

Perception and satisfaction of Nursing students with virtual education in times of the COVID-19

Percepción y satisfacción de estudiantes de Enfermería con la educación virtual en época de COVID-19

Percepção e satisfação dos acadêmicos de Enfermagem com o ensino virtual durante a COVID-19

Carlos Jesús Canova-Barrios¹, ORCID 0000-0003-3901-6117

Patricia Graciela Méndez², ORCID 0000-0002-5671-1894

Liliana Rosa Sosa³, ORCID 0000-0002-2427-7931

Marcela Anahí Flores⁴, ORCID 0000-0001-5115-5609

Mónica Andrea Rodríguez⁵, ORCID 0000-0002-2707-5294

Silvina Soledad Hernández⁶, ORCID 0000-0002-6990-1953

¹⁴ *Universidad de Ciencias Empresariales y Sociales, Argentina*
²³⁵⁶ *Instituto Universitario de la Policía Federal Argentina, Argentina*

Abstract: Objective: To analyze the perception and satisfaction with education in virtual modality of Nursing Bachelor's degree students from a public higher education institution in the Autonomous City of Buenos Aires, Argentina during the second semester of 2021. Methods: Analytical, cross-sectional, and quantitative study. The sample consisted of 121 students, selected by non-probabilistic sampling, who answered an instrument made up of 24 questions. Results: The respondents were mostly female (84.30 %), with a mean age of 29.2 years (SD: 8), in their third year (55.37 %) and with children (44.63 %). Regarding the perception of the virtual modality, it was found that the classes were mostly considered as a motivating factor for learning (66.94 %), students were able to maintain their attention between 75-99 % of the time during the class (38.84 %), a low number were able to make all consultations with the teacher (16.52 %) and most of them felt nervousness before the remote evaluation at the same level as their face-to-face counterpart (52.89 %). Overall satisfaction with the modality was rated with an average of 6.9 out of 10 and 75.20 % of respondents would like to continue with virtual classes. Conclusions: Satisfaction was characterized as average. The variables that were associated with greater satisfaction with distance education are having children, older age, the belief that they would have learned more with face-to-face classes, the time they perceive they can maintain their attention in virtual classes, the low feeling of nervousness before the virtual evaluation, and the absence of difficulties in connecting to synchronous classes.

Keywords: nursing students; nursing education; coronavirus infections; perception.

Resumen: Objetivo: Analizar la percepción y la satisfacción con la educación en modalidad virtual de los estudiantes de la carrera de Licenciatura en Enfermería de una institución de educación superior de carácter público de la Ciudad Autónoma de Buenos Aires, Argentina, durante el segundo semestre de 2021. Metodología: Estudio analítico, transversal y cuantitativo. La muestra estuvo compuesta por 121 estudiantes, seleccionados mediante muestreo no probabilístico, quienes respondieron un instrumento conformado por 24 preguntas. Resultados: Los encuestados fueron mayormente de sexo femenino (84.30 %), con media de edad de 29.2 años (DE: 8), de tercer año (55.37 %) y con hijos (44.63 %). Respecto a la percepción sobre la modalidad virtual se halló que las clases fueron consideradas como motivantes para el aprendizaje (66.94 %), los alumnos pudieron mantener la atención entre un 75-99 % del tiempo durante la clase (38.84 %), una baja cantidad pudo realizar todas las consultas al docente (16.52 %) y la mayoría sintió nerviosismo ante la evaluación remota al mismo nivel que su contraparte presencial (52.89 %). La satisfacción global con la modalidad fue puntuada con una media de 6.9 sobre 10 y el 75.20 % los encuestados desea continuar con clases virtuales. Conclusiones: La satisfacción fue caracterizada como media. Las variables que se relacionaron con una mayor satisfacción con la educación remota son la tenencia de hijos, la mayor edad, la creencia de que se hubiese aprendido más con clases presenciales, el tiempo que perciben que pueden mantener la atención en clases virtuales, la baja sensación de nerviosismo ante la evaluación virtual y la ausencia de dificultades para la conexión a las clases sincrónicas.

Palabras clave: estudiantes de enfermería; educación en enfermería; infecciones por coronavirus; percepción.

Resumo: Objetivo: Analisar a percepção e a satisfação com a educação na modalidade virtual dos alunos da Licenciatura em Enfermagem de uma instituição pública de ensino superior da Cidade Autônoma de Buenos Aires, Argentina durante o segundo semestre de 2021. Metodologia: Estudo analítico, transversal e quantitativo. A amostra foi composta por 121 alunos, selecionados por amostragem não probabilística, que responderam a um instrumento composto por 24 questões. Resultados: Os participantes eram maioritariamente do sexo feminino (84,30 %), com idade média de 29,2 anos (DP: 8), cursando o terceiro ano (55,37 %) e com filhos (44,63 %). Quanto à percepção sobre a modalidade virtual, constatou-se que as aulas foram consideradas em sua maioria com motivadoras para a aprendizagem (66,94 %), os alunos conseguiram manter a atenção entre 75- 99 % do tempo durante a aula (38,84 %), um baixo número conseguiu fazer todas as consultas ao professor (16,52 %) e a maioria se sentiu nervosa com a avaliação à distância no mesmo nível da presencial (52,89 %). A satisfação global com a modalidade foi pontuada com média de 6,9 sobre 10 e 75,20 % dos entrevistados desejam continuar com as aulas virtuais. Conclusões: A satisfação caracterizou-se como média. As variáveis que se relacionaram com a maior satisfação com o ensino a distância são ter filhos, a idade, a crença de que aprenderiam mais com as aulas presenciais, o tempo que percebem que conseguem manter a atenção nas aulas virtuais, a baixa sensação de nervosismo perante a avaliação virtual e a ausência de dificuldades para a conexão nas aulas síncronas.

Palavras-chave: estudantes de enfermagem; educação em enfermagem; infecções por coronavírus; percepção.

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Correspondence: Carlos Jesús Canova-Barrios. E-mail: ccanova@uces.edu.ar

Introduction

The emergence of the COVID-19 pandemic caused a disruption in traditional education processes in all educational spaces, including university higher education in health sciences. ^(1, 2) This prompted a sudden transition to a system of remote training, which brought with it numerous challenges, not only for professors, but also for students, especially for nursing students who traditionally carried out training activities in classrooms, simulation spaces and health care centers, given the practical and experiential component of the profession. ⁽³⁾

Regarding the online training process, it has been reported that it contributes to the development of the student's independence and confidence, in addition, that it allows the optimal development of the theoretical components of the subjects as well as digital skills. ⁽³⁾ Also, benefits have been mentioned such as, access to learning materials from anywhere, which provides flexibility and comfort to the student body, making the training more accessible for people who work and have busy schedules, such as students who are heads of household, with children and/or people in charge. ⁽¹⁾

However, despite the benefits mentioned, the experiences and opinions of students towards virtual training are dissimilar, being linked to aspects such as previous experience with said education format, the needs and shortcomings of students regarding access to the Internet and electronic devices for the online lessons (computer, cell phone, tablet), digital illiteracy in professors and students, little experience in virtual education of professors, among others, which together generate a complex environment for the development of education in this modality. Added to this, low motivation as a result of isolation and the suspension of hospital practices and simulation, represented another variable to be considered when carrying out teaching activities, to avoid low motivation representing a greater risk of desertion or affecting the achievement of the objectives of the different subjects. ⁽¹⁾

Studies such as Spector et al. ⁽¹⁾ found in a sample of 252 students from a health sciences faculty, a positive perception and high satisfaction with virtual training, while other studies ⁽⁴⁾ have reported a negative perception of this modality, affecting the commitment to study, the grades obtained and even the dropout levels. ⁽⁵⁾ The differences described can be explained given that in the context of the pandemic, many of the students had overlapping work, home and educational activities, ^(6, 7) which added to a low level of knowledge about the use of digital tools, led to a greater demand for time to study and an overload of activities for students compared to face-to-face. Therefore, it is imperative to carry out studies that analyze the perceptions of students about this formative modality to identify areas susceptible to improvement.

Due to the aforementioned, the present study was carried out with the objective of analyzing the perception and satisfaction with the education in virtual modality of the

students of the Bachelor's degree in Nursing of a public higher education institution in the Autonomous City of Buenos Aires, Argentina during the second semester of 2021 in the context of the COVID-19 pandemic.

Methods

Observational, analytical study, with a quantitative and cross-sectional approach.

The population was comprised of students of the Bachelor's degree in Nursing from a public higher education institution in the Autonomous City of Buenos Aires, Argentina. The sampling was non-probabilistic consecutive, seeking to incorporate the largest amount of population possible. The sample consisted of 121 students (71.87 % of the total enrolled) who met the inclusion criteria and who agreed to participate in the study.

Students from second to fifth year who had completed at least one semester in the remote modality and who voluntarily agreed to participate in the study were included. Students whose virtual education experience had taken place in other institutions were excluded.

For data collection, a self-administered questionnaire validated by Spector et al. ⁽¹⁾ was implemented, and permission was obtained from the authors for its use. Said instrument is made up of 24 closed-ended questions, which inquire about the sociodemographic variables of the respondents, connection to online classes and their development modality, interaction with the professor, difficulties with the development of remote training processes, remote assessment and exam preparation, and the level of satisfaction with virtual education. The questionnaire is designed to be answered in approximately 15 minutes.

The information was collected using Google Forms platform in which the instrument and informed consent were uploaded and sent via email and WhatsApp to the students. The members of the research team sent the instrument through the aforementioned channels and a reminder was sent month later to increase student participation.

The collected information was exported to a Microsoft Excel database and analyzed using InfoStat Free Version program. The descriptive analysis of the numerical variables was performed, expressing them as mean and standard deviation, while, for categorical variables, relative and absolute frequencies were calculated. For the inferential analysis, non-parametric tests were used due to the type of sampling implemented. Spearman's Rho tests were used to analyze correlations between quantitative variables, the U-Mann Whitney-Wilcoxon test to analyze the relationship between quantitative variables and dichotomous categorical variables, and the Kruskal Wallis test to analyze the relationship between quantitative variables and polytomous categorical variables. A significance level of $p < 0.05$ was set.

Regarding ethical aspects, the study was approved by the Biomedical Ethics Committee on May 6, 2022. The participation of the respondents was at all times highlighted as voluntary and informed consent was requested for their incorporation into the study. Personal data was protected in accordance with current legislation, no affiliation data was collected from the sample and only the research team had access to the data of the respondents.

Results

The sample consisted of 121 students of the Bachelor's Degree in Nursing who agreed to answer the survey voluntarily. These had a mean age of 29.2 years (SD: 8) with a minimum of 19 and a maximum of 56 years old, and were female (84.30 %), single (77.69 %), of third year of the degree (55.37 %), with children (44.63 %) and dependents (22.27 %). Complete data is shown in Table 1.

Table 1 - Sociodemographic characterization

Variable	Category	Frequency	Percentage
Age			
	19-29	51	42.15
	30-56	70	57.85
Gender			
	Man	16	13.22
	Woman	102	84.30
	I prefer not to say	3	2.48
Year of study			
	Second	32	26.45
	Third	67	55.37
	Fourth	8	6.61
	Fifth	14	11.57
Custody of children			
	Yes	54	44.63
	No	67	55.37
Dependants			
	Yes	33	27.27
	No	81	66.94
	Does not answer	7	5.79
Marital status			
	Single	94	77.69
	Married/Common-law marriage	23	19.01
	Widowed	0	0.00
	Divorced	4	3.31

Source: Own elaboration (2023)

Analysis of the perception of education in virtual modality

Connection to classes and modality of development. Initially, the respondents were asked to mention which devices they had used during the remote study to connect to the classes, finding that the most used was the cell phone (85.15 %), followed by the computer (70.24 %) and to a lesser extent, electronic tablets (3.30 %). When inquiring about the internet sources used, 72.72 % reported the use of their home Wi-fi, 45.45% used cellular data at some point and 21.48 % used the Wi-fi connection of a home neighbor, friend or relative. It should be noted that, in both questions, the selection of several options was allowed.

Classes during the period of isolation and/or social distancing were mostly carried out through synchronous connection, with 91.73 % of those surveyed reporting this modality. They also report that there was complementary development of content through practical work (68.59 %), pre-recorded classes (54.54 %) and case analysis (24.79 %). It is highlighted that when faced with this question, it was possible to select the response options that they wanted and that represented the development of the training activities.

It was found that 38.84 % of the students reported that they were able to maintain attention during synchronous virtual classes between 75 and 99 % of the time, while 38.10 % were able to maintain attention between 50 and 74 % of the time, 12.39 % mentioned that they were able to maintain attention all (100 %) of the class time.

Regarding the modalities of development of the classes and their relationship with the motivation to learn, it was identified that the synchronous classes were the most motivating class modality (66.94 %), followed by practical homework (56.19 %), pre-recorded classes (54.54 %), bibliography or reading material (53.71 %), the possibility of participating in classes (42.14 %) and, to a lesser extent, the use of chat, forums and email (30.57 %).

Interaction with faculty. Regarding the interaction with faculty, it was found that 46.28 % mentioned that, during the course, they were able to ask very few questions to the professor(s), 34.71 % were able to ask almost all of the questions and 16.52 %, asked all the questions they needed to understand the topic. Only 2.47 % reported not having interacted with the professors during the development of the classes. Likewise, it was found that 44.62 % felt that most of the questions asked by themselves or by classmates to professors were answered, followed by a 46.28 % who mentioned that almost all their questions had been answered, and a 1.65 %, who received no answer.

Remote assessment and exam preparation. It was inquired about the materials used for the preparation of the midterm exams, finding that 66.94 % used the professor's lessons as the main input to prepare for the exams, 52.89 % reported reading the texts and other materials provided by the professors, 8.20 % prepared by reviewing their notes or summaries, and 4.10 % used class recordings for this purpose.

When inquiring about the emotions linked to the remote evaluation process, it was found that 52.89 % felt nervous at the same level as in the face-to-face evaluation formats, while 30.57 % reported being less nervous than if the exam had been face-to-face, 11.57 % felt more nervous and 5.78 % mentioned not feeling nervous when being evaluated (See Figure 1).

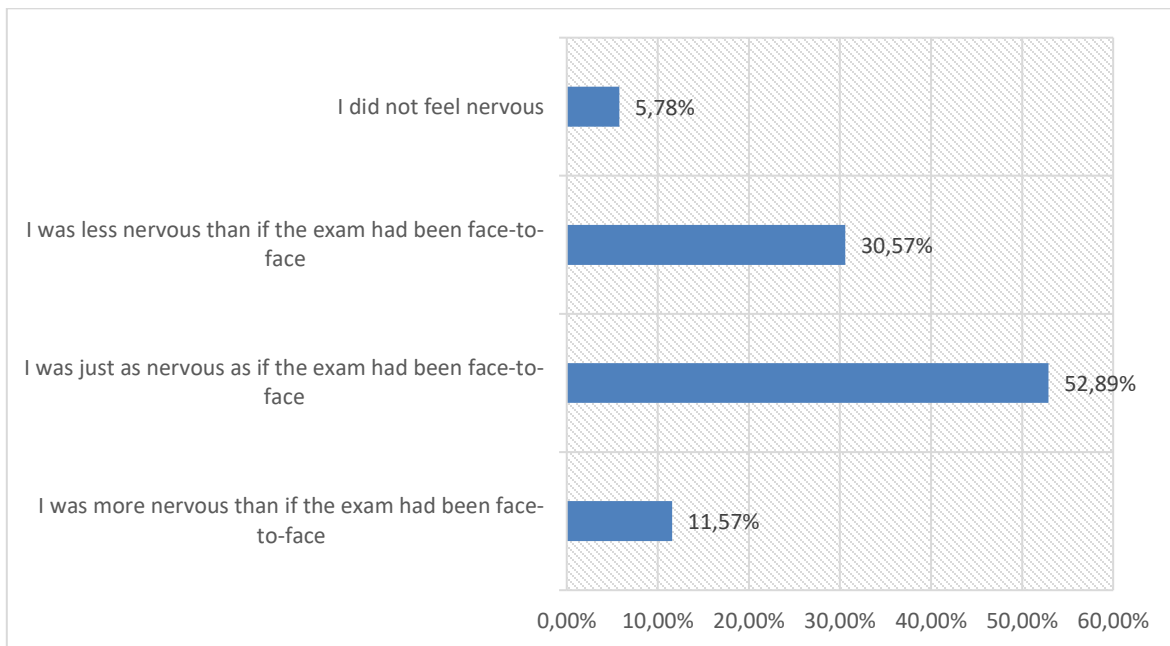


Figure 1. Perceived level of nervousness when facing the remote evaluation compared to face-to-face evaluation.

It was found that 59.50 % mentioned having obtained the grades they expected according to their perceived performance, 11.57 % felt that they had obtained lower grades than expected and 8.26 % mentioned that they had obtained more grades than expected. The remaining percentage had no expectations about their grades.

Difficulties referred by students regarding the development of remote training processes. 53.71 % of those surveyed stated that at some point they had some kind of difficulty joining classes or taking exams, and 38.01 % mentioned having received help from the professor to solve said difficulties. The difficulties experienced according to the frequency of appearance were: Problems with Wi-Fi or mobile data (69.42 %), difficulties at home (29.75 %), connection device shared with the family, mainly problems with the children (21.48 %), lack of a device to connect to classes due to its failure (7.43 %), work issues (4.95 %), problems with electricity (2.47 %), difficulties with class schedules or health problems (0.82 %).

General satisfaction with virtual education

It was found that 75.20 % of the respondents were interested in continuing with some subjects in virtual mode when the isolation and social distancing were lifted. 92.56 % of the students felt that they needed practice to better understand some topics covered in class, and 76.03 % felt that they would have learned more with face-to-face classes.

The level of general satisfaction with the implementation and development of virtual education during the COVID-19 pandemic was categorized as medium, with an average of 6.9 points (SD: 2) (See Figure 2).

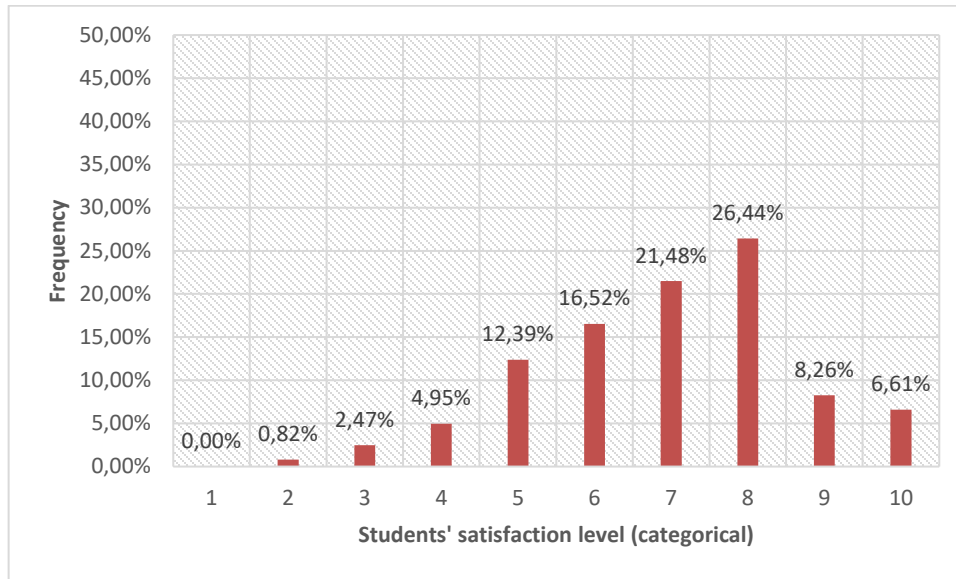


Figure 2. Level of satisfaction with virtual education. **Note:** Scale goes from 1: *not very satisfied* to 10: *fully satisfied*.

When performing the inferential analysis, an association was found between the level of satisfaction with virtual education and the desire to continue with virtual classes (X^2 33.76, $p < 0.001$), having children (Yes 7.39 vs. No 6.61, p 0.022), while there was no relationship between gender (p 0.123), year of study (p 0.404), dependents (p 0.316) and marital status (p 0.101) with the level of satisfaction with the course mediated by information and communication technologies.

It was also found that the level of satisfaction was lower in those who felt that face-to-face classes were needed to better understand some topics (6.51 vs. 8.24, $p < 0.001$), as well as in those who felt that with practical activities would have learned better some of the topics covered in the professional subjects (6.78 vs. 8.78, $p < 0.001$). Likewise, a low positive correlation was found between age and the level of satisfaction (r 0.20, p 0.024).

When applying the Kruskal-Wallis test, it was found that the attention span that they could maintain during the classes was related to the level of satisfaction (See Table 2).

Table 2 - Satisfaction level vs. attention time

Attention time	Satisfaction level		<i>p</i>
	Mean	SD	
100 %	8.13	8.00	<0.001
75-99 %	7.57	8.00	
50-74 %	6.41	6.00	
<50 %	5.00	4.00	

Source: Own elaboration (2023)

Students who felt less nervous before the remote evaluation processes in their different modalities showed higher averages in the level of satisfaction with virtuality, thus, for example, the average satisfaction in the students with the highest level of perceived nervousness was 6.43 points, while, in those who experienced less nervousness, it rose to 7.17. However, these findings were not statistically significant (p 0.501).

Finally, it was found that the difficulties in taking classes or being evaluated through virtual resources showed a negative impact on the level of student satisfaction, finding lower averages in those who experienced problems or difficulties with the platforms and resources implemented by professors (6.46 vs. 7.51, p 0.003).

Discussion

COVID-19 pandemic had a significant impact on the execution of educational activities at university level, mainly in the disciplines of Health Sciences, which due to their characteristics warranted on-site activities in simulation spaces and health centers, in addition to the classroom spaces, causing significant alterations in the teaching and learning processes. ⁽⁷⁻¹⁰⁾

Various studies have inquired about the perception of technology-mediated education in health sciences students, particularly nursing, during the pandemic context, reporting mostly the experiences of curricular migration from a traditional face-to-face scheme to one that involved the technology from theoretical training spaces to practical scenarios. ⁽¹⁰⁻¹³⁾ The foregoing has been reported to contribute to innovation in training processes, and to favor development of teamwork skills, responsibility, active listening, and autonomy in students. ⁽¹⁴⁾

Within the aspects that have been most referred to as affecting the perception and satisfaction of the student body, teacher preparation is one of the most relevant. Their little or no training proved to be one of the most significant elements at the beginning of the pandemic, which, taking unexpectedly, did not allow training activities for teaching staff to be carried out so that they could transfer the educational processes to a technology mediated modality. It can be evidenced in our study with a level of satisfaction equal to or less than 6 points on a scale of 10 (low and medium satisfaction) in 37.15 % of those surveyed. The level of satisfaction identified is lower compared to other studies such as that of Černelič-Bizjak & Dolenc ⁽¹⁵⁾ and Pérez-Avilés ⁽¹⁶⁾ who found a high level of satisfaction with the

virtual course. In the last case, it is identified in its population that less than 2.5 % of the students reported difficulties such as not having a computer or smartphone at home, not having internet at home or not knowing how to upload/download files from the cloud, in contrast to our study in which 69.42 % had internet connection problems, 29.75 % had difficulties at home, 21.48 % shared devices (with children or another relative) and 7.43 % lacked devices for connection. However, the level of satisfaction and positive perception of the virtual modality of our sample is similar to other studies such as that of Mamani Humpiri⁽¹⁷⁾ in Peru, who found an average level of satisfaction (81.82 %) related to a positive perception of the remote modality (61.04 %). Costa Pereira Rodrigues⁽⁷⁾ refers in his work that during the isolation due to the pandemic, students expressed difficulties in being able to respond to family, work and educational demands, considerably affecting satisfaction with this modality. The author refers that the high load of educational and work activities, family obligations, and physical and mental exhaustion, resulted in a satisfaction categorized between medium and low. In contrast, it has been described that psychosocial support, the perception of help from teachers and family members, and self-efficacy for autonomous and teamwork mediated by technologies, have been positively associated with satisfaction.^(1, 17-19)

It was identified that only 11.57 % of the students consulted reported feeling more anxious before the virtual exams compared to the face-to-face modality. These findings coincide with various studies such as that of Verma et al.⁽¹⁹⁾ in which, in a sample of 130 medical students from India, they reported enjoying classes in the virtual modality, and that studying contributes to the reduction of stress derived from the pandemic, it contrasts with the results presented by Spector et al.⁽¹⁾ who reported that 47.6 % of the students expressed higher levels of anxiety before the virtual assessment.

In our study, 75.20 % of the students expressed their interest in continuing with classes in the virtual modality once the COVID-19 pandemic was overcome, which shows a positive perception of this teaching modality. This data proved to be superior when compared to the results of studies such as that of Spector et al.,⁽¹⁾ Verma et al.⁽¹⁹⁾ and Hameed et al.⁽²⁰⁾ in which 53.60 %, 47.00 % and 13.04 % of the students wanted to continue with the classes in virtual mode, respectively.

It is interesting that despite having identified a high level of satisfaction with the virtual modality, it was found that 76.03 % of those surveyed perceive that they would have learned more with face-to-face classes, which may be related to the particularities of health science education, in which practical activities (in health centers or hospitals) are related to the acquisition of abilities and skills of great relevance for the professional life that cannot be fully developed through this modality. A study carried out in Mexico,⁽²¹⁾ in which 872 students of the Degree in Nursing were surveyed, found a low level of satisfaction and varied perception about the virtual modality in the execution of classes during the COVID-19 contingency, and another work carried out in Cuba,⁽²²⁾ identified that 45.16 % of medical students felt dissatisfied with virtual education and 22.58 % of them reported being dissatisfied with the facilities and infrastructure dimension. Another work carried out in Chile identified that nursing students reported that doing internships in the context of a pandemic was an opportunity to learn how to provide nursing care in times of crisis, humanize care and provide support to health teams, in addition to favoring the perception of personal growth and disciplinary learning.⁽²³⁾

It was identified that factors such as older age, having children, longer attention to virtual classes, less nervousness before exams and absence of difficulties connecting to classes, showed a positive impact on the perception and satisfaction with the virtual

education modality. These findings coincide with the results of the study conducted by Pérez-Avilés ⁽¹⁶⁾ in Mexico who reports that the difficulties in connecting to virtual classes negatively affect the satisfaction of nursing students with the virtual education modality, while in Chile ⁽²⁴⁾ an unfavorable perception has been reported regarding the professor's interest in student access to technological means.

An element that is rarely described are the preferences of the students, who enrolled in a face-to-face modality and were abruptly transferred to the remote training scheme, which turned out to be antagonistic to their preferred instructional format, ⁽²⁵⁾ and is an element that in future studies deserves to be relieved.

Conclusion

In the context of the post-pandemic and considering the interest of institutions in maintaining virtual training activities in the career in nursing, it is essential to identify and intervene in aspects that students consider deficient to increase student satisfaction. and guarantee its permanence.

In the present study, it was found that nursing students are moderately satisfied with virtual education, and the variables that were related to greater satisfaction with remote education were having children, age, the time that students report that they can maintain attention in virtual classes, the low sensation of nervousness before the virtual evaluation and the absence of difficulties for the connection to synchronous classes. Likewise, it was found that most of the classes were developed synchronously, and the students perceive them as motivating for learning, although it is highlighted that almost in their entirety, it was mentioned that the hospital practices and the activities in simulation spaces were needed to better understand some topics covered in class. Students reported their desire to continue with some classes online after the COVID-19 pandemic.

It is important that continuous training activities be implemented for faculty if student satisfaction with the remote modality is to be improved. ⁽¹⁾ The benefits of this format are well described in the bibliography, however, given the characteristics of training in professions in the health area, this modality is insufficient for subjects that require practice and direct patient care to develop skills and competencies necessary for the future professional role.

It is necessary to emphasize that it is worth having the necessary means so that faculty and students can feel included in the educational processes, which represents a challenge in places where there are problems with Internet access, lack of stable connection to electricity, where there are high levels of digital illiteracy and where economic conditions do not allow having appropriate devices to carry out activities.

This study serves as a starting point for educational managers and teachers to identify weaknesses and strengths in the process of implementing the virtual modality of teaching and carry out activities aimed at improving the perception and satisfaction of students, positively impacting their academic performance and learning, and decreasing dropout.

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