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ORIGINAL RESEARCH

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Beyond scientific and technical training: Assessing the relevance of empathy and assertiveness in future physiotherapists: A cross-sectional study

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Abstract

Background and Aims: Empathy and assertiveness are two essential social skills for a health professional such as a physiotherapist and are necessary for developing moral thinking. Previous studies show that the development of empathy and other social skills improves as students progress in their studies. However, other authors show deterioration of empathy as students progress in their studies and acquire clinical experience. Training in soft skills, such as assertiveness, among health science students will have an impact on the quality of patient care. Effective communication, conflict resolution and the ability to work as part of a team are competencies that have been put to one side as a result of the recent COVID-19 pandemic and it is important to resume training students in soft skills. The objective of this study is to investigate to determine the empathic and assertive state of physiotherapy university students.

Methods: A descriptive cross-sectional study of physiotherapy university students was conducted in the 2022/2023 academic year. The Interpersonal Reactivity Index (IRI) scales for empathy and the Rathus test for assertiveness (RAS) were used as study tools. Finally, 127 students participated in the study, 52.91% of the total population of physiotherapy students. The questionnaire was available for 4 weeks in November and December 2022.

Results: The empathetic and assertive development of the students was found to be acceptable. Significant differences were also observed according to the gender variable in the students, with female students presenting better results ($p = 0.01$). Students who are working or have clinical experience in other professions score lower on the empathy personal distress subscale ($p < 0.001$).

Conclusion: Future research should be considered to help improve clinical and professional expertise in physiotherapy students about empathic and assertive development. The findings provide new evidence on the levels of empathy and assertiveness in physiotherapy students.

KEYWORDS
assertiveness, education, empathy, health occupations students, physiotherapy

1 | INTRODUCTION

In the words of Cortina,[1] Professor of Ethics at the University of Valencia (Spain), about what she understands by being a good professional, she argues the following: "The profession, we could say in the first place, requires a particular vocation, which does not mean that someone feels called to it from childhood, but rather that they must have certain aptitudes for its exercise and with a particular interest in the goal that this specific activity pursues. Without sensitivity towards the suffering of the sick person, without concern for transmitting knowledge and training in autonomy, and without desire for justice, it is challenging to be a good doctor, nurse, teacher or lawyer. The same is true for other professions." A health professional's training should include a part that promotes their vocation and teaches those aspects that influence the relationship between people in the care context.

Considering that physiotherapy professionals are trained at the University, vocational, teaching and training concerns mean that there is a duty to try to discover the degree of critical, ethical and human thinking the students have today in the 21st century. As background research at the University, the descriptive results of De Villar Casado,[2] show that moral and empathic reasoning among physiotherapy students is good and is significantly better in students in higher years in the degree courses compared to those in the lower years. However, there is no significant correlation to show any ethical gap.

Håkansson-Eklund et al.[3] report that empathy improves notably among nursing students in higher years than those in lower years, even more so if they receive training in empathy skills in their formal curriculum. Pades-Jiménez et al.[4] said that fourth-year physiotherapy students present better assertiveness and emotional intelligence development than students in lower years of their physiotherapy courses and that clinical practice has a strong influence. However, in the study by Hiok-Lim et al.,[5] there were no significant statistical contrasts between the empathic level of students and that of professional physiotherapists, but the results are not sufficiently conclusive.

Training health professionals requires teachers in the disciplines of health sciences to investigate and be trained in ethics. For example, bioethics is increasingly essential for developing physiotherapy as a discipline since it is a profession that is acquiring increasing responsibilities.[6] In physiotherapy, training in bioethics should not only be at a theoretical level but should also have practical applicability. This should be done by seeking motivating educational strategies to promote independent judgment and critical awareness because physiotherapists need to make decisions to help patients in their recovery.[7] As Silva et al.,[8] pointed out, training in skills and abilities in the socioemotional sphere is crucial to train health professionals in clinical decision-making.

As observed in nursing studies, teaching ethics should be transversal to create solid foundations. In this way, the ethical dilemmas faced in their professional lives could be addressed and more humane care provided.[9,10] Bioethics should also be a transversal area in undergraduate, postgraduate and continuing physiotherapy education. As a result, human values can be modified and improved, leading to better future professionals since they will benefit from enhanced clinical and ethical reasoning.[11]

Regarding humanized care, an empathic attitude is an essential factor. Fostering empathic attitudes in nursing and health sciences degrees is vital for humanized care, and empathy training should be considered as fundamental until they become professionals.[11-13] The professional health sciences praxis competes in performance with vocation, social values, and a high humanistic sense.[14] Empathy is a fundamental element in professional ethical thinking in nursing care, and this attention helps produce better results in nursing and other health sciences care interventions.[15]

In this regard, training future health professionals requires the involvement of both the university and the healthcare or clinical worlds. Moreover, human care requires scientific, academic and/or clinical training and human and moral training. This is why, the physiotherapy degree curricula should also focus on training in clinical-health communication skills.[14-17]

Even more so in the context of the recent pandemic, it becomes even more relevant for the healthcare professional to have practical communication skills in patient care. For example, to be able to conduct an effective clinical interview, to know how to deliver bad news, and to understand the patient's emotions.[18]

Educational interventions have shown that they can be more effective in enhancing students' empathic development when provided over time than when applied as a single intervention. However, not all empathy training activities are suitable for all learner profiles.[16,19,20]

Sobczak et al.[21] point to the need to introduce social and emotional competency training in health sciences degrees since these researchers detected that the levels of empathy of medical students decrease over the course of their degree. Nevertheless, according to Karayiannis et al.,[22] nursing students show better results in empathy

Key points

- Fostering empathic attitudes in health sciences degrees is vital for humanized care, and empathy training should be considered fundamental until they become professionals.
- Significant differences were found in the personal distress empathy subscale concerning working while studying or previous health science jobs/experience.
- The personal distress empathy subscale showed a significant negative correlation with assertiveness.

levels compared to other health sciences majors. These authors point out that as students have more contact with clinical reality, they begin to present lower levels of empathy. More research is required not only into the clinical impact on empathy, but also into mixed methodologies and studies of other factors such as gender. The same has been mentioned by Yucel and Acar[23]: students have better levels of empathy at the beginning of the physiotherapy degree and this decreases slightly in the last year. These results contrast with the ones mentioned above,[2,3,21,24] which suggest that contact with clinical reality improves students' empathy levels. In the case of oral health professionals, one study also shows that their students improve empathic development as they interact with the clinical context.[21]

The authors understand that professional and ethical thought development in physiotherapy students is interrelated with humanized care, and empathic and assertive action should be included in ethics. The aforementioned will be explored in this work, which is the first part of a larger research project whose aim is to improve the training of the students in this respect. As argued by Çınar et al.,[25] more studies and investigations are needed that address everything related to critical thinking and social and communication skills among students in a multicentric way: age, gender, years of educational training, and even students' social well-being.

A teaching-learning process for students in empathy and other soft skills, such as assertiveness, is necessary to train and raise awareness of ethical behavior. For example, nursing students with low levels of assertiveness may experience greater signs of anxiety and/or depression. It is clear, therefore, that the higher the level of assertiveness, the higher the level of self-esteem.[25-29]

However, a contrast can be seen between the results in the literature on how empathic thinking develops in health science students as they progress in their careers. The training of health professionals should integrate general knowledge common to all health professions, such as anatomy, physiology, pathology and research, but also knowledge specific to each profession, medicine, nursing, physiotherapy, and others. Furthermore, this training should also integrate interpersonal skills, ethics and bioethics to improve future health professionals' overall training. Therefore, training students is a process that synergistically integrates knowledge from the academic and clinical fields with a plan related to this importance, as shown in Figure 1.

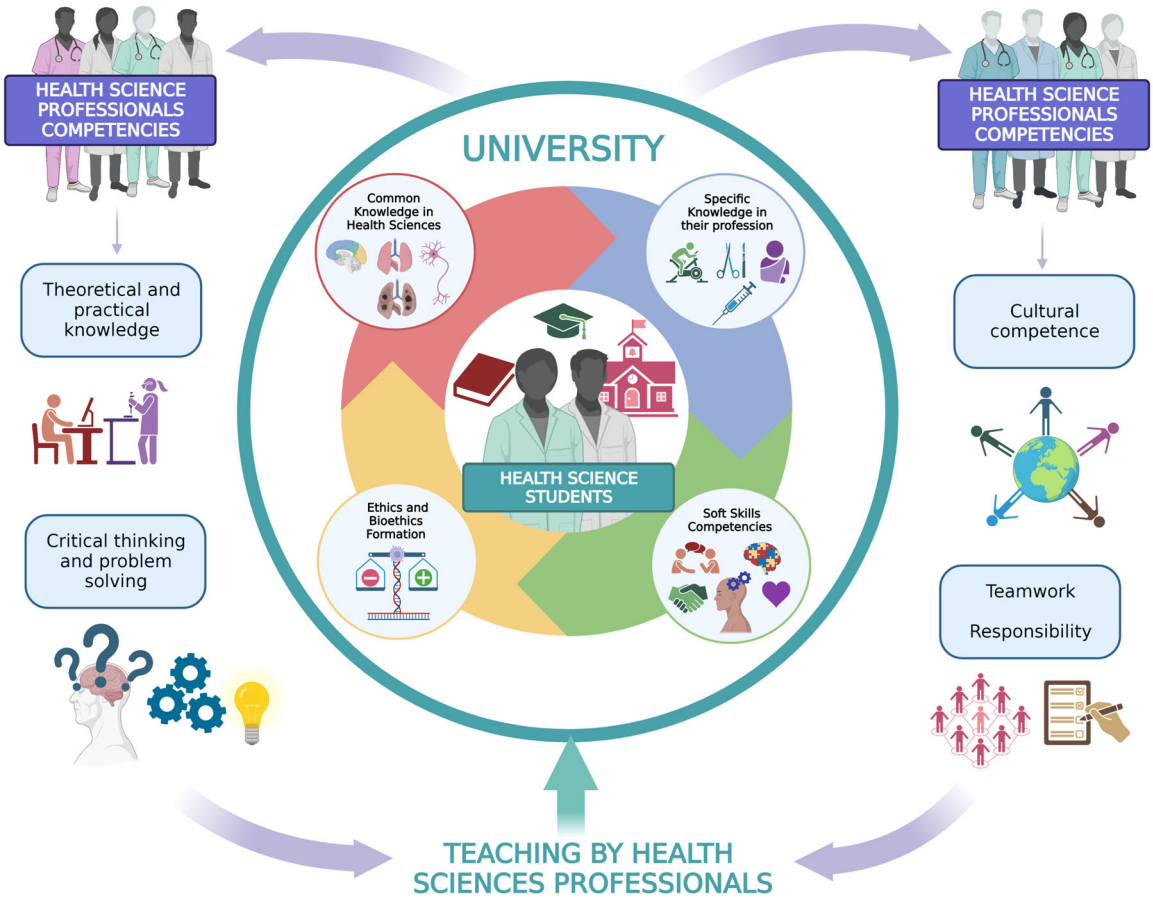

FIGURE 1 The scheme shows the information flow in health science students' teaching-learning process. The relationship that exists between the knowledge taught at university (common to the health sciences professions, specific to each profession, ethics and bioethics and social skills) and which is complemented by the clinical experience they acquire in healthcare centers trained by professionals and the implementation of other competences (relationship between theory and clinical practice, problem-solving, teamwork, critical thinking, responsibility, and cultural competence). Created with BioRender.com.

Therefore, the present study aims to describe the state of empathy and assertiveness of physiotherapy students at the University. Empathy and assertiveness are essential soft skills to build students' critical and ethical thinking that will help improve the quality of care given by future professionals.

2 | METHODS

Following the STROBE guidelines, an observational, descriptive, and cross-sectional study design was proposed. This study was approved by the University Research Ethics Committee (CEIBA-UNIVERSITY), with code CEIBA2022-3133.

All students were recruited voluntarily and were free to withdraw from the study at any time. No participants were coerced or pressured to complete the survey. They provided their consent for participation in the study.

2.1 | Study design, sample, and participants

The research team contacted professors and student representatives from the degree course to ensure maximum participation from physiotherapy students. A face-to-face meeting was convened for students from each academic year where the purpose of the research was explained, as well as the steps to follow to participate in the study; in this first phase of the study, the aim was to provide information about the study.

In addition, all the students were invited via email to complete the questionnaire in a face-to-face meeting posterior to the information day of the study. Subsequently, all students unable to attend the meetings (information or questionnaire) were sent an email with a copy of the study information presented in person and a link to the questionnaire that they could fill in voluntarily and anonymously, and informed consent was also obtained from the participants. The students were free to ask any questions at any time before completing the questionnaire. The questionnaire was available for 4 weeks in November and December 2022. The questionnaire format was the same for all study participants; they always had to use the institutional account to access the questionnaire. To see the data collection and information protocol, see Figure 2.

The inclusion criteria were: (a) University physiotherapy students, and (b) students who consented to participate in the study with full knowledge of its purpose and content. Students had to meet the criteria of 1 and 2 above to be included in the study.

The exclusion criteria was: (a) External university students with a national or international exchange program that is, Erasmus, Sicue or similar; the Erasmus Program is a student exchange program between European universities; the Sicue Program is an exchange program similar to Erasmus but between universities in Spain. In these programs, students stay 6–12 months at the university).

Finally, 127 students participated in the study, 52.91% of the total population of physiotherapy students at University (240 students, 60 students per academic year).

2.2 | Questionnaire

2.2.1 | Interpersonal reactivity index (IRI-Spanish Version).[30,31]

The IRI empathy questionnaire is an essential tool in research because it provides a standardized way to measure different dimensions of empathy. Empathy is a complex construct that involves understanding and responding to the emotions and experiences of others. It has links to many important outcomes, such as social competence, relationship quality, and mental health.

The IRI is a measure of dispositional empathy that takes as its starting point the notion that empathy consists of a set of separate but related constructs.[32,33] The instrument contains four subscales, each covering a separate facet of empathy.

The four IRI subscales measure four dimensions of the global concept of empathy. Some show us more cognitive aspects (the Perspective Taking-PT and Fantasy-FS subscales). That they are related to the spontaneous attempts of the subject to adopt the perspective of the other and to understand the point of view of the other person. And that they evaluate the tendency to identify with others and the imaginative capacity to put themselves in fictitious situations.

The other two subscales, empathic concern (EC) and personal distress or discomfort (PD) measure people's emotional reactions to negative experiences. In the first (EC), the feelings "oriented towards the other person" are measured; in the second (PD), the feelings of anxiety and discomfort that the subject manifests when observing the negative experiences of others are evaluated (these are feelings « self-oriented). Therefore, two subscales would refer to different feelings.[31-33]

The IRI-Spanish version is one of the most widely used self-report measures for assessing students' empathy.[30,31] The reliability of the IRI Empathy Questionnaire ranges between 0.66 and 0.84 (Cronbach's α coefficients of the four subscales that make up the instrument).[30]

2.2.2 | The Rathus assertiveness scale (RAS-Spanish Version).[34–37]

The RAS questionnaire provides a standardized way to measure an individual's level of assertiveness. Assertiveness is a communication style that involves expressing one's thoughts, feelings, and needs directly and respectfully. It is a critical social skill that can influence an individual's personal and professional relationships and overall well-being.

The RAS was designed to measure a person's level of assertiveness. It is also an instrument for measuring behavioral change in assertion training. The RAS was developed in 1973 by Spencer Rathus.[36] The RAS consists of 30 items (including 16 inverted items) with a 7 point Likert scale scored from −3 (very uncharacteristic of me) to 3 (very characteristic

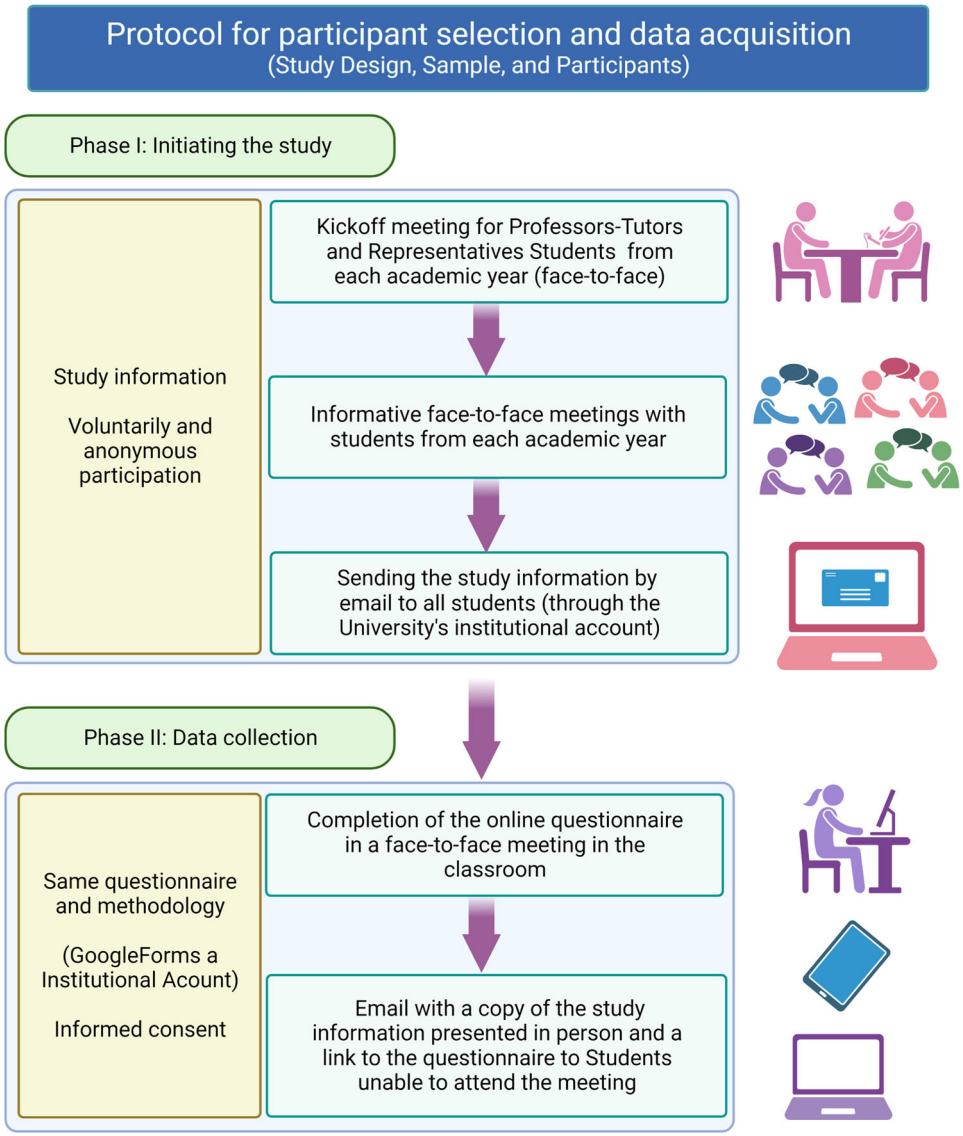

FIGURE 2 The scheme shows the process of student selection and how data are acquired. The working protocol is developed in two phases: the first phase consists of providing information about the study, with three stages: (a) teaching representatives staff and representatives student are informed, (b) a face-to-face meeting with all students in each academic year, (c) all the information provided in the previous steps is sent by email to students. The second phase consists in data collection: Students are summoned to a meeting in person in their class to fill in the questionnaire using an electronic device and their institutional account. Likewise, filling in the questionnaire remotely is possible for students using their institutional account. Created with BioRender.com.

of me). Total scores range from −90 to 90 points and provide a score for interpretation. The RAS result can also be divided into three intervals: (a) Very assertive (from 30 to 90), (b) Acceptable assertiveness (from −30 to 30), and (c) Slightly assertive (from −90 to −30).

The reliability of the RAS Questionnaire ranges between 0.73 and 0.86 (Cronbach's α coefficient).[37]

2.3 | Data analysis

Data management and analysis were performed using SPSS 26.0 (IBM, 2019). Exploratory analysis was realized, the empathy subscales and assertiveness were analyzed through 2-sided student *t*-test for independent samples.

The relationship between empathy, assertiveness and demographic data was analyzed using Pearson correlation analysis. A p-value ≤ 0.05 was considered a statistically significant difference in this study.

3 | RESULTS

First, we presented a descriptive analysis of the sample and the dependent variables, followed by the inferential analysis and, finally, the correlational analysis.

3.1 | Descriptive analysis of sample

A total of 127 students participated in the study, and 127 questionnaires were received (all questionnaires completed by students were valid; there were no partially completed questionnaires or missing data).

All participants were between 18 and 58 years old (M = 22.60; SD = 7.03).

3.1.1 | Gender and academic year of students

The gender distribution of the sample was 56 men (44.09%) and 71 women (55.91%). The percentages of participants for each academic year were 50% (30/60) in their first year, 55% (33/60) in their second year, 53.33% (32/60) in their third year, and 53.33% (32/60) in their fourth year (see Table 1).

3.1.2 | Questions about working while studying or previous health science jobs (Question 1. Are you currently working (simultaneously with your studies)?; Question 2. Have you been or are in any job related to "Health Sciences"?)

Regarding the employment status of the physiotherapy students, 21.26% (27/127) were working, and 10.24% (13/127) of the students had work experience in health sciences.

3.1.3 | Interpersonal reactivity index (IRI—Spanish Version)

University physiotherapy students obtained an overall empathy score on the IRI subscales of perspective-taking (PT) (M = 27.38; SD = 4.23; Crombach's $\alpha = 0.70$), EC (M = 27.17; SD = 5.01; Crombach's $\alpha = 0.70$), FS (M = 19.87; SD = 3.66; Crombach's $\alpha = 0.62$), and PD (M = 16.32; SD = 4.40; Crombach's $\alpha = 0.69$). The results from each subscale in physiotherapy students, by gender and academic year, are shown in Table 2.

3.1.4 | The rathus assertiveness scale (RAS-Spanish Version)

Physiotherapy students obtained a global RAS score of −4.84 (SD = 24.90; Crombach's $\alpha = 0.86$). 76.38% of physiotherapy students got an "acceptable assertiveness" score, 15.75% obtained "slightly assertiveness," and 7.87% were "very assertive." RAS scores on the different assertiveness subscales by academic year or gender are shown in Table 3.

3.2 | Inferential analysis

Significant differences were found in two subcategories of empathy concerning the gender variable (fantasy and empathic concern). Females scored higher than males ($t[125] = 2.57$; $p = 0.01$; $r^2 = 0.05$) in the empathic fantasy subscale. Females also scored higher on the empathic concern subscale ($t[125] = 5.10$; $p < 0.001$; $r^2 = 0.17$). (see Table 4).

Significant differences were also found in the PD empathy subscale concerning questions about working while studying ($t[125] = 2.24$; $p < 0.001$; $r^2 = 0.13$) or previous health science jobs/experience ($t(125) = 3.64$; $p < 0.001$; $r^2 = 0.10$). In addition, students concurrently studying with a job or had experience in health science jobs had lower scores on the PD empathy subscale. These differences are shown in Table 5.

3.3 | Correlation analysis of empathy and assertiveness

The perspective-taking and fantasy empathy subscales showed a significant positive correlation with another empathy subscale empathic concern. The perspective taking subscale had a positive correlation with empathic concern ($r[127] = 0.306$; $p < 0.001$). The fantasy subscale also had a positive correlation with empathic concern ($r[127] = 0.387$; $p < 0.001$).

The personal distress empathy subscale showed a significant negative correlation with RAS-assertiveness ($r[127] = -0.383$; $p < 0.001$). The results of the correlational analysis are shown in Table 6.

TABLE 1 Descriptive analysis of sample: gender, age and academic year of students.

	First-year	Second-year	Third-year	Fourth-year	Total
Female	$n = 18$	$n = 17$	$n = 16$	$n = 20$	71 (55.91%)
	M = 19.83; SD = 5.17	M = 22.35; SD = 6.22	M = 25.60; SD = 11.50	M = 23.25; SD = 6.20	
Male	$n = 12$	$n = 16$	$n = 16$	$n = 12$	56 (44.09%)
	M = 22.42; SD = 1.41	M = 20.13; SD = 2.83	M = 25.00; SD = 7.07	M = 23.00; SD = 0.00	
Total	$n = 30$	$n = 33$	$n = 32$	$n = 32$	127 (100%)

Abbreviations: M, average age; *n*, number of students; SD, standard deviation age.

TABLE 2 Interpersonal Reactivity Index (IRI) score in students of physiotherapy.

		PT_perspective taking	FS_fantasy	EC_empathic concern	PD_personal distress
IRI score (Academic Year)	First-Year	M = 27.84; SD = 4.43	M = 19.84; SD = 5.57	M = 27.95; SD = 4.38	M = 15.32; SD = 3.89
	Second-Year	M = 26.76; SD = 4.67	M = 20.85; SD = 5.33	M = 27.36; SD = 3.59	M = 17.67; SD = 4.61
	Third-Year	M = 27.28; SD = 4.07	M = 20.28; SD = 4.77	M = 27.00; SD = 3.47	M = 14.81; SD = 4.30
	Fourth-Year	M = 27.75; SD = 3.94	M = 17.75; SD = 4.02	M = 26.31; SD = 3.15	M = 16.94; SD = 4.19
IRI score (Gender)	Female	M = 27.63; SD = 4.03	M = 20.86; SD = 5.27	M = 28.51; SD = 3.13	M = 16.41; SD = 4.14
	Male	M = 27.05; SD = 4.48	M = 18.61; SD = 4.38	M = 25.46; SD = 3.60	M = 16.21; SD = 4.14
IRI score (TOTAL)		M = 27.38; SD = 4.23	M = 19.87; SD = 5.01	M = 27.17; SD = 3.66	M = 16.32; SD = 4.40
Cronbach's α		0.70	0.79	0.62	0.69

TABLE 3 Results of Rathus test for assertiveness (RAS)-Spanish version in students of physiotherapy.

		Slightly assertive	Acceptable assertiveness	Very assertive	RAS score
RAS-students (Academic year)	First-Year (n = 30)	n = 2 (6.67%)	n = 24 (80.00%)	n = 4 (13.33%)	M = 2.30; SD = 24.25
	Second-Year (n = 33)	n = 5 (15.15%)	n = 28 (84.85%)	n = 0 (0.00%)	M = −10.97; SD = 20.24
	Third-Year (n = 32)	n = 6 (18.75%)	n = 24 (75.00%)	n = 2 (6.25%)	M = −6.22; SD = 24.89
	Fourth-Year (n = 32)	n = 7 (21.88%)	n = 21 (65.63%)	n = 4 (12.50%)	M = −3.84; SD = 28.37
RAS-students (Gender)	Female (n = 71)	n = 15 (21.13%)	n = 51 (71.83%)	n = 5 (7.04%)	M = −7.32; SD = 24.98
	Male (n = 56)	n = 5 (8.93%)	n = 46 (82.14%)	n = 5 (8.93%)	M = −1.70; SD = 24.65
RAS-students (TOTAL, n = 127)		n = 20 (15.75%)	n = 97 (76.38%)	n = 10 (7.87%)	M = −4.84; SD = 24.90
Cronbach's α = 0.86					

TABLE 4 Inferential analysis—Empathy subcategories/assertiveness versus gender.

	Gender	n	Mean	SD	t	Sig.	r^2
Empathy (PT)	Female	71	27.63	4.03	$t_{125} = 0.77$	0.45	<0.001
	Male	56	27.05	4.48			
Empathy (FS)	Female	71	20.86	5.27	$t_{125} = 2.57$	0.01*	0.05
	Male	56	18.61	4.38			
Empathy (EC)	Female	71	28.51	3.13	$t_{125} = 5.10$	<0.001*	0.17
	Male	56	25.46	3.60			
Empathy (PD)	Female	71	16.41	4.14	$t_{125} = 0.25$	0.81	<0.001
	Male	56	16.21	4.14			
Assertiveness RAS	Female	71	−7.32	24.98	$t_{125} = -1.27$	0.20	<0.001
	Male	56	−1.70	24.65			

Abbreviations: EC: empathic concern; FS: fantasy; PD: personal distress; PT, perspective-taking; RAS: Rathus assertiveness scale.
*$p \leq 0.01$ are shaded.

4 | DISCUSSION

The aim of this research is focused on knowing the students' data to subsequently improve their teaching-learning process. In this regard, attention is focussed on technical, profession-specific, and personal training in soft and life skills. The continuous knowledge of the reality of the students, together with the references of other experiences and studies in other universities, improves the training process and prepares all involved for the future. Furthermore, the profile of the student, the curricula, and our society is continuously evolving; this

makes adaptable continuous evaluation necessary with the aim of offering society quality care.

4.1 | Descriptive data

In most of the previous studies on empathy, such as Yucel and Acar[23] and Grau et al.,[38] women participate at a higher rate than men (between 60% and 81%). However, in the present study, the participation of women is higher than that of men (53.5%) but does not coincide with the data of the studies mentioned above.

In the present study, physiotherapy students expressed levels of empathy that were different from the national sample used for the Spanish validation of the questionnaire and in more recent studies by Grau et al.,[38] where the FS, EC, and personal distress parameters were lower. However, the data on PT, understood as the most crucial empathic skill for clinicians, which assesses cognitive aspects and indicates the ability to understand another person's point of view, were similar to the studies mentioned.[38]

Assertiveness plays a fundamental role in managing social skills in contexts and situations where health professionals need to show opinions, feelings, ways of thinking and relating, as occurs in the educational field and clinical practice. Along the same lines the study by Cañón-Montáñez and Rodríguez-Acelas,[26] carried out with nursing and physiotherapy students, the highest proportion of students showed acceptable assertiveness, which indicates that although they resolve some situations positively, it is necessary to consider more harmonious ways to help resolve relationships with the people around you.

TABLE 5 Inferential analysis—Personal distress (PD) versus simultaneous work or previous health sciences job.

	Yes/No	*n*	Mean	SD	*t*	Sig.	r^2
Working while studying	Yes	27	1.33	3.87	$t_{125} = 4.24$	<0.001	0.13
	No	100	5.13	4.20			
Previous health sciences job	Yes	13	0.31	3.07	$t_{125} = 3.64$	<0.001	0.10
	No	114	4.78	4.30			

4.2 | Pairwise comparisons

In the present cross-sectional study, it can be seen in the studied sample that female physiotherapy students at the University present more significant empathic development than male students, something which agrees with the results of Chu et al.[39] However, in this study by Chu et al., an improvement in empathic development was observed among male physiotherapy students after having received training in communication skills and improved empathic thinking. Therefore, the authors believe it is right to continue innovating and implementing training to enhance the students' communication skills and critical and empathic thinking, as other authors have also reported.[26,40-47]

In addition, the fact that the students are working or have work experience in another health profession while studying for their degree in physiotherapy means they obtain lower scores on the IRI subscale of personal distress (PD). This issue is closely related to the conclusions of the studies'.[3-5,12] The results of the aforementioned studies report that health professions students have a less empathic attitude as they advance in their studies.

Therefore, it is noteworthy in the results here that students who have experience in other areas of health sciences present less empathic development; this is an issue to consider at the University for future research. The present study found a more significant relationship between less empathic development and more excellent

TABLE 6 Correlation analysis—Empathy subscales and assertiveness.

	Empathy (PT)	Empathy (FS)	Empathy (EC)	Empathy (PD)	Assertiveness (RAS)
Empathy (PT)	-	0.047	0.306*	−0.115	−0.040
		$p = 0.60$	$p < 0.001$	$p = 0.20$	$p = 0.66$
Empathy (FS)	0.047	-	0.387*	0.182	0.000
	$p = 0.60$		$p < 0.001$	$p = 0.04$	$p = 1.000$
Empathy (EC)	0.306*	0.387*	-	0.170	−0.145
	$p < 0.001$	$p < 0.001$		$p = 0.06$	$p = 0.10$
Empathy (PD)	−0.115	0.182	0.170	-	−0.383*
	$p = 0.20$	$p = 0.04$	$p = 0.06$		$p < 0.001$
Assertiveness (RAS)	−0.040	0.000	−0.145	−0.383*	-
	$p = 0.66$	$p = 1.000$	$p = 0.10$	$p < 0.001$	

Abbreviations: EC: empathic concern; FS: fantasy; PD: personal distress; PT, perspective-taking; RAS: Rathus assertiveness scale.
*Correlations higher than 0.300 are shaded.

clinical experience or more significant contact with healthcare or work reality, as other authors have shown.[21-23] The authors understand that this is an issue to be addressed in future studies with students since, as mentioned in other studies,[2,6,25] further research on these issues and their development is needed for better student preparation. Even in the comparative study by Hiok Lim et al.,[5] to determine the empathic development between physiotherapy professionals and students, there are no relevant conclusions. It is also possible to consider addressing the study of belief systems in a just world and their relationship with empathy in students, as in Zheng et al.,[48] since it can open up ways for us to find new answers to improve students' empathic development. In addition, it should be remembered that, in the 21st century, we live in a healthcare world where medical technology can depersonalize patient care.[49]

The results here showed a better score for women than men regarding the EC and FS dimensions. In the study carried out in Spain by Grau et al.,[38] but with medical students, there is a similarity in gender to the present results. Another study conducted with medical students found that women show better empathic development than men.[50] Among oral health professionals, women score better on empathy.[51]

Therefore, future approaches should address the issue of gender with empathy, assertiveness and PD, since in the study by Luna et al.,[29] it is their results show that nursing students, having better empathic development, have worse results at the assertive level and are also more likely to develop depression. According to the authors, this wearing down is due to compassion fatigue. The opposite was observed in men: less empathic development indicates a lower risk of depression. Therefore, we must be vigilant in future research about whether people who combine their physiotherapy studies with working life or have experience in other health science professions, such as nursing, are emotionally worn out and may be at risk of suffering the so-called burn-out syndrome.

However, medical students may experience burnout or stress due to the high level of academic competition required to enter medical schools, and this can lead to emotional exhaustion, an increased risk of alcohol consumption and a decrease in empathic concern. The decline in empathy among medical students is related to the clinical context when they observe difficulties in providing quality care to the user, which leads to cognitive dissonance, moral distress and burnout.[52-54]

Other authors suggest that resilience should be trained among medical students from their third academic year until they transition to clinical training as a preventive measure against burnout.[55] Regardless of the situation, protective factors against burnout syndrome among physicians include the development of cognitive empathy and the strengthening of emotional regulation skills.[56]

Empathy should be studied from different dimensions since a single measurement from a single dimension does not give a complete and realistic picture of whether a student's level of empathy improves or worsens as they progress through their academic training. Some findings in medical students indicate that improvement in empathy occurs at the cognitive level, especially. Nevertheless, determining changes in empathic development also requires considering emotional dimensions at a more specific level.[57]

Empathy should be understood as multidimensional and holistic, encompassing cognitive, emotional, moral and behavioral dimensions. When investigating the development of empathy among future healthcare professionals, issues such as race, class, gender and cultural competence cannot be ignored. The mechanisms shaping empathy in the professional-patient relationship need a better understanding and multidimensional measurement scales.[58,59] In a likely decline in empathy among students as they progress through their training, such multidimensional scales are needed to know where empathy is deteriorating.[60] Concerning this holistic understanding of empathy among students, medical students with disabilities exhibit better empathic thinking compared to their nondisabled peers.[61]

4.3 | Correlational study

The four IRI subscales measure four dimensions of the global concept of empathy. The PT and FS subscales cover more cognitive aspects related to the spontaneous attempts of the subject to adopt the perspective of the other and to understand the point of view of the other person. They evaluate the tendency to identify with others and the imaginative capacity to put themselves in fictitious situations.

The other two subscales, EC and PD, measure people's emotional reactions to negative experiences. The first (EC) measures the feelings “oriented towards the other person”; the second (PD) evaluates the feelings of anxiety and discomfort that the subject manifests when observing the negative experiences of others (these are self-oriented feelings). Therefore, these two subscales refer to different feelings.[30]

Along the same lines as the study by Mestre-Escrivá et al.[31] and Eisenberg,[62] the correlations of the PT and EC FS and EC subscales are significant and consistent with a result in the one that seems to be a feeling oriented to the other. In addition, the results in the empathy subscales, in general terms, correlate positively and in a direction that points to prosocial behavior and prosocial reasoning styles. A negative correlation would be more in line with aggressive behavior and emotional instability, as also reported by Luna et al.[29] It is necessary to consider the relationship between EC, PD, gender and whether the students have clinical experience in other professions or work experience in general.

The strongest correlations are reached between the empathy factors indicating a more mature empathic disposition (PT, FS, and EC) and prosocial behavior. Among these same factors and internalized reasoning, this reasoning includes precise arguments aimed at understanding the other's problem, anticipating physical and emotional consequences that may be derived from helping or not and ideas such as the personal satisfaction of acting according to their own values.

The present study found an inverse correlation between the empathy subscale PD and assertiveness-RAS, which suggest that the

students' assertiveness improves with a lower score in PD. Other authors have found a positive correlation between age and assertiveness; this is the case of Cañón-Montañez and Rodríguez-Acelas,[26] as age increases, so does assertiveness; nevertheless, the results obtained in our study found no significant differences for age or academic year. Training assertiveness among healthcare professionals can lead to a work environment with better communication, greater job satisfaction and improved quality of care for patients. Research studies have demonstrated the efficacy of assertiveness training in improving assertiveness levels.[63,64] Therefore, improving training in assertiveness and social skills may be worthwhile.

In addition, implementing strategies so that assertiveness as a relational skill is considered a requirement in the training of health professionals. Assertiveness correctly applied allows a more significant and complete delivery of health care and services.

Life skills are framed within a broad vision of developing personal skills or abilities, transcending an instrumental understanding limited to the skillful management of some psychosocial techniques or tools. In this respect, it is convenient to review whether students are developing some of these capacities, how to improve them and later reinforce them to provide better care as a professional, better quality of life and greater satisfaction.

Future teaching-learning projects should be planned so that the aspects of empathy that improve and help students of health professions are promoted as well as aspects about assertiveness and the control of factors linked to discomfort or personal distress. All this would positively affect the care and development of the profession and aspects of communication in the healthcare work environment. In addition, this will lead to better professionals and improved job satisfaction.[65,66]

Concerning life skills, there are the so-called nontechnical skills (NTS). These cognitive, social and personal skills or competencies are crucial for providing safe and quality clinical care. These NTS need to be taught to health sciences students so that they are able to overcome frustration, insecurity, fear, anxiety, stress or any other emotional dissonance. In addition, their training and simulation are essential for students to know how to behave in interpersonal relationships between colleagues in the clinical setting.[67,68] For example, positive mental health and a correct development in social skills, such as nurse assertiveness, are closely related to positive mental health.[69]

4.4 | Limitations

The main limitation of the present study is related to its cross-sectional design. In this design, it is difficult to make causality inferences. However, the authors' interest was focused on studying and describing specific population characteristics to adjust future studies. Another problem with this design is that the results may have been overestimated when performing the analysis. Another disadvantage of the cross-sectional design is the drawback of data being provided from a single time period.

5 | CONCLUSIONS

The findings of the present study provide new evidence on the levels of empathy and assertiveness in health sciences students. The data obtained in this study show that the levels of empathy and assertiveness of the University physiotherapy students are acceptable and are in accordance with those of other health sciences students in other universities. Based on the results, the study shows that gender is one of the sensitive variables in the measurement of empathy. In addition, female students perform better in empathy than male students. Working concurrently with studying, and working in health sciences, also appears to be related to levels of empathy and assertiveness, this should be considered in further research.

Future studies should explore the care, development and improvement of social skills to improve care as a professional, quality of life, and personal satisfaction. Fostering attributes and skills, including specific components of health professionalism, such as ongoing work on soft and life skills, could play an important role in improving the students' training.

AUTHOR CONTRIBUTIONS

Juan-Elicio Hernández-Xumet: Conceptualization; data curation; formal analysis; investigation; methodology; project administration; resources; software; supervision; validation; visualization; writing—original draft; writing—review and editing. **Alfonso-Miguel García-Hernández**: Conceptualization; methodology; project administration; resources; visualization; writing—review and editing. **Jerónimo-Pedro Fernández-González**: Conceptualization; methodology; project administration; resources; visualization; writing—review and editing. **Cristo-Manuel Marrero-González**: Conceptualization; investigation; methodology; project administration; resources; supervision; validation; visualization; writing—original draft; writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICS STATEMENT

This study was approved by the Universidad de La Laguna Research Ethics Committee (CEIBA-ULL), with code CEIBA2022-3133. The study was conducted according to the guidelines of the Declaration

of Helsinki. Informed consent was obtained from all subjects involved in the study.

TRANSPARENCY STATEMENT

The lead author Juan-Elicio Hernández-Xumet affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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