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Online nutritional counseling in the Nutrition and Dietetics career at the University of Chile: A teaching-learning resource in professional practices

Consejerías nutricionales online en la carrera de Nutrición y Dietética de la Universidad de Chile, una nueva actividad de enseñanza-aprendizaje en las prácticas profesionales

Paulina Herrera^a, Paulina Molina^b, Carolina Zamudio^a, Cristopher Chavarría^a, Bernardita Daniels^a, Paola Cáceres^b, Karen Basfi-fer^b, Constanza Riveros^a y Evelyn Bustamante^a

^a Escuela de Nutrición y Dietética, Facultad de Medicina, Universidad de Chile, Santiago, Chile

^b Departamento de Nutrición, Facultad de Medicina, Universidad de Chile, Santiago, Chile

* paumolina@uchile.cl

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HIGHLIGHTS

- During the COVID-19 pandemic, the School of Nutrition and Dietetics decided to implement a specific telemedicine activity: Online Nutrition Counseling (ONC) to continue the teaching-learning process for students in professional practice.
- Telemedicine is an activity that provides distance health services, with interaction between professionals and users, through the use of information and communication technologies (ICTs).
- The ONC activity was positively evaluated by students, teachers and users, in terms of its implementation, user satisfaction and student performance.
- Due to the high valuation of the ONC by all participants, this is an activity that can be considered as a complementary teaching and learning strategy to face-to-face practical activities.

ABSTRACT

Introduction: Due to the COVID-19 pandemic, the School of Nutrition and Dietetics of the University of Chile suspended all face-to-face professional practices, incorporating Online Nutritional Counseling (ONC) as a telemedicine activity. The objective of this study was to analyze the perception of students, users and supervising teachers regarding the implementation, user satisfaction and student performance in ONC as a new teaching and learning activity.

Material and methods: Cross-sectional, descriptive and observational study, using non-probabilistic sampling. Students (n=42), users (n=133) and supervising teachers (n=6) were invited to participate. The level of user satisfaction, the perception of the counseling implementation process and student performance were evaluated through semi-structured online surveys. Quantitative and qualitative results were analyzed using Excel Office software.

Results: The surveys were answered by 55.6% of users, 100% of teachers and 87.2% of students. The participating users perceived a high level of satisfaction with the ONC (95.9%), in terms of good implementation (98.1%) and good attention received by the students (98.6%). Students (83.3%) and teachers (79.6%) perceived a high level of satisfaction related to the implementation of the activity. Regarding student's performance, students (89.7%) and teachers (86.7%) perceived a high level of performance.

Conclusions: Users, teachers and students perceptions were evaluated regarding user satisfaction, implementation and student performance in the ONC, obtaining a high valuation by all the actors involved. It is suggested to consider the ONC as a permanent teaching-learning strategy and complementary to face-to-face professional practice activities.

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Keywords: Telemedicine; Counseling; Professional Practice; COVID-19; Nutritionists.

RESUMEN

Introducción: Debido a la pandemia por COVID-19, la Escuela de Nutrición y Dietética de la Universidad de Chile, suspendió todas las prácticas profesionales (PP) presenciales, incorporando la Consejería Nutricional Online (CNO) como actividad de telemedicina. El objetivo de este estudio fue analizar la percepción de estudiantes, usuarias/os y docentes supervisores respecto a la implementación, satisfacción usuaria y el desempeño estudiantil en las CNO, como una nueva actividad de enseñanza aprendizaje.

Material y métodos: Estudio observacional descriptivo transversal, con muestreo no probabilístico. Se invitó a participar a estudiantes (n=42), usuarios/as (n=133) y docentes supervisores (n=6) y se evaluó con encuestas semiestructuradas online el nivel de satisfacción usuaria, percepción de la implementación y del desempeño estudiantil. Se analizaron resultados cuantitativos y cualitativos con programa Excel de Office.

Resultados: Un 55,6% de usuarios/as respondió la encuesta, el 100% de los/as docentes y el 87,2% del estudiantado. Las/os usuarias/os participantes, percibieron una alta satisfacción por las CNO (95,9%), en términos de su buena implementación (98,1%) y buena atención recibida por el estudiantado (98,6%). Tanto estudiantes (83,3%) como docentes (79,6%), percibieron un alto nivel de satisfacción relacionado a la implementación de la actividad. En cuanto al desempeño estudiantil, estudiantes (89,7%) y docentes (86,7%) percibieron un alto nivel de desempeño.

Conclusiones: Se evaluaron percepciones usuarias, docentes y estudiantiles, respecto a la satisfacción usuaria, implementación y desempeño estudiantil en las CNO, obteniéndose una alta valoración por parte de todos los involucrados. Se sugiere considerar a la CNO como una estrategia de enseñanza-aprendizaje permanente y complementaria a actividades de PP presencial.

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Palabras clave: Telemedicina; Consejo; Práctica Profesional; COVID-19; Nutricionistas.

INTRODUCTION

In 2020, the World Health Organization declared an outbreak of disease caused by a new coronavirus (COVID-19)¹ as a pandemic. In Chile, the first cases of COVID-19 disease were registered at the beginning of March 2020, so, the government adopted different measures to prevent the spread of the virus in the population, among them, the implementation of territorial quarantines prohibiting the free movement of people in the streets.² At the same time, educational establishments, such as universities, suspended their on-site activities and, particularly, the University of Chile suspended all on-site administrative and academic activities, starting teleworking and emergency remote teaching³. In this context, the School of Nutrition and Dietetics of the University of Chile suspended all Professional Practices (PP), carried out by students in the 5th level (last year of training) and also, modified the course programs of the PP, to adapt them to the social and health situation by incorporating new teaching activities that allowed the continuity of the teaching-learning process.

Telemedicine was a new activity incorporated in PP, being recognized as a teaching and learning strategy that delivers distance health services, with interaction between professionals/students and users, using Information and Communication Technologies (ICTs)⁴. This strategy aims to ensure equity and timeliness of healthcare, giving access to healthcare when it is not possible to attend health centers in person⁵. Additionally, telemedicine has been used as a teaching-learning resource in undergraduate courses, where the expert professional (teacher) helps to determine a diagnosis and exchange ideas or opinions with a student in practice⁶. The Telemedicine activity implemented in the PP of the Nutrition and Dietetics program was, specifically, the Online Nutritional Counseling (ONC), an educational-communicational, interpersonal and participatory action, carried out between the student and a user, with the purpose of analyze his/her food-nutritional situation, based on the nutritional status of the user, the analysis of his/her food practices and lifestyles, and to support him/her in making healthier choices.⁷⁻⁹

Since this is the first time that students of the 5th level of the Nutrition and Dietetics career executed Telemedicine in the context of PP to comply with the learning outcomes, it was considered essential to evaluate this activity from the point of view of all participating actors so as to define its permanence as a teaching-learning strategy, and thus contribute to the process of continuous improvement of teaching in the career. The objective of this study was

to analyze the perception of students, users and supervising teachers regarding the implementation, user satisfaction and student performance in the CNO activity.

MATERIAL AND METHODS

Design and ethical aspects

This was a cross-sectional descriptive observational study. The Human Research Ethics Committee of the Faculty of Medicine of the University of Chile indicated that there were no ethical objections and that the study had social value. Informed consent was obtained from each participant prior to the collection of any type of information and the confidentiality of their data was protected by a coding system.

Participants of the ONC

The sampling was non-probabilistic. All the actors involved in the ONC activity were invited to participate voluntarily in the study: 5th level students of the Nutrition and Dietetics career who participated in the ONC during July to September 2020, users who participated in the ONC and supervising nutritionists' teachers. There were no exclusion criteria.

To contact users, an invitation was published through social networks offering free ONC, suitable for users of all ages and health conditions. Interested users completed an electronic registration form with their personal and medical data, time availability and reason for consultation. The data was handled confidentially by teachers from the School of Nutrition and Dietetics.

Variables and data collection instruments

The variables considered in this study were: perception of implementation, level of user satisfaction and perceived student performance. For each variable, sub-variables were analyzed (**Table 1**). In addition, the advantages and disadvantages of the ONC were examined.

Table 1. Primary and secondary variables of the study according to the stakeholders involved.

Primary variables	Secondary variables	Evaluator
Perceived user satisfaction	Implementation of ONC (Coordination and execution)	Users
	Care received in ONC	Users
	General satisfaction with ONC	Users
Perceived implementation of ONC	Coordination and execution of the ONC	Students Teachers
Perceived student performance	Student performance during the ONC	Students
	Overall student performance	Teachers
Advantages and disadvantages	Advantages of the ONC	Users
	Disadvantages of the ONC	Students Teachers

ONC: Online Nutrition Counseling

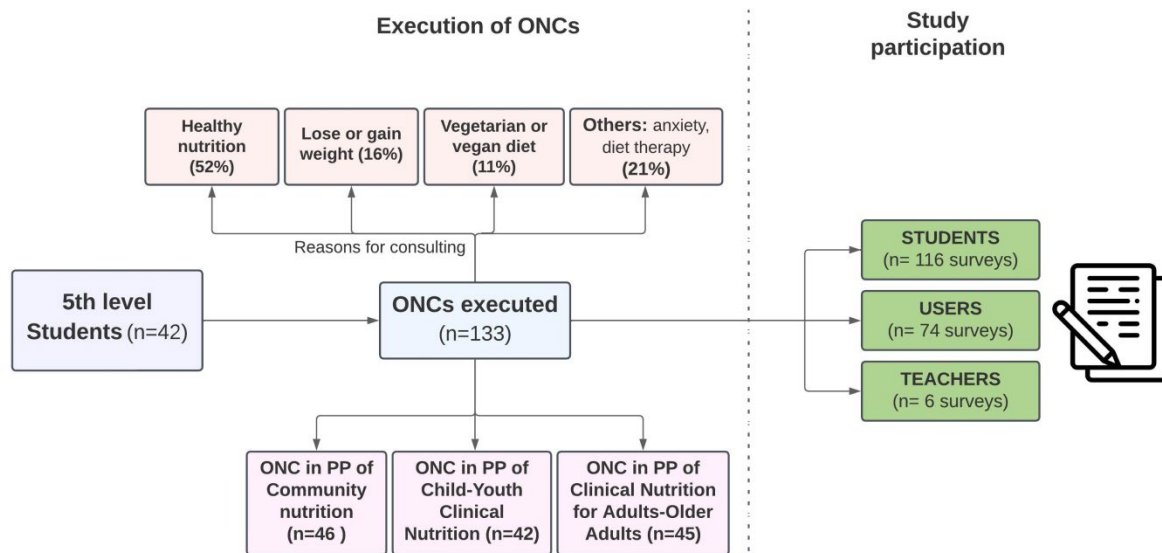
Execution of the ONC

The ONCs were carried out using Zoom or Meet platform, after coordinating the day and time with the users. The total duration of the activity was 60 minutes: 30 minutes to develop the ONC and 30 minutes of feedback between student and teacher. All 5th level PP students (n= 42) participated in the ONCs, always accompanied by a supervising teacher. Each student carried out a minimum of 3 ONCs, associated with 3 of the 4 face-to-face PPs at the 5th level: PP in Community Nutrition, PP in Clinical Nutrition for Adults-Older Adults and PP in Child-Youth Clinical Nutrition¹⁰ (**Figure 1**). The PP of Collective Food Services was excluded because, among its usual activities, it does not consider health attention for users.

A total of 133 ONCs were performed, approximately a third of these ONCs were performed in the context of each of the three PPs. 67% of the users were women and 33% men, whose age mostly fluctuated between 19 and 39 years (44%). The main reasons for consultation referred

by users were healthy eating (52%) and, to a lesser extent, weight loss or gain (16%) (Figure 1).

Figure 1. Online Nutritional Counseling executed and actors participating in the study



ONC: Online Nutritional Counseling

Instruments

For data collection, 3 semi-structured surveys were designed by 2 members of the research team, one for each actor participating in the ONCs. The surveys were similar to each other, but presented minimal differences, depending on the role of each actor involved. These included Likert-type scale questions (with a rating of 1 to 5, where 1 was "strongly disagree" and 5 "strongly agree") and open response questions. Once the first version of the instruments has been designed, a cross-validation by experts was carried out, with the participation of 7 members of the research team, different from those 2 participated in the design of the surveys. The content validation considered the review of the 3 surveys by each member, who had to review them in terms of: relevance and sufficiency of the questions with the objectives of the project, importance of each question for the main and secondary variables defined and other structural aspects, such as clear wording of the questions and logical sequence of the questions within the survey¹¹. After the expert validation, the research team held group meetings to adjust the questions and reach a consensus on the final format of the surveys. The instruments were disseminated online, in Google Forms, after the execution of the ONC.

The users and students answered the surveys at the end of each counseling session, while teachers answered the survey only once, at the end of all the supervised ONCs. All the participants answered the survey anonymously.

Statistic analysis

Descriptive statistics was used for present quantitative results. The categorical primary and secondary variables (description of the sample and Likert-scale questions) are presented as frequencies (n and %). The sum of the percentage frequencies of the items "strongly agree" and "agree" was considered as a high level of assessment; medium level to the item "neither agree nor disagree", and low level, to the sum of the categories "disagree" and "strongly disagree".

We analyzed whether there were differences in the perception of the participating actors by means of Fisher's test, considering a value $p < 0.05$ as significant. Then, Bonferroni adjustment was made to evaluate particularly between which groups there were differences. A p-value < 0.016 was considered a statistically significant difference.

To analyze the qualitative answers, the concept or idea that each participant transmitted was analyzed and the answers were grouped according to the similarity that the various topics or variables mentioned by the users presented and the data was emptied into a dynamic table in Excel.

RESULTS

Out of the 42 students who completed all the ONC (n=133), 87.2% (n=116) responded to the survey at the end of each ONC activity. Out of the total number of users, 55.6% (n=74) responded to the survey and, of these, 25.7% were men and 74.3% were women, 28.4% were ONC in the pediatric population and 71.6% were in the adult population. Regarding teachers, 100% responded to the survey (n=6).

Implementation of the onc

83.8% of the students and 83.3% of the teachers expressed a high level of general satisfaction with the implementation of the ONC. However, the time or duration of the ONC was a relevant issue for the teachers, where 50% indicated a low level of satisfaction regarding the time

scheduled for the ONC and the fulfillment of that time (**Figure 2.B**), while 33.3% indicated a medium-low level of satisfaction regarding the time for feedback.

Users satisfaction

In terms of users satisfaction with the ONC, 95.9% of users expressed high overall satisfaction, 98.1% expressed high satisfaction with the implementation of the ONC and 98.6% expressed high satisfaction with the attention received by the students.

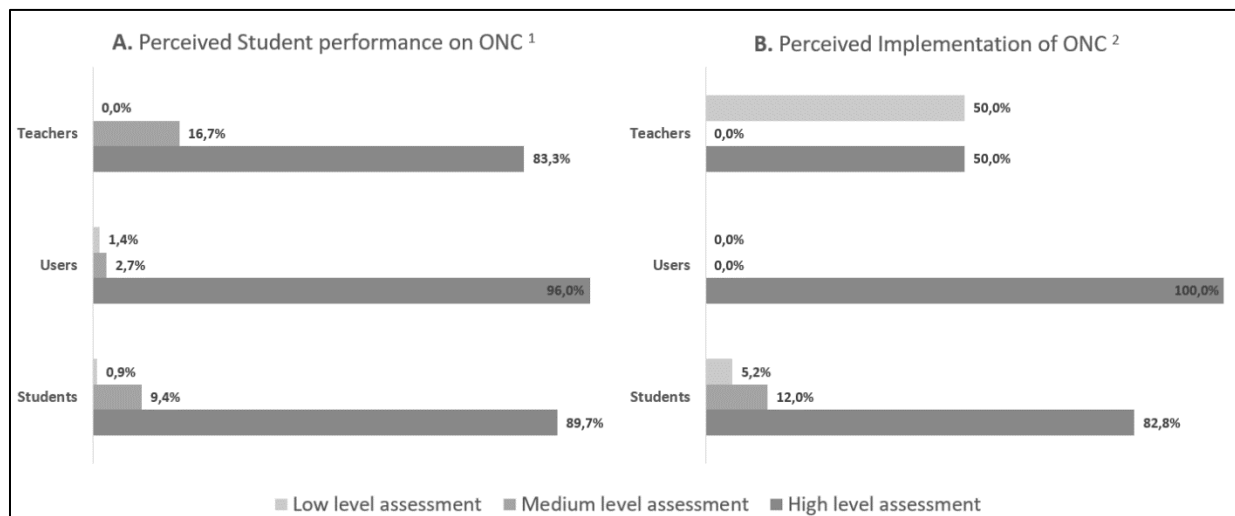
Perception of students performance in the ONC

Regarding the students' performance in the ONC, 89.7% perceive themselves with a high level of general performance, coinciding with the perception of teachers, where 83.3% perceived a high level of general students' performance (**Figure 2.A**). In particular, it is noteworthy that 33.3% of teachers perceived a medium level of performance with respect to the confidence of the student during the ONC.

Comparison of perceptions among actors

When comparing whether there are differences in perceived student performance among actors (**Figure 2.A**), it was found that there were significant differences between the perception of students and users ($p=0.000$) and between users and teachers ($p=0.002$). There was no statistically significant difference when comparing perceived student performance between students and teachers ($p=0.549$). In addition, there were statistically significant differences when comparing the perception regarding the duration time of the CNO (**Figure 2.B**) between students and users ($p=0.000$), users and teachers ($p=0.001$) and students and teachers ($p=0.009$).

Figure 2. Perception of students, users and teachers with respect to student performance (A) and to the implementation of the Online Nutritional Counseling (B)



ONC: Online Nutritional Counseling

¹ The variable "overall satisfaction" was considered as a proxy for student performance on ONC perceived by users.

² The graphs show the level of satisfaction perceived by actors respect to the "duration of the ONC".

Perceived advantages and disadvantages with respect to oncs

Table 2 shows the advantages and disadvantages perceived by all the participants, highlighting the most frequently mentioned in decreasing order. Students, teachers and users agreed that convenience is one of the main advantages of the ONC. Students and teachers also emphasized that the ONC allowed the development of digital competencies. On the other hand, all participants perceived that the instability of the Internet connection and the lack of direct contact with the user were the main disadvantages.

Table 2. Summary of the main advantages and disadvantages of the Online Nutritional Counseling perceived by users, students and teachers.

	Users	Students	Teachers
Advantages	<ul style="list-style-type: none"> -Do not require mobilization. -Easy access. -Free 	<ul style="list-style-type: none"> -Development of digital competencies and communication skills. -Better preparation and confidence (because they know in advance the reason for consultation). -Comfort and protection of health in the context of a pandemic. 	<ul style="list-style-type: none"> - Saves time and money. - The student can be supervised and given immediate feedback. - Development of digital competencies.
Disadvantages	<ul style="list-style-type: none"> -Dependence on stable internet. -Lack of accurate anthropometric measurements. -Less linkage with students. 	<ul style="list-style-type: none"> -Difficulty in maintaining fluid communication due to connection problems. -Difficulty in using the connection platform. -Impossibility to practice anthropometry. 	<ul style="list-style-type: none"> -The student cannot be evaluated for his/her anthropometric technique. - Delays in scheduled ONC (due to connection problems, backwardness of users, or very long ONC).

ONC: Online Nutrition Counseling

DISCUSSION

In the present study, the perception of different actors regarding the ONC activity, carried out by 5th level students in the context of their PP was evaluated. Users, students and supervising teachers coincided in perceiving a high level of general satisfaction with the activity, where users emphasized the cordial and respectful treatment received, while students and teachers perceived a high level of satisfaction with the implementation of the activity, although teachers expressed low satisfaction related to compliance with the time scheduled for the activity. Regarding student's performance, students and teachers expressed a high level of general satisfaction, but teachers perceived the performance as regular in relation to the confidence of the student during the ONC.

Previous studies have proposed that online teaching and learning strategies applied in the health area can be as effective as face-to-face teaching^{12,13,14}. Among these strategies, non-face-to-face clinical simulation is recognized as versatile, efficient and low cost, allowing teaching and evaluation in times of pandemic¹² and is considered by students as a reasonable substitute for face-to-face learning¹³. Similarly, a recent review has supported the safety and effectiveness of telehealth for various clinical areas such as mental health, teleconsultation and nutrition, where telemedicine is equivalent to face-to-face health care¹⁴. Health students perceive that it is possible to acquire the competencies and learning outcomes of practical subjects through an activity such as teleconsultation¹⁵ and expressed the development of various skills as advantages of this activity. Thus, the results of this study are complemented by the available evidence, which shows telemedicine as an effective strategy for the achievement of learning in health careers. In the case of the Nutrition and Dietetics career, the pandemic favored the implementation of this strategy to facilitate the continuity of the training program and contributed to the achievement of the competencies declared in the course program. These competencies address much more than the implementation of theoretical knowledge, since they also incorporate the development of other transversal competencies, such as respectful treatment of the user and the achievement of effective communication. In addition, the use of digital technologies for the development of telemedicine could generate added value in common non-pandemic contexts, where students require innovative techniques that ensure their training quality and contribute to the achievement of competencies¹⁶.

In this study, the satisfaction perceived by students and teachers with the ONC activity was high, which can be explained by the advantages they identified of the ONC, such as better preparation and confidence in their abilities when receiving prior information and the comfort they perceive when performing the activity from home. Previous research agrees with these results, showing that students consider telemedicine activities to be highly motivating¹⁷ and express a high degree of overall satisfaction with this type of teaching activity¹⁵. High satisfaction with the ONC was also expressed by users participating in this study, who mainly emphasized the attention received by students. This result coincides with previous research, which has shown a high degree of users satisfaction when telemedicine has been used as a means of providing therapeutic education in diabetes¹⁸⁻¹⁹, when providing care through telenutrition services²⁰ and when rehabilitating people with Post Covid-19/Post-ICU

Syndrome through an online program²¹. Other interventions in the area of telenutrition have obtained high user satisfaction due to the care or treatment received by the health professionals²⁰, the actions of the work team (treatment, attitude, language used, empathy and resolution capacity) and the administrative and management support procedures carried out²¹. The high satisfaction perceived by the different actors participating in the study and how each one of them highlighted different elements that contributed to this perception, allows us to identify that the ONC is an integral teaching and learning activity that contributes to the application of theoretical knowledge and the development of other transversal skills in the students.

When comparing perceived satisfaction with respect to the duration of the ONC, students and users rate it positively, but half of the teachers rate it with a low level of satisfaction; they perceived a regular satisfaction related to compliance with the total time of the activity (60 minutes) and with respect to the time programmed for student feedback (30 minutes). This may be due to the fact that, despite the fact that each ONC was planned for a total time of 60 minutes, it was common for students to exceed the suggested time for interaction with the user (30 minutes), which reduced the time for receiving complete feedback from the teacher. Exceeding the duration of the activity may favor students and users, who are able to give a much more complete attention, but for teachers this may have negative effects. For example, this may have caused the teachers to identify the delay in their schedules when supervising several ONCs on the same day as a disadvantage of the activity. Although the available evidence is limited regarding the feedback given to students in a telemedicine activity, receiving immediate feedback has been rated positively by the students, because it facilitates joint analysis of the nutritional food intervention proposed to the user¹⁸. These results show the need to seek effective and joint strategies among the participants of the ONC activity for its implementation, as well as the need to respect the time for execution and feedback to the student, thus ensuring the discussion of the proposed intervention.

This study has some limitations, mainly associated with the online modality. Among them, the need for a stable internet connection and adequate connection devices are elements of the use of ICTs in telemedicine, but require students, teachers and users with basic ICT skills and restrict the potential beneficiaries or users of nutritional care. Also, telemedicine prevents the execution of anthropometric measurements to users (weight, height, and others), restricting the realization of an integrated and accurate nutritional diagnosis, as well as limiting the

development of other practical skills in students, which require face-to-face contact with users. In this sense, some authors have reported difficulties associated with distance learning activities, such as the impossibility of developing motor skills, the need for internet connection, decreased interaction between teacher and students, increased levels of distraction, among others^{12,16}. Therefore, it has been mentioned that it is necessary to complement online teaching and learning activities with face-to-face interventions with users, for the development of other practical skills in students¹⁶.

The strengths of this study are associated with the use of telemedicine as an innovative teaching and learning methodology, which allows to continue with the training of students in PP, despite the mobility restrictions generated by the pandemic, in addition to reducing the risk of infection to users, students and teachers, reducing costs and time associated with travel^{15,22,23}. Other studies indicate that virtual health activities, in addition to allowing social distancing, are a versatile, efficient and relatively low-cost strategy that allows teaching, learning and evaluation, with the advantages offered by deliberate reflection in real time, generating greater cognitive engagement and possibly greater learning in students^{12,16}.

The use of telemedicine as a teaching strategy was very useful in the context of the pandemic and made it possible to continue with the professional training of future nutritionists; however, the limitations and advantages associated with its use and the competencies that are relevant to develop with this methodology should be considered.

CONCLUSION

This study evaluated the perception of users, teachers and students regarding the implementation, user satisfaction and student performance of the ONC, obtaining a high valuation by all participants. However, if perceptions are compared among the 3 actors, there is a tendency for teachers to evaluate with a lower score some elements of counseling, such as duration time and student performance.

Although the analysis of the perception of the actors involved is an approximation to evaluate the effectiveness of the ONC as a teaching-learning methodology, it is suggested to complement these results with other objective analyses, such as the level of compliance with the declared learning outcomes and student performance. It can be concluded that the ONC is a feasible teaching-learning strategy to be incorporated permanently and complementary

to face-to-face PP activities, in careers such as Nutrition and Dietetics, due to the high valuation of this activity of ONC.

AUTHORS CONTRIBUTION

P.H.: Conceptualization, Methodology, Research, Formal Analysis, Data Analysis, Drafting-Original draft, Drafting-Review and Editing; P.M.: Conceptualization, Methodology, Research, Formal Analysis, Drafting-Original draft, Data Analysis, Redaction and Editing final version; C.Z.: Conceptualization, Methodology, Formal Analysis, Research, Data Analysis, Means, Redaction- Drafting-Original draft; C.Ch.: Conceptualization, Methodology, Formal Analysis, Research, Data Analysis, Means, Redaction- Drafting-Original draft; B.D.: Conceptualization, Methodology, Formal Analysis, Research, Data Analysis, Means, Redaction- Drafting-Original draft; K.B.: Conceptualization, Methodology, Formal Analysis, Research, Data Analysis; P.C: Conceptualization, Methodology, Formal Analysis, Research, Data Analysis; C.R.: Conceptualization, Methodology, Formal Analysis, Research, Data Analysis; E.B.: Conceptualization, Methodology, Formal Analysis, Research, Data Analysis.

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CONFLICTS OF INTERESTS

The authors declare that there are no conflicts of interest in writing this manuscript.

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