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Transversal competencies among Peruvian dental students in times of the COVID-19 pandemic

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Transversal competencies are not related to any specific degree program but are crucial with respect to university students' academic and professional training and entry into the labor force. Therefore, this study aimed to identify the transversal competencies (including instrumental, interpersonal, and systemic competencies) exhibited by Peruvian dental students in times of the COVID-19 pandemic as well as the relationships between these competencies and various sociodemographic characteristics. A cross-sectional study second to 6th-year students in a Peruvian dental school was performed. A validated paper and pencil questionnaire that collected information concerning transversal competencies was used in this research. This questionnaire contained three sections; the first section solicited informed consent, the second section focused on the sociodemographic characteristics of participants (6 items) and the third section pertained to transversal competencies (185 items). The survey was conducted between May and August 2022. Descriptive statistics were calculated with respect to each of the competencies investigated in this research. The Friedman, Dunn–Bonferroni post-hoc, Mann–Whitney U, and Kruskal–Wallis tests were used to compare the variables included in this study. The three categories of competencies exhibited similar median values (3), while four subcompetencies exhibited lower median values. Furthermore, interpersonal competencies exhibited significantly lower values ($p = 0.003$) than did instrumental or systemic competencies. No statistically significant relationships were observed between each group of transversal competencies and the corresponding socio-demographic variables.

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Introduction

COVID-19, an infectious disease that is caused by SARS-CoV-2, which is transmitted by contact with aerosols, saliva droplets, or contaminated surfaces and is mutable, has not only caused the death of more than six million people according to Johns Hopkins University (JHU) (Johns Hopkins Coronavirus Resource Center (2023) Desai, 2020; Khader et al., 2020) but also had a tremendous impacts on different environments due to the public health measures that have been implemented to address this issue; these impacts include social isolation. COVID-19 has also affected education directly as a result of the closure of educational institutions and the subsequent adoption of distance or virtual teaching models (Rodríguez-Moreno et al., 2021; Vázquez-Parra, 2021).

Accordingly, UNESCO, via the IELSAC (International Institute for Higher Education), reported on the consequences of COVID-19 pandemic for students, teachers, workers, and other relevant individuals, indicating that for students the most notable impact of the pandemic pertained to the temporary closure and cessation of face-to-face activities, the results indicated that, until May 2020, 160 million students in Latin America and the Caribbean did not participate in face-to-face classes, which greatly damaged their learning processes (Vidal et al., 2021). In Peru, the resumption of face-to-face classes occurred in March 2022.

On the other hand, societal knowledge includes collective information obtained via technology, which results in constant changes in social, economic, and labor conditions that, in turn, lead to the emergence of new standards for competitiveness and both personal and group performance, including new forms of teaching and learning in the context of education. This situation has been interpreted as indicating a change in the conceptualization of performance on the basis of competencies pertaining to learning and the development of these competencies throughout individuals' lives (Morales Morgado Erla et al. (2013); Sepúlveda, 2017). Therefore, students must acquire the knowledge and competencies that they need to perform in the work environment. Accordingly, since 2007, the Tuning Project has been developed in response to the need to modernize and reformulate degree programs with the aim of making them more flexible with regard to new trends, the requirements of society and the demands of a globalized world, including by providing a type of education that can enable students to extent what they have learned beyond borders and understand the importance of relevant competencies with respect to the processes of modernization and curricular reform (Beneitone et al., 2007; González and Wagenaar, 2009; Beneitone and Yarosh, 2015).

In its report *Rethinking Education: Towards a virtual common good?*, UNESCO made the following statement: "Everyone, at every stage of life, should have lifelong learning opportunities to acquire the knowledge and competencies necessary for achieving aspirations and contribute to society" (UNESCO, 2015a). Furthermore, with regard to the objective of Quality Education, which is included in Target 4.4, this organization made the following statement: "By 2030, significantly increase the number of young people and adults who have the necessary skills, particularly technical and vocational skills, to have access to employment, decent work and entrepreneurship" (UNESCO, 2015b).

The university cannot stand on the sidelines of the labor situation and must offer both students and society a higher education system that can provide students with the most appropriate opportunities to seek and discover their own fields of excellence. One demand that society makes of the university is to promote entry into the socio-professional world. Accordingly, an educational system that is rooted in competency-based training has been developed, according to the Tuning Project, such competencies refer to: "a combination of attributes such that,

when linked together they allow competent performance as part of the end product of an educational process that is connected to the work performed in higher education" (Beneitone et al., 2007). Competence involves knowing and understanding (namely, the theoretical knowledge associated with an academic field), knowing how to act (with respect to the practical and operative application of knowledge to certain situations), and knowing how to be (i.e., experiencing values as part of the way in which one perceives others and lives in a social context) thus highlighting the level or degree of sufficiency that a person is capable of exhibiting (González and Wagenaar, 2009; Guamán Gómez et al., 2017; Fortea, 2019); these factors are specific and transversal, and should be linked closely to the social and labor demands of the current market (Agudo et al., 2013; Rufino et al. (2022); Caballo et al., 2022).

Although transversal competences in the context of dentistry have been studied in Latin American countries such as Mexico and Chile (Soto-Araya et al. (2021); Solís Castañeda and Varela Rodríguez, 2022), this topic has not yet been studied in Peru. Thus, the present research represents a necessary starting point with regard to the task of obtaining knowledge of the state of training among dental students in terms of three transversal categories: instrumental, systemic, and interpersonal. The first such competencies include conceptual, methodological, technological and linguistic skills (i.e., the capacity to engage in analysis and synthesis, the capacity to organize and plan, information management skills, problem solving, and communication). Interpersonal competencies are related to social capacities pertaining to social interaction and collaboration (i.e., capacity for criticism and self-criticism, teamwork, an appreciation of diversity, and ethical commitment). Finally, systemic competencies include skills that involve complex systems, which require a combination of understanding, meaning, and knowledge (i.e., research skills, the ability to adapt to new situations, leadership, and autonomy) (Aguado et al., 2017; Solís Castañeda and Varela Rodríguez, 2022; Soto-Araya et al. (2021)).

In response to the social isolation resulting from the COVID-19 pandemic and the transition to distance education, university students have experienced various problems that can affect the development of competencies, including transversal competencies, especially in Peru, which is characterized by an educational system that exhibits several limitations (such as a lack of teacher training, scarce and deficient infrastructure, inadequate management of educational institutions, and limited access to information and communication technologies) (Huertas Vilca et al. 2022). Therefore, this problem must be studied with the aim of determining whether students' transversal competencies have been affected in this context, thereby facilitating effective decisions regarding the training of professionals who can satisfy the needs of the labor market and society as a whole.

The objective of this study was thus to identify the transversal competencies exhibited Peruvian dental students in times of the COVID-19 pandemic as well as the relationships between these competencies and various sociodemographic characteristics.

Methods

A cross-sectional, observational investigation was performed. The present research was approved by the Research Ethics Committee of the Faculty of Medicine, Universidad Nacional Mayor de San Marcos under code 0044-2022. The data collected for this research and all the corresponding tests were performed in compliance with the guidelines and regulations of the Declaration of Helsinki (2013). The anonymity of the participants was always guaranteed, and the information obtained as part of this research

was kept completely confidential and used exclusively for research purposes.

The population under investigation in this context consisted of 355 students at the Faculty of Dentistry of the Universidad Nacional Mayor de San Marcos who were in their second to 6th year of study in 2022. First-year students were excluded because they were affiliated with the General Studies department rather than the Faculty of Dentistry. The following eligibility criteria were applied in this research: being Peruvian, agreeing to participate voluntarily in the study, and signing the informed consent form.

For this process, a paper-and-pencil questionnaire was used, the questionnaire was completed by the participants in their classrooms at the beginning of each class from May 21 to August 21, 2022. This questionnaire included three sections: The first section focused on informed consent. The second section collected the sociodemographic characteristics of the participants, including gender, age, year of study, place of origin (i.e., whether the student was from the department of Lima/or another department of Peru), school of origin, and work activity. The third section measured the categories of transversal competencies (i.e., instrumental, interpersonal, and systemic) among participants on the basis of the validated questionnaire developed Aguado (Aguado et al., 2017); this measurement also evaluated 26 subcompetencies (including 9 instrumental competencies, 8 interpersonal competencies, and 9 systemic competencies) by reference to a set of 185 items. This section focused on behavioral evidence as scored on a four-point Likert-type scale (i.e., 1. Never-almost never; 2. A few times; 3. Often; and 4. Always-almost always). These competencies pertaining to university students were derived from the Tuning Project (González and Wagenaar, 2009). These items satisfied the criterion that behavioral observation scales (BOS) should be used, given that these scales have been proven to be reliable and valid in the context of efforts to evaluate competencies. The questionnaire was developed in Spanish and was included in the present study in the same language. Its psychometric properties were evaluated. All of these properties indicated high levels of internal consistency, including Cronbach's α coefficients above 0.70; furthermore, in terms of content validity, all scales achieved values above 0.8. The latent structure analysis of the questionnaire was performed on the basis of an exploratory factor analysis, which revealed that the dimensional structure seemed to reproduce the initial substantive model. These results indicated that this questionnaire faithfully reproduced the structure of the proposed theoretical model (Aguado et al., 2017). The average time to complete the survey was 18–20 min.

Statistical analysis. Data processing and analysis were performed with the assistance of SPSS Statistics V22 software. Descriptive statistics were calculated with respect to each of the transversal competencies on the basis of summary measures. Since these measures did not follow a normal distribution, the comparisons among the three dimensions of transversal competencies were performed on the basis of Friedman's test and the Dunn-Bonferroni post-hoc tests. The comparisons between each of the dimensions of the competencies and the sociodemographic variables were performed via the Mann-Whitney U and Kruskal-Wallis tests. The significance level was 5%.

Results

A total of 316 surveys were received (for a response rate of 89%), seven of which were excluded because they were duplicates. The final study sample consisted of 309 surveys that were submitted mainly by students between 22 and 25 years old (54%), female

Table 1 Sample characteristics.

Variable	n	%
Age group		
18–21 years old	95	30.7
22–25 years old	167	54.0
26 years old and over	47	15.2
Gender		
Female	188	60.8
Male	121	39.2
Year of Study		
Second	44	14.2
Third	62	20.1
Fourth	90	29.1
Fifth	36	11.7
Sixth	77	24.9
Place of origin		
Lima	248	80.3
Other departments	61	19.7
School of origin		
State	135	43.7
Parish	31	10.0
Private	143	46.3
Work activity		
No	227	73.5
Yes	82	26.5

(60.8%), in their 4th year of study (29.1%), from Lima (80.3%), from private schools (46.3%) and not working (73.5%) (Table 1).

With respect to each of the competencies evaluated in this research, the scores pertaining to the relevant indicators were averaged; the results are presented in terms of summary measures in Table 2. The three categories of transversal competencies exhibited very similar median values (3) ranging from 1.2 to 4. Only four subcompetencies exhibited lower median values: basic computer skills (2.8), critical and self-critical capacity (2.86), knowledge and appreciation of diversity (2.86), and interest in quality (2.9). Among these competencies, two corresponded to interpersonal competencies. Similarly, self-confidence (interpersonal competence) exhibited a median value of 3.14 (Table 2).

A comparison of the median values of the three groups of transversal competencies revealed that interpersonal competencies exhibited a statistically significantly ($p = 0.003$) lower value (2.975) than did the other two groups (2.984 and 2.989) (Table 3). Finally, no relationships were observed among any of the groups of transversal competencies and the relevant sociodemographic variables ($p > 0.05$) (Tables 4–6).

The sociodemographic characteristics that coincided with a median value of three (the highest) with respect to the instrumental, interpersonal and systemic competencies including: being 26 years old or older, being in one's second or 6th year of college, and originating from a state school. No statistically significant differences were observed between the scores obtained with respect to each of the competencies and the corresponding sociodemographic characteristics (Tables 4–6).

Discussion

This research analyses transversal competencies (i.e., systemic, interpersonal, and instrumental) among dental students at the Universidad Nacional Mayor de San Marcos 2 years following the declaration of the COVID-19 pandemic. Initially, teaching at this time was 100% virtual (2020–2021); however, in 2022, the teaching took blended approach. The theoretical component of the courses offered at this time was developed online and was not modified in terms of its structure or implementation. The instrumental and systemic competencies developed in the

theoretical context were associated with results that were similar to those reported in previous years as evidenced in relevant academic reports; this finding may have been due to the fact that the methodologies used in this context were similar to those that were employed before and during the pandemic, thus ensuring that the students were familiar with them. On the other hand, the structure of the practical component of the courses was modified because during the pandemic period, these courses were offered via video conferences while a teacher observed the procedures through the monitor. In 2022, the resources used by the teachers allowed the students to develop their interpersonal skills in a different way since the students worked together. However, students found it difficult to some degree to develop and learn

interpersonal skills, problem solving with regard to the clinical assessment of patients, and the ability to interact with professionals from different specialties because the interactions among peers as well as those with patients and teachers represented a new context for some students, whereas others had not practiced such skills in 2 years.

Studies on transversal competencies can help mitigate the discrepancies between the initial training provided by university institutions and the demands of the labor market, thus helping unify the commitments and collaborations that are necessary to improve curricula (Fernández, 2010; Bautista Ramírez et al., 2013; Rodríguez Martínez et al., 2019). Only a few studies have investigated the transversal competencies developed as part of the Tuning Project during the COVID-19 pandemic, thus making it difficult to compare the results of our study with those of other studies since only some of these findings are comparable (Cano García and Lluch Molins, 2022; Dirección de Innovación educativa-Gobierno Vasco, 2020; Ripoll et al., 2021; Sá et al., 2021; Sălceanu 2020; Solís Castañeda and Varela Rodríguez 2022; Velásquez-Rojas et al., 2022). The only study that investigated dentistry students during the COVID-19 pandemic emphasize transversal competencies was conducted by Solís Castañeda and Varela Rodríguez. Their study concluded that dentistry students developed transversal competencies in virtual contexts, thus increasing their potential for entry into the labor market (Solís Castañeda and Varela Rodríguez, 2022).

The three categories of transversal competencies exhibited similar average values; however, among the instrumental competencies, basic computer skills exhibited the lowest value. Among these skills, three components were notable: the technical aspect, the teaching factor, and the student factor. The low value observed in this context with regard to the technical aspect can be attributed to the fact that, until the third quarter of 2021, only 55% of the university population had access to the internet; furthermore, 65% of this population had access to mobile data, 44% had access to another type of network, and 4% did not have access to such a network (Instituto Nacional de Estadística e Informática, 2021). In addition, 51% of this population obtained such access via a cell phone, and 2% did so via a tablet (Cuenca Pareja et al., 2021). Another factor that should be considered in this context pertains to teachers' capacity, mastery, and knowledge of the use of virtual platforms, which can enable them to make their classes dynamic and understandable, as well as to develop a learning proposal that is suited to the educational modality in question (Morales Mantilla, 2011; Pinedo et al., 2021; Mancha Pineda et al., 2022). Similarly, the student factor, the student as the protagonist of learning, who must establish a relationship with the content developed virtually as well as his/her work group with the goal of building knowledge (Morales Mantilla, 2011; Cuenca Pareja et al., 2021).

The fact that basic computer skills were associated with a lower value differs from in the findings of other studies, such as those

Table 2 Transversal competencies in Peruvian dental students.

Transversal competencies	n	Median	Minimum	Maximum
Instrumental competencies				
Capacity for analysis and synthesis	309	3	1.60	4
Information search and management skills	309	3	1.29	4
Customer orientation	309	3	1.50	4
Results-oriented	309	3	1.57	4
Communication	309	3	1.50	4
Planning and Organization	309	3	1.60	4
Basic Computer Skills	309	2.8	1.40	4
Troubleshooting	309	3	1.57	4
Decision-making	309	3	1.60	4
Interpersonal competencies				
Teamwork	309	3	1.60	4
Self-confidence	309	3.14	1.71	4
Self-control	309	3	1.80	4
Assertiveness	309	3	1.40	4
Capacity for criticism and self-criticism	309	2.86	1.71	4
Knowledge and appreciation of diversity	309	2.86	1.29	4
Social responsibility	309	3	1.60	4
Labor responsibility	309	3	1.60	4
Systemic competencies				
Learning capacity	309	3	1.60	4
Knowledge use	309	3	1.60	4
Innovation	309	3	1.20	4
Leadership	309	3	1.50	4
Interest in quality	309	2.9	1.60	4
Initiative	309	3	1.29	4
Flexibility change	309	3	1.57	4
management				
Negotiation persuasion	309	3	1.57	4
Ability to work autonomously	309	3	1.86	4

Table 3 Comparison of transversal competencies in Peruvian dental students.

Transversal competencies	n	Average Range†	Median	Minimum	Maximum	p-value*
Instrumental competencies	309	2.10 ^b	2.98	1.65	4	0.003
Interpersonal competencies	309	1.84 ^c	2.98	1.77	4	
Systemic competencies	309	2.06 ^b	2.99	1.73	4	

†Post hoc tests for pairwise comparison. Different letters indicate statistically significant differences.

*Friedman test.

Table 4 Instrumental competencies according to sociodemographic characteristics.

Instrumental competencies					
Variable	n	Median	Minimum	Maximum	p-value*
Age group					0.225
18–21 years old	95	3.00	1.65	4.00	
22–25 years old	167	2.97	1.96	4.00	
26 years old and over	47	3.00	2.00	3.97	
Gender					0.398
Female	188	2.97	1.65	4.00	
Male	121	3.00	1.71	4.00	
Year of Study					0.494
Second	44	3.00	1.65	4.00	
Third	62	2.95	1.71	4.00	
Fourth	90	2.99	2.04	4.00	
Fifth	36	2.94	2.53	3.52	
Sixth	77	3.00	1.96	3.96	
Place of origin					0.792
Lima	248	2.99	1.65	4.00	
Other departments	61	2.96	1.71	3.96	
School of origin					0.558
State	135	3.00	1.86	4.00	
Parish	31	2.98	2.41	3.86	
Private	143	2.98	1.65	4.00	
Work activity					0.420
No	227	3.00	1.71	4.00	
Yes	82	2.96	1.65	4.00	

*Mann-Whitney or Kruskal-Wallis U tests.

Table 6 Systemic competencies according to sociodemographic characteristics.

Systemic competencies					
Variable	n	Median	Minimum	Maximum	p-value*
Age group					0.155
18–21 years old	95	3.00	1.87	3.96	
22–25 years old	167	2.95	1.73	4.00	
26 years old and over	47	3.03	2.00	3.94	
Gender					0.383
Female	188	2.97	1.73	3.96	
Male	121	3.00	1.89	4.00	
Year of Study					0.414
Second	44	3.02	1.87	3.96	
Third	62	2.94	1.89	4.00	
Fourth	90	2.98	2.09	3.88	
Fifth	36	2.96	2.41	3.53	
Sixth	77	3.00	1.73	3.94	
Place of origin					0.697
Lima	248	3.00	1.73	4.00	
Other departments	61	2.97	1.89	3.95	
School of origin					0.530
State	135	3.0000	1.73	4.00	
Parish	31	2.9622	2.62	3.88	
Private	143	2.9656	1.87	3.96	
Work Activity					
No	227	3.0000	1.73	3.95	
Yes	82	2.9683	1.87	4.00	

*Mann-Whitney or Kruskal-Wallis U tests.

Table 5 Interpersonal competencies according to sociodemographic characteristics.

Interpersonal Competencies					
Variable	n	Median	Minimum	Maximum	p-value*
Age group					0.279
18–21 years old	95	2.98	1.77	3.97	
22–25 years old	167	2.96	1.96	4.00	
26 years old and over	47	3.02	2.00	3.95	
Gender					0.600
Female	188	2.96	1.77	3.95	
Male	121	2.98	1.92	4.00	
Year of Study					0.309
Second	44	3.00	1.77	3.95	
Third	62	2.94	1.92	4.00	
Fourth	90	2.97	2.03	3.87	
Fifth	36	2.95	2.54	3.50	
Sixth	77	3.00	2.09	3.95	
Place of origin					0.275
Lima	248	2.99	1.77	4.00	
Other departments	61	2.95	1.92	3.97	
School of origin					0.523
State	135	3.0000	1.96	4.00	
Parish	31	2.9450	2.46	3.81	
Private	143	2.9588	1.77	3.97	
Work activity					0.626
No	227	2.9875	1.92	3.97	
Yes	82	2.9575	1.77	4.00	

*Mann-Whitney or Kruskal-Wallis U tests.

conducted by Núñez-Canal and Escoda, because those studies were carried out in Europe, where computer platforms have been in use since before the beginning of the pandemic, thus allowing students to develop the corresponding skills since the school stage. Notably, digital competencies will be necessary to promote lifelong learning in the near future, as a result of the global situation following the pandemic (Pérez-Escoda et al., (2021); Núñez-Canal et al., 2022).

Among the interpersonal competencies: the capacity for criticism and self-criticism (2.86), exhibited a value below the median. This finding thus represents a disadvantage given that this competency can be used as a resource to promote the capacities that can allow students to respond to the requirements of the contemporary globalized society, by developing and strengthening their critical thinking, thus making them aware of the role that they themselves play in society. This result stands in contrast to that reported by Roldán and Escobar in the context of another Peruvian university, which could be associated with the use of gamification at that university to develop academic activities with the goal of cultivating this ability (Polo Escobar et al., 2022).

Another interpersonal competency that obtained a value below the median pertained to knowledge and appreciation of diversity (2.86), which is associated with the racism and discrimination (not only racial but also cultural) that exists in Peru and all of Latin America. Importantly, this competency encompasses intercultural dialog; understanding, comprehension, and mutual respect; and citizenship and democracy. Equality and social cohesion, cultural expressions, and creativity should be cultivated not only at the teaching level but also at the institutional level with the goal of promoting the equality and acceptance of different human groups (Chavez-Dueñas et al., 2014; Ortiz Hernández et al., 2018; Busey and Coleman-King, 2020).

Owing to the high level of competitiveness, that characterizes the contemporary world, it is insufficient for university institutions to equip professionals only with technical knowledge in their efforts to cultivate those individuals; it is also necessary for these institutions to include in their curricula the soft skills considered in this context (i.e., transversal competences), thus allowing professionals to develop adequately in the work environment, alongside their peers and superiors (Abdul Karim et al., 2012; Villán-Vallejo et al., 2022; Mwita et al., 2023). Among the interpersonal competencies studied in this context, self-confidence is notable; this soft skill is necessary with regard to individuals' ability to perform in the working world. Our study, revealed a median score of 3.14 in this context, which was higher than those associated with all the other competencies, thus indicating that despite the complicated situation that emerged during the COVID-19 pandemic (Desai, 2020; Sălceanu, 2020; Costa et al., 2021; Vidal et al., 2021) and the different limitations that occurred in this context, dental students were not affected.

Interpersonal competencies exhibited the lowest value among all the transversal competencies (including instrumental and systemic competencies). This finding could be attributed to the social isolation that was enforced not only by Peruvian authorities but also by authorities in many other countries. This situation prevented not only interactions with peers, teachers, and patients but also teamwork, which is essential with respect to the development of academic and clinical tasks and activities that promote responsibility in both social and labor contexts (Ferrerías-García et al. 2022). In Chile, these competencies, have also been reported to exhibit a lower value, which has been attributed to the fact that subjects related to students' development represented only 5% of the curriculum, thus indicating that a large component of this learning was included in the hidden curriculum and was likely achieved via instructional modeling as part of the students' daily clinical practice (Soto-Araya et al. (2021)).

In terms of sociodemographic characteristics, 54% of participants were between 22 and 25 years old (given that they were students in their 2nd year of study or above), which is an advanced age according to the overall population of dental students in the same academic semesters at other Peruvian universities, since the average age for beginning these studies is 20 years according to reports that have been issued by the General Planning Office. Additionally, 60.8% of the students were female, and 73.5% of the students did not work and focused solely on their studies. These demographic trends are due to the curriculum used in this context, which demands several hours of clinical and theoretical work. No relationships were observed between any of the groups of transversal competencies and the sociodemographic variables included in this research because the COVID-19 pandemic had global repercussions regardless of students' gender, age, place of residence, and employment status, among other factors (Yavorsky et al., 2021; Stock et al., 2022).

One weakness of this study pertains to the small sample it investigated, which included only students from one degree program at a public university. A limitation of the questionnaire used in this research pertains to the fact that it does not establish reference values that could indicate that a certain level of useful competence with regard to the work environment has been acquired. However, this approach allowed us to determine the behavior associated with the various competencies included in this research according to the scores obtained, in this context, higher scores indicate the more effective development of the competences. Furthermore, the data obtained in this research were collected via the questionnaire approach; accordingly, students could overestimate or underestimate their actual competencies. In this sense, the results of this research should be interpreted and generalized with caution, they are indicators of the trends observed among dental students from only one

public university. One strength of this study lies in the fact that, to our knowledge, it is the first to identify the transversal competencies, proposed in the Tuning Project, in the context of dental students during the COVID-19 pandemic.

This study can serve as a starting point for future research that can evaluate the transversal competencies (i.e., instrumental, systemic and interpersonal) of relevant subjects during a specific evaluation period, with the goal of promoting strategies that can facilitate their development in a manner that depends on the results of such research.

Interdisciplinary programs in the health area should be developed with the aim of strengthening interpersonal, instrumental, and systemic competencies among relevant groups of professionals, thus allowing them to confront the reality of health care in Peru. Finally, it is necessary to consider the possibility that educational practices should model problematic situation pertaining to scientific and social reality, thereby promoting the integral development of the student and including learning on the basis of transversal competencies as a reference in the curricula used for undergraduate degrees; in this manner, students can become professionals who are capable of addressing the challenges of entailed by a changing and globalized society.

Conclusions

In our study, interpersonal competencies were observed to be less developed than instrumental and systemic competencies among dental students at a Peruvian university. These transversal competencies are necessary with regard to the task of cultivating competent professionals in this globalized and changing world and relevant curricula should focus on them. No statistically significant relationships were observed between each group of transversal competencies and the sociodemographic variables included in this research.

Data availability

The online version contains supplementary material available at: <https://zenodo.org/record/8137114>. File 1: Database. File 2: Informed Consent.

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Competing interests

The authors declare no competing interests.

Ethical approval

The study was approved by the Research Ethics Committee of the Faculty of Medicine, Universidad Nacional Mayor de San Marcos with code 0044-2022. Data collection and all tests were performed following the guidelines and regulations of the Declaration of Helsinki (2013).

Informed consent

Informed consent was obtained from all participants. The anonymity of the participants was always guaranteed, and the information obtained was kept in total confidentiality and used only for research purposes. Informed consent is available online.

Additional information

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