⁵Investigation of the School of Health Sciences, Universidad Latinoamericana de Ciencia y Tecnología, San José, Costa Rica

Email: *victor.diaz@uss.cl, amec1708@gmail.com, jbilbao55@hotmail.com, fgonzalezm1@unicartagena.edu.co, mpadilla@racsa.co.cr, mhowarducr@gmail.com, guadalupesilva1@gmail.com, ladymi516@yahoo.com, fredy.gutierrez@upch.pe, tebeva@hotmail.com, ritasalcedor@hotmail.com, jhuberman@udd.cl, doriscarrasco@udec.cl

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Abstract

Background: It is well-founded that empathy is an attribute that increases the likelihood of good

*Corresponding author.

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communication between health professionals and patients, and it is usual that there is the conviction that empathy levels are higher in women than in men. **Aims:** A study comparing levels of empathy gender of students in 18 schools of dentistry from six Latin American countries was conducted. **Method:** An exploratory cross-sectional study of which empathy levels were measured by the Jefferson Scale of Empathy for dental students (S version) and these levels were compared between genders by t-student test, after verification of normal distribution and homoscedasticity. **Results:** Variability was found in the results of the comparisons. In some cases, empathy levels were higher in women, others in men and in most of them there were no differences between genders. **Conclusions:** The observed results do not support the belief that women are more empathetic than men. However, more studies must be performed in more powers and countries to verify that the results described constitute a scientific fact and not just a feature of dental students specifically in the countries studied.

Keywords

Empathy, Gender, Dental Students

1. Background

The professional relationship between health practitioner and patient must be considered a two person interaction of which both have different personal interests [1], constitutes a human encounter. This relationship contains, itself, an eminent subjectivity and inter-subjectivity that goes beyond the purely clinic dimension of a treatment [2].

The empathy during health care can be understood as a cognitive and behavioral attribute, which implies the capacity to understand how the experiences and feelings of a patient can influence and can be influenced by illness and its symptoms, and the capacity to communicate that understanding to the patient [3]. This constitutes one of the elements needed to develop basic communication skills for the human relationship that is performed, voluntarily in form [4].

Investigations in the professional area of health show that the empathy has been related, theoretically and empirically, to diverse attributes, such as the pro-social behavior, the ability to obtain clinical history, has increased the level of patient and doctor satisfaction, as well as good clinical results [2] [5] [6].

Various authors have proposed that women show higher levels of empathy compared to men [7]-[9] and those empathy measurements, of those investigations, have been performed with different instruments developed for the general population and the medical field. On the other hand, some authors have proposed, with theoretical basis and less empirical evidence, that empathy could be a “variable” that is subjected to the influence of several factors, in addition to the gender [10]-[12], as well as age, intent about the specialty to follow in the future, the current course the student is taking, structure and family environment, personality, empathetic experiences, socio-cultural environment, scale of ethical and moral values, among others; which could act as independent “variables” or confounding variables, and at the same time, could contribute to explain the variability observed in empathetic orientation levels found in some research [13]-[16].

There are many researches in which empirical results have been found that contradict the fact that women are more empathetic than men [17]-[19]. However, more empirical evidence is required to demonstrate the real existence of this contradiction. The purpose of this investigation is to determine if indeed the levels of empathy are higher in women, in relation to the male students of 18 dental faculties of six countries in Latin America.

2. Materials and Methods

This is an exploratory, non-experimental, descriptive, transversal and ex post facto cause-effect investigation, bio-ethically governed by the rules of Helsinki (was approved by the Ethics Committee of Research, Development University and German Clinic with code CAS-UDD approval: 2011-64 in Santiago de Chile). The studied population was composed of students of first through fifth year from 18 dental faculties of six countries in Latin America (Dominican Republic, Costa Rica, Panama, Colombia, Argentina and Chile) ($n_{\text{total}} = 4407$) (**Table 1**).

Table 1. Estimation results of the descriptive statistics of the levels of gender empathy in each of the universities studied.

School of Dentistry	Gender	Median	Standard Error	Confidence Level of 95%			n
				Inferior Limit	Superior Limit	Standard Deviation	
Universidad de Antofagasta (Chile)	Female	110,518	1.312	107,945	113,090	14,262	114
	Male	110,144	1.477	107,249	113,040	13,393	90
Universidad Latina de Panamá (Panamá)	Female	104,971	1.675	101,688	108,255	14,051	70
	Male	101,826	2.922	96,098	107,554	15,831	23
Universidad de Cartagena (Colombia)	Female	107,869	0.940	106,026	109,713	12,518	222
	Male	103,190	1.197	100,843	105,537	12,396	137
Universidad de Magdalena (Colombia)	Female	96,080	1.494	93,151	99,008	18,544	88
	Male	88,753	1.520	85,774	91,732	16,758	85
Universidad Metropolitana (Barranquilla, Colombia)	Female	98,826	1.461	95,962	101,690	16,175	92
	Male	100,274	1.779	96,786	103,763	13,541	62
Universidad Central de Este (República Dominicana)	Female	102,000	1.091	99,862	104,138	13,424	165
	Male	99,622	1.629	96,428	102,815	18,358	74
Universidad de Concepción (Chile)	Female	117,364	0.976	115,450	119,278	11,880	206
	Male	113,756	1.206	111,391	116,120	13,036	135
Universidad del Desarrollo (Chile)	Female	116,296	0.983	114,368	118,224	12,444	203
	Male	110,983	1.307	108,421	113,544	11,573	115
Universidad Finis Terrae (Chile)	Female	113,464	0.974	111,555	115,373	13,307	207
	Male	110,098	1.387	107,378	112,818	13,905	102
Universidad ULACIT (Costa Rica)	Female	106,735	1.075	104,629	108,842	14,350	170
	Male	101,636	1.889	97,932	105,340	10,913	55
Universidad Andrés Bello (Sede Viña del Mar) (Chile)	Female	112,958	1.016	110,965	114,951	14,160	190
	Male	112,231	1.295	109,691	114,770	12,432	117
Universidad Católica de Córdoba (Argentina)	Female	108,134	1.210	105,761	110,507	15,195	134
	Male	98,527	1.889	94,823	102,231	15,206	55
Universidad Peruana Cayetano Heredia (Perú)	Female	110,511	1.016	108,518	112,503	13,712	190
	Male	107,176	1.699	103,845	110,508	13,427	68
Universidad de Costa Rica (Costa Rica)	Female	112,762	0.986	110,830	114,695	14,516	202
	Male	109,841	1.494	106,913	112,769	14,417	88
Universidad De Panamá (Panamá)	Female	108,318	1.336	105,699	110,937	15,901	110
	Male	104,565	2.922	98,838	110,293	15,249	23
Universidad San Martín (Barranquilla, Colombia)	Female	100,431	1.387	97,712	103,151	13,996	102
	Male	101,667	1.725	98,285	105,048	19,233	66
Universidad de San Marcos (Perú)	Female	108,471	1.387	105,751	111,190	12,934	102
	Male	109,939	1.415	107,164	112,714	15,208	98
Universidad Andrés Bello (Sede Santiago) (Chile)	Female	112,692	0.864	110,998	114,386	12,977	263
	Male	109,810	1.033	107,785	111,835	14,653	184

Stratified samples by gender were obtained from this population. The collection of data was performed between July and August 2012. Since the students were able to visit different clinic areas, attend classes in different places, in addition to be absent from classes, among other circumstances, it was not possible to apply the scale to all the students. The scale was not applied to the ones who were absent, (due to the reasons before mentioned) nor on the second time in order to avoid possible skewed answers. The Jefferson Scale of Empathy (JSE) in the Spanish version for students of Medicine (version S) was used in each of the participating countries, based on

criteria Alcorta-Garza *et al.* [10] and Rivera *et al.* [20], was applied to those participating students in classrooms or clinic rooms, using just one anonymous and confidential measurement by a neutral operator. Before the Jefferson Scale of Empathy (JSE) was applied, it was submitted to board (a committee composed of five relevant academic members of the Psychology and Dentistry field or related to), in order to verify the cultural and content validity [2]. A pilot study was created for the purpose of checking the students comprehension of the scale culturally adapted. There was not judgment of exclusion, since the objective was to evaluate the variable of interest of as many students as possible.

Statistical Analysis

The primary and original data from the empathy levels of each university examined were submitted to the Cronbach's alpha test (reliability by internal consistency). The sum of the primary data score, obtained using the scale previously mentioned, was initially submitted to the Kolmogorov-Smirnov normality test (K-S) in both types and to the Homoscedasticity Levene test. Descriptive statistics were estimated, arithmetic mean, absolute deviation and standard deviation of these sum. Comparisons between both genders mean were performed by Student's t-test, considering the presence of equal variances. The effect size was measured by the Hedges g. Data was processed by the statistical program SPSS 20.0 TM. The significance level used was ≤ 0.05 in each case.

3. Results

The K-S test was not significant ($p > 0.05$), in any of the data groups, which means that the data observed were distributed normally. The Cronbach's alpha test estimated for each gender and university fluctuated between 0.768 and 0.834, which shows that the data have values of acceptable internal consistency. **Table 1** shows the results of the descriptive statistics estimation of empathy levels, estimated for each gender and each of the studied universities, and **Table 2** shows the results of the total mean estimation in both examined gender. This last table shows that women have superior empathy levels compared to the men, and that the student's t-test was highly significant ($p < 0.0001$); however, the value statistically adjusted was 0.199, which shows that the effect size is low, therefore, the magnitude of the differences between means is small.

The results of estimation of equal variances between the studied gender in each university, the comparison of the means between the gender in each university and the effect size corresponding to each of the comparisons are presented in **Table 3**. The F-Test was not significant ($p > 0.05$) in all cases, with the exception of the comparison between the gender variances in the San Martin University (Barranquilla, Colombia) ($p < 0.01$).

The student's t-test was not significant ($p > 0.05$) in the following universities: Antofagasta (Chile), Andrés Bello (Viña del Mar branch, Chile), Universidad Latina and from Panama (Panama), Universidad Metropolitana and San Martin (Barranquilla, Colombia), Universidad Nacional Cayetano Heredia and Nacional Mayor de San Marcos (Lima, Peru), Universidad de Costa Rica (San José, Costa Rica) and Universidad Central del Este (Dominican Republic).

Significant differences ($p < 0.05$) were found in the rest of compared universities. Of all the universities where no significant differences were found, five of these absolute values of the means were higher in women; in three of them the absolute values were higher in men and in two of them, the means were practically the same (**Table 1**).

The effect size sample was low (lower than 0.2) in six of them and in the rest the effect was medium-sized (between 0.2 and 0.5) (**Table 3**). In the case of the universities where statistical differences were found, in all cases the values of the empathy levels were higher in women than in men (**Table 1**). However, from these statistical differences, the only one that had a high effect size was the University Católica de Córdoba ($g = 0.632$); meanwhile in the rest of the universities the value of the effect size sample fluctuated between 0.209 and 0.438 which is considered medium-sized (**Table 3**).

4. Discussion

The studies of gender empathy level distribution initiated with works of Block [21] and followed by Hoffman [22]. The first one did not find differences between men and women; however, the second one found that women had more points than men regarding Affective Empathy (AE), but the opposite happened regarding Cognitive Empathy (CE). Later on, Eisenberg and Lennon [23] had the same results as Hoffman [22]. Those differences were attributed to the gender role stereotypes.

Table 2. Estimation results of the total median for each gender.

Gender	Median	Standard Error	Confidence Level of 95%	
			Inferior Limit	Superior Limit
Female	108,244	0.283	107,690	108,798
Male	105,224	0.408	104,425	106,024

T Test = 6.4; $p < 0.0001$; $g = 0.199$.

Table 3. Results of the comparison of means of both genders in each of the universities studied and estimation of the effect size (g).

Universities	F test	Signification	T Value-student	Signification	g
Universidad de Antofagasta (Antofagasta, Chile)	0.138	$p = 0.711$ ns	0.191	$p = 0.849$ ns	0.0272
Universidad Latina (Ciudad de Panamá, Panamá)	0.001	$p = 0.975$ ns	0.503	$p = 0.616$ ns	0.217
Universidad de Cartagena (Cartagena, Colombia)	0.024	$p = 0.877$ ns	3.606	$p = 0.0001$ **	0.375
Universidad de Magdalena (Santa Marta, Colombia)	3.585	$p = 0.060$ ns	2.723	$p = 0.007$ **	0.414
Universidad Metropolitana (Barranquilla, Colombia)	1.467	$p = 0.228$ ns	-0.578	$p = 0.562$ ns	-0.095
Universidad Central del Este (San Pedro de Macorí, República Dominicana)	4.228	$p = 0.041$ ns	1.001	$p = 0.319$ ns	0.158
Universidad de Concepción (Concepción, Chile)	0.397	$p = 0.529$ ns	2.639	$p = 0.009$ **	0.292
Universidad del Desarrollo (Santiago, Chile)	0.172	$p = 0.678$ ns	3.751	$p = 0.0001$ **	0.438
Universidad Finis Terrae (Santiago, Chile)	1.011	$p = 0.315$ ns	2.060	$p = 0.040$ *	0.302
Universidad Latinoamericana de la Ciencia y Tecnología (San José, Costa Rica)	3.040	$p = 0.083$ ns	2.417	$p = 0.016$ *	0.375
Universidad Andrés Bello, Sede Viña del Mar (Viña del Mar, Chile)	3.256	$p = 0.702$ ns	0.457	$p = 0.648$ ns	0.054
Universidad Católica de Córdoba (Córdoba, Argentina)	0.115	$p = 0.735$ ns	3.947	$p = 0.001$ **	0.632
Universidad Peruana Cayetano Heredia (Lima, Perú)	0.119	$p = 0.731$ ns	1.73	$p = 0.085$ ns	0.244
Universidad de Costa Rica (San José, Costa Rica)	0.526	$p = 0.469$ ns	1.579	$p = 0.115$ ns	0.202
Universidad de Panamá (Ciudad de Panamá, Panamá)	0.162	$p = 0.688$ ns	1.036	$p = 0.302$ ns	0.261
Universidad San Martín (Barranquilla, Colombia)	9.491	$p = 0.002$ **	-0.481	$p = 0.631$ ns	-0.076
Universidad Nacional Mayor de San Marcos (Lima, Perú)	1.21	$p = 0.273$ ns	-0.736	$p = 0.462$ ns	-0.104
Universidad Andrés Bello, Sede Santiago (Santiago, Chile)	1.031	$p = 0.31$ ns	2.19	$p = 0.029$ *	0.209

ns: not significant ($p > 0.05$); * $p < 0.05$; ** $p < 0.01$.

Other studies have supported those conclusions [24]-[26], but using different measurement tools. Fernández-Pinto *et al.* [27], suggested two possible generalizations of these results: 1) that the empathy seems to be connected to individual differences, such as personality and gender differences, and 2) the results of the research made seem insufficient to come to a conclusion about the interrelationships named, since the results come from the measurement of empathy using different tools and, therefore, underlie different concepts of conceptualizations of the empathy behind each one of the measurement types. This situation makes these results incomparable, stimulates the ambiguity and even its apparent contradiction.

Additional studies developed with students from different health and geographic areas [28]-[30], agree with the fact that women score higher empathy measures than men, with the exception of a study realized with dental students in Malaysia, in which differences between both genders were not found and men scored absolute values higher than women [31]. In Latin America (LA) some studies were developed about the empathy levels in different schools of dentistry and the results around the gender differences are contradictory. Studies have been performed by Gutierrez *et al.* [32], Salcedo *et al.* (results sent to publish) in Perú; Carrasco *et al.* [33], Huberman *et al.* [34], López *et al.* (results not published), González *et al.* (results not published), and Silva *et al.* [35] en Chile; Silva *et al.* [36] in Dominican Republic; Bilbao *et al.* (results sent to publish), Erazo *et al.* [37], González *et al.* (data sent to publish), Pérez *et al.* (data sent to publish) in Colombia; Howard *et al.* [38], Sánchez *et al.* [39]

in Costa Rica, Bullen *et al.* (results sent to publish); Gordon *et al.* (results not published) in Panamá, Varela *et al.* [40] in Argentina. All these results show that there is variability in the answer of empathy levels in both students outside and inside from all the different universities considered in this study [41]. The totality of authors previously mentioned developed their research in LA with the Jefferson Scale of Empathy (JSE), adapted to the health area researched, therefore, the difference of tools seems not to be the variability source and they can be compared not only by the scale used, but by the same methodological conceptions and statistics with which these studies were developed.

Vera [41], analyzing some of these studies about empathy in dental students from LA, sets three generalizations: 1) the empathy represents a variable behavior; 2) there is a tendency to show higher levels of empathy in female and in higher courses and 3) these variables do not explain more than 20% of the variation found. The authors from this study completely agree with the generalization 1) and 3), but the data observed in this current study shows variability in the gender and, therefore, it is not possible to coincide with the generalization 2), in relation to the “gender” factor. The studies previously mentioned, show that the variability is necessary to be explained, mostly, if required to make interventions that try to increase empathy levels in students of health science, by active processes of empathy teaching-learning.

The differences found could have some sources of explanation. Mercadillo *et al.* [42] propose that compassion is a moral emotion that determines a help behavior and the observation of the brain activity, after the students were submitted to watch images triggered to compassion; it showed that the compassion experience triggers by the experience of physical pain or illness, and it is associated to the experience of dislike, anxiety and dominance, characteristics of negative emotions. On other hand, the brain maps of this experience [42] show that women expressed a higher and more diverse activity in the basal and limbic zones of the brain, such as parahippocampal and temporal cortex (anger and sadness) and frontal areas involved in processing learned information and carrying out (intentions and making decisions). Men showed predominant activity in the orbitofrontal cortex (learning of moral concepts and social rules), but the behavioral results of their emotional experience did not show differences, which creates contradiction between what the students said what they felt and what their brains reflected.

Two proposals exist to explain this difference. Men as well as women feel compassion in similar ways, but feelings are processed by different ways in the brain: compassion felt by women goes with an empathy that can benefit the spread, and in men the feeling of compassion and their decision to help is directed by the moral judgment of the situation: “when someone suffers one has to help”. The described differences can be explained by two proposals: 1) the evolutionist in which a woman owns a more sensible empathic system that assists the nurturing system; the high levels of oxytocin in women produce reactions like inhibiting pain faced with intruders, increases the anger to protect her children and builds an emotional bond towards them [43] and 2) the cultural proposal indicates that both the family and social education teach women and men to express their emotions in different ways. Both proposals do not have to be observed mostly as contradictions. Mercadillo *et al.* [42] comes to the conclusion that “even though the brain and body are different between genders, those differences do not determine the way we behave, they just lead the members of a gender to respond in an easier way to specific types of situations.”

These situations are valued as concepts, rules and ways of expression that get into our brains and we learn during our daily lives, culturally and can create ways of response and perception throughout human development [42]. However, to obtain a major approach of which is the empathic behavior between gender, longitudinal studies are required, but not only related to location, since the result of this type would explain the local situation and what can be valid for a population not necessarily is valid for others, because of the possible influxes of some factors regarding the conformation of empathy. The social stereotypes (sexual role) influence the answers, since these stereotypes assign women the tendency of caring and supporting weak people, a bigger capacity to detect feelings and nonverbal signs and a major concern about the social aspects of interaction and other’s feelings [43] [44].

On the other hand, other authors proposed that empathy has an impact in the emotional health and in the social field throughout culture [4] [43]-[46], besides it is correlated with the pro-social behavior and altruism and also inhibits the unsocial and aggressive behavior [47] [48]. There are circumstances that negatively influence empathy: levels of anxiety, claustrophobia, obesity, depression and stress [47]-[49]. In summary, the variability of observed empathy levels in this study, related to gender, cannot be explained. This variability constitutes empirical evidence that the empathy construct is difficult to elucidate and that some of the possible explanations

that have been used so far, do not have a general character (for example, gender role).

5. Conclusions

It is still early to make generalizations regarding the distribution of the empathy levels in gender, because of the possible following reasons: 1) the observed variability between the genders in different universities of LA can be just a limited fact of the studied countries and, therefore, other studies are required in order to confirm that this variability is a general characteristic in LA, or is only endorsed to the six countries studied in this document, and even, it could be just a characteristic of the students of dentistry; 2) at least, in the studied region in this current document, intervention with teaching-learning processes associated with empathy should not occur without a prior study of what are the factors of influence, how they influence and by how much.

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Authors' Contributions

All authors designed the study. They participated in the statistical analysis, drafting of the components of this work and final review and final approval of the article.

Conflicts of Interest

The authors declare that they have no competing interests.

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