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Student satisfaction in clinical area subjects during the COVID-19 pandemic in a medical school

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Introduction: Coronavirus SARS-CoV-2 had an impact on health and education, among other subjects. It caused changes in teaching medicine. The objective of the study was to determine student satisfaction in the subjects of the clinical area in a medical school during the coronavirus SARS-CoV-2 pandemic.

Methods: The current study has an observational, descriptive, and cross-sectional design. The sample consisted of 119 students. Inclusion criteria included being a student enrolled in the 2021–2022 semester, between the VI and XII semesters in a medical school.

Results: It was found that the median age was 21 years; 68 (57.1%) were men. Overall student satisfaction was 67.1%. High student satisfaction was found in the dimension development of professional skills (84.9%), achievement of student expectations (69.7%), and virtual assistance (67.2%) at a medium level of student satisfaction. Flexibility in learning (64.7%), the use of infrastructure and facilities (61.7%), and the use of educational resources (61.3%) were reported.

Discussion: The students were generally satisfied with the dynamic communication of the teachers, especially concerning promoting student participation (79%).

KEYWORDS

student satisfaction, medical school, COVID-19, university students, Peru

Introduction

The appearance of the type 2 coronavirus, which causes severe acute respiratory syndrome (SARS-CoV-2), has had a negative impact on health (Román et al., 2020; Lizana et al., 2021; Wang et al., 2021; Yáñez et al., 2021; Cost et al., 2022; Vizcardo et al., 2022; Zhang et al., 2022), education (Chaturvedi et al., 2021; Talib et al., 2021; Alvarez-Risco et al., 2022; Bozkurt et al., 2022; Del-Aguila-Arcentales et al., 2022; Gonzáles-Gutierrez et al., 2022), prices (Apcho-Ccencho et al., 2021; Leiva-Martinez et al., 2021), ecommerce (Alvarez-Risco et al., 2021; Gao et al., 2023), and economy (Nundy et al., 2021; Shanmuga Priya et al., 2021; Zhou et al., 2021; Carvache-Franco et al., 2022), and has led to changes

in medical education (Kaul et al., 2021; Liu and Lin, 2021; Succar et al., 2022), particularly in the updating of curricula and the promotion of self-learning (Binks et al., 2021; Kaul et al., 2021; Sigdel et al., 2021); in this emerging context, quality education depends on having well-trained (Henriques et al., 2021; Llerena-Izquierdo and Ayala-Carabajo, 2021) and motivated teachers (Toto and Limone, 2021), the development of relevant content (Gul and Khilji, 2021; Hadar et al., 2021), and the provision of safe and appropriate learning environments (Surdez-Pérez et al., 2018). COVID-19 has had an unprecedented adverse impact on medical education around the world, causing the suspension of academic activities (Elshami et al., 2021); however, universities had to adapt quickly to the new educational scenario by opting for temporary remote teaching (TRE) to continue providing higher education to students (Hettiarachchi et al., 2021). During the online teaching-learning process, it is necessary to consider the intervention of several educational factors, such as communication, student participation in online discussions, flexibility, workload, technological support, teacher's pedagogical skills, virtual simulation, and feedback (Almarzooq et al., 2020; Vallée et al., 2020; Behmadi et al., 2022).

According to Neuwirth et al. (2020), learning through virtual education has advantages in improving some knowledge and skills of university students compared to online learning (online), which can be considered a potential method in medical education. It has also been pointed out that to avoid the possible limitations of online learning, it is convenient to develop a hybrid pedagogy because it improves the effectiveness of teaching, due to its easy acceptance by students (Liu et al., 2020). The satisfaction and usefulness of virtual education from the perspective of the members of a faculty may be related to the educational strategies applied by teachers, to the infrastructure and facilities it has, and to student participation (Almarzooq et al., 2020; Mohebbi et al., 2022); in this sense, it is vital to measure the level of satisfaction with the implementation of virtual education in the clinical area of undergraduate medical student training. The development of the research will allow obtaining accurate knowledge about the factors related to the virtualization of the subjects in addition to contributing to the level of satisfaction with virtual education, specifically for those subjects that, by their nature, require clinical field or simulation centers during the COVID-19 pandemic. The research was designed to determine student satisfaction in clinical subjects during the COVID-19 pandemic in a medical school.

Materials and methods

Study design and population

The study design was observational, descriptive, and cross-sectional. The population consisted of 480 students enrolled during the 2021–2022 semester. The study period was between December 2021 and January 2022. The formula determined the sample size, considering a variable of interest of 10% (Gómez et al., 2021), a confidence level of 95%, and an error of 5%. The inclusion criteria were acceptance to participate in the study through informed consent by filling out the Google Forms form, enrolling in the 2021–2022 semester, and belonging to academic cycles VI, VII, VIII, IX, X, XI, and XII. The exclusion criteria were students who had booked their

academic enrolment and who were not students at the time of the survey. The final sample consisted of 119 students from a university in Peru.

Variables

Virtual education is an open system that allows the exchange of ideas and knowledge through different spaces, synchronously and asynchronously, promoting student self-learning through a teacher facilitator (Mota et al., 2020). Education, in this regard, was approached through the following factors:

- Teacher factor: It refers to the professional and virtual didactic competencies during the teaching-learning process, as well as to the interaction with students (Zambrano, 2016; Gopal et al., 2021; She et al., 2021).
- Institutional factor: These are the characteristics given by the facilities, infrastructure, flexibility, or the organization of the teaching-learning process (Zambrano, 2016; Gopal et al., 2021; She et al., 2021).
- Student factor: Given student interactions with the content, with the ease of use of the platforms and the attitude toward digital tools (Zambrano, 2016; Gopal et al., 2021; She et al., 2021).

Each of these three variables was considered regarding student satisfaction. Here, student satisfaction is defined as the degree of congruence between the previous expectations of the students and the results obtained concerning the learning experience through virtual courses (Zambrano, 2016; Gopal et al., 2021; She et al., 2021; Abdullah et al., 2022). Three levels of satisfaction were considered (low level was considered between 0 and 33%, medium level between 34 and 66%, and high level between 67 and 100%).

Collection of data and analysis

The technique used as the survey and the data collection instrument was an online questionnaire with 19 indicators. The questionnaire was developed based on a literature review. The items were based on the studies of Zambrano (2016), Gopal et al. (2021), and She et al. (2021). An administration protocol was established and followed by a group of authors for uniform data collection. Student satisfaction was represented by the factors associated with the teacher, which comprised three dimensions: development of professional competencies, dynamic communication, and educational resources, which were, in turn, represented by six indicators. The factors associated with the institution are three dimensions: infrastructure and facilities, collaboration and virtual assistance, and five indicators. The factors associated with the student were represented by the following dimensions, student expectations, evaluation system, and learning flexibility, and were made up of eight indicators, all of which were expressed through dichotomized closed questions. One indicator was aimed at knowing the virtual perception of virtual education and face-to-face education. The instrument was validated by five experts, obtaining an Aiken V value of 1.0; for reliability, the

Kuder–Richardson (KR) technique, which was 0.972 and was administered to 10 students, was used. The data were processed with SPSS version 22.0, also used by other studies linked to COVID-19 (Chekole et al., 2020; Jose et al., 2021). Frequencies and percentages described the characteristics of the participants. Continuous variables were expressed as medians and interquartile ranges.

Ethical issues

Informed consent was obtained from all patients/participants for the current study. The ethical approval was N° 005-CEFMH-2022/UPLA from the Unit of Research at Universidad Peruana Los Andes (UPLA).

Results

Of a total of 119 students, the median age was 21 years (interquartile range: 21 and 23); 68 (57.1%) were men, and the most significant number of students was found between 21 and 23 years of age, in the more significant percentage (47.9%) they belonged to the academic cycles VII and VIII. Regarding the satisfaction of the factors associated with the teacher during virtual education in the subjects of the clinical area, the development of professional competencies (84.9%) and dynamic communication (79.0%) were found at a high level, and the use of educational resources (61.3%) at a medium level (Table 1). Regarding the factors associated with the institution during virtual education in the subjects of the clinical areas, virtual assistance was found to

be at a high level of 67.2%, and at a medium level, the infrastructure and facilities were found to have an average of 61.7% and virtual collaboration of 45.8% (Table 2). About the factors associated with student satisfaction during the implementation of virtual clinical education, the students' expectations were met at a high level (69.7%). Additionally, the flexibility of learning (64.7%) and the evaluation system (60.5%) were rated at medium levels (Table 3). There is an average student satisfaction of 67.1%, yet only 21% of the students prefer virtual education to face-to-face education.

Discussion

In this study, the aim was to evaluate student satisfaction under purely virtual and emergency learning due to the confinement caused by COVID-19, which, according to some studies, is effective, although it requires improvements in the security and technology of virtual platforms (Wilcha, 2020). For its development, virtual classrooms, essential digital tools, and new teaching methodologies must be available. According to Stoehr et al. (2021), most medical schools during the pandemic have implemented the online teaching-learning process (78%); furthermore, a large percentage of students agreed with the quantity (67%) and quality of the courses (62%) (Stoehr et al., 2021). This same result was reflected in the present study. It is known that a fundamental basis in the training of the future physician is the development of academic activities in the clinical fields for the acquisition of skills, abilities, communication, and professionalism (Burgess et al., 2020); therefore, the teaching and learning process is generally in small groups that provide a more

TABLE 1 Teacher factors associated with student satisfaction during virtual education in clinical area subjects.

Factors	Indicators	N = 119			
		Yes		No	
		fi	%	Fi	%
Development of professional skills	The knowledge imparted by teachers is current and relevant	106	89.1	13	10.9
	Teachers demonstrate capacity when developing topics	96	80.7	23	19.3
	Mean	101	84.9	18	15.1
Dynamic communication	The teacher promotes student participation during the practical classes	112	94.1	7	5.9
	During the classes, the teacher shows interest in your learning	87	73.1	32	26.9
	Good interaction between teacher and student during the classes	82	68.9	37	31.1
	Mean	94	79.0	25	21.0
Educational resources	Teachers use relevant didactic resources for learning sessions on a virtual platform	73	61.3	46	38.7
	Mean	73	61.3	46	38.7

TABLE 2 Institutional factors associated with student satisfaction in virtual education in clinical area subjects.

Factors	Indicators	N = 119			
		Yes		No	
		Fi	%	fi	%
Virtual assistance	Training on how to use the blackboard platform has been sufficient.	80	67.2	39	32.8
	Mean	80	67.2	39	32.8
Infrastructure and facilities	Availability of permanent and adequate Internet access for virtual classes	78	65.5	41	34.5
	The university provides timely technological resources to develop virtual education	69	58.0	50	42.0
	Mean	73.5	61.7	45.5	28.3
Virtual collaboration	The university is concerned about the development of your competencies	57	47.9	62	52.1
	The university provides tutoring to improve your academic performance	52	43.7	67	56.3
	Mean	54.5	45.8	64.5	63.2

TABLE 3 Student factors associated with student satisfaction during the virtual education of clinical subjects.

Factors	Indicators	N = 119			
		Yes		No	
		Fi	%	fi	%
Student expectations	The course you have taken is of interest to you	107	89.9	12	20.1
	The development of the syllabus is fulfilled in its entirety	92	77.3	27	22.7
	The effort made in studying is related to the practice grade	77	64.7	42	35.3
	The development of the course by the virtual platform has met your expectations	56	47.3	63	52.7
	Mean	83	69.7	36	20.3
Learning flexibility	Undertakes independent self-study for ten or more hours by week to address subject topics	77	64.7	42	35.3
	Mean	77	64.7	42	35.3
Evaluation system	Evaluation of practice reflects the level of learning achieved	75	63.0	45	37.0
	The practical grade you obtained reflects your level of learning	75	63.0	45	37.0
	Exams developed by virtual platforms are the most suitable for assessing your ability to	66	55.5	53	44.5
	Mean	72	60.5	47	39.5

fruitful environment, this being a practice adopted also for virtual environments.

This study found a high level in the development of competencies and dynamic communication provided by teachers, while the use of educational resources reached a medium level. In parallel, it has been reported that the strengths of virtual teaching include the variety of resources available on the web, teacher expertise, and peer tutoring (Stoehr et al., 2021). Previous studies mention that overall satisfaction with synchronous online learning depends on the quality of the course design, the responsiveness of the teachers, the teaching resources used, institutional preparation, the quality of the technological infrastructure available, the information provided, the service offered, the interactions generated in the training action, the fairness of the evaluation system, collaboration, and virtual accompaniment (Gonzales-Quispe, 2021; Patitsa et al., 2021; Segovia-García and Said-Hung, 2021).

According to Li et al. (2021), 36.5% of medical and nursing students were satisfied with virtual education. A total of 64.7% of the students were satisfied with virtual education. Additionally, according to El Shami et al., the areas of most excellent satisfaction for students were communication and flexibility for learning. In our study, communication achieved high satisfaction, while learning flexibility

was considered medium satisfaction. A total of 34.4% of the students were dissatisfied with collaborative activities, while we found that in our series on this variable, the percentage of dissatisfaction was higher (54.5%).

Very high levels of satisfaction were reported in the interactions within the platform at 87.1% and in the importance of the topics covered at 89% (Naciri et al., 2021); in our case, the dynamic communication was also found to be satisfactory at a high level (79%). According to Mercado-Rey et al. (2021), the student's expectation of virtual education was 58.94%, and we found a high level of satisfaction (67.1%). Alsoufi et al. (2020), 21.1% of medical students agreed that e-learning could be used for clinical aspects. Naciri et al. (2021) reported that 15 % of medical students indicated that e-learning could replace traditional education, while in our study, the students were generally satisfied with the dynamic communication of the teachers, especially concerning promoting student participation (79%).

One of the limitations found in the study was the low sample size, which does not allow extrapolation to larger contexts, as well as the minimal number of participants in some cycles. The solution was to divide the participants into three groups about age and belonging to a specific academic cycle. In this way, the results provided the initial satisfaction of the group.

Conclusion

In this current study of medical students in one medical school, regarding student satisfaction concerning the virtual delivery of clinical area subjects during the SARS-CoV-2 pandemic, satisfaction reported was 67.1%. Specifically, a higher percentage of satisfaction was found regarding developing professional skills—highly valued and most efficiently transferred to the e-learning system. Satisfaction with virtual assistance in the functioning and management of the virtual classrooms was also high, which is encouraging since the system was new, implemented quickly, and initially difficult to understand; moreover, high levels of satisfaction were found for student expectations. Students were dissatisfied with the exams taken virtually and the use of the virtual platform. Low satisfaction was also reported regarding tutoring to improve academic performance and providing technological resources to develop virtual classes. A high satisfaction level in this regard is essential as it was crucial for the continuity of student studies during COVID-19.

The information found can be used to improve teaching-learning processes in the clinical setting through specific programs aimed at student satisfaction. The information found can be used to prepare strategies to optimize teaching-learning processes in the clinical setting through specific plans that have student satisfaction as a leading indicator and, at the same time, might be relevant to future pandemic situations and the adaptation of the teaching-learning process in medical education.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Unit of Research from Universidad Peruana Los Andes (UPLA), N° 005-CEFMH-2022/UPLA. The patients/participants provided their written informed consent to participate in this study.

Author contributions

AD-L, CC, SC, and MR-A: conceptualization, methodology, software, validation, formal analysis, investigation, resources, and data curation. AD-L, CC, SC, MR-A, SD-A-A, AA-R, ND, CM, and JY: writing—original draft preparation, writing—review and editing, and visualization. All authors contributed to the article and approved the submitted version.

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