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ORIGINAL PAPER

Online teaching during Covid-19 pandemic: attitudes of Croatian nursing students

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Abstract

Aim: The aim of the study was to investigate the attitude of nursing students towards online teaching during the pandemic Covid-19. *Design:* A cross-sectional study was conducted. *Methods:* The sample included full-time and part-time undergraduate and graduate students of nursing in the Republic of Croatia. The research was conducted using an online method with a questionnaire to measure students' attitudes towards the learning process through online teaching. *Results:* The largest number of participants (58.66%) expressed a moderate attitude towards online teaching; two participants (0.96 %) expressed a negative attitude towards online teaching; while 84 (40.38%) had a highly positive attitude towards online teaching. The findings indicated a significant difference in attitude towards online teaching with regard to student status (full-time / part-time) ($p = 0.003$), students' conditions for monitoring online teaching ($p = 0.003$), and their beliefs and expectations ($p = 0.001$). *Conclusion:* Nursing students tended to express a moderate attitude towards online teaching. Most students would prefer combined classes and believe that conducting online classes only during the Covid-19 pandemic would reduce the amount of specific knowledge they would acquire during their studies.

Keywords: Covid-19, education, nursing, pandemic, students.

Introduction

The new coronavirus infection began in China in December 2019 and soon spread to the rest of the world, leading to the declaration of a global pandemic (Cucinotta & Vanelli, 2020). The unstoppable spread of the virus has led to significant changes in the functioning of many systems around the world, including those in Croatia (Tokić et al., 2021). The pandemic radically changed the lives of people, including students (Ravselj et al., 2021; White & Ruth-Sahd, 2020). Among the most affected was the education system, which urgently needed changes in its functioning.

In order to adapt to the new situation, the Croatian Government published a decision to suspend teaching in all schools and universities in March 2020 (Croatian Government, 2020a). According to the published decision and instructions, in order to protect the health of students and prevent the possible spread of infections, all undergraduate and graduate students, including nursing students, were sent home and were not allowed to visit university buildings and healthcare facilities, where practical clinical teaching had previously taken place (Olum et al., 2020; White & Ruth-Sahd, 2020). All higher education institutions were temporarily closed and the usual educational process within higher education institutions was stopped (Ravselj et al., 2021). The Government of the Republic of Croatia decided that all schools and universities should start teaching through online platforms (Puljak et al., 2020). The Institute of Public Health, in collaboration with the Ministry of Science and Education, published on its official website on April 29, 2020 its first directive with detailed instructions for the prevention and control of the Covid-19 epidemic (Croatian Institute for Public Health, 2020). Shortly after, in May 2020, the Croatian government came to a decision on how teaching would proceed in primary and secondary schools and higher educational institutions, and on the regular operation of preschool institutions (Croatian Institute for Public Health, 2020). The government announced that laboratory and clinical exercises would be allowed in compliance with all prescribed epidemiological measures for small groups of students (Croatian Government, 2020b). Due to the high burden on the health system,

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and fear of further transmission of the infection, clinical exercises were mainly performed in clinical practicums of higher education institutions.

Students largely supported the decisions made, as they had concerns about the risk of infection from attending clinics (Lovrić et al., 2020). However, studies indicate a slightly different attitude in teachers towards online nursing education. While some supported the introduction of online teaching, others had negative attitudes (Orhan & Beyhan, 2020). Teachers generally believe that online teaching is appropriate for theoretical teaching, while classroom and clinical teaching should be conducted face-to-face (Eycan & Ulupinar, 2021).

Higher education institutions around the world, including Croatia, face a number of challenges related to the successful implementation, maintenance, and development of online teaching (Mohamed Abd El-Hamed Diab & Fouad Elgahsh, 2020). In fact, online teaching and learning has not been implemented at all in most Croatian health degree programmes (Puljak et al., 2020). Nevertheless, despite the fact that electronic forms of teaching were not previously common in Croatian health degree programmes (Brumini et al., 2012), teachers have started to use the method of online teaching (Mohamed Abd El-Hamed Diab & Fouad Elgahsh, 2020), since it is the only possible and safe teaching method in the given circumstances (Puljak et al., 2020).

Aim

Since it is known that students' attitudes towards online teaching plays an important role in achieving the intended learning outcomes and, thus, the success of the online teaching process (Olum et al., 2020), the aim of this study was to investigate nursing students' attitudes towards online teaching during the Covid-19 pandemic. Knowledge of nursing students' attitudes towards online teaching and possible factors related to the formation of their positive and / or negative attitudes will contribute to the effective implementation of this teaching method and the development of future teaching processes under both regular and exceptional circumstances.

Methods

Design

A cross-sectional survey was conducted.

Sample

The participants in this research were full-time and part-time undergraduate and graduate students of nursing in the Republic of Croatia (n = 208). A total of 170 (81.7%) undergraduate students and 38 (18.3%) graduate students participated, including 14 (6.7%) male students and 194 (93.2%) female students. The age of the respondents ranged from 19 to 51 years, while the mean age was 25.7 (SD = 12.44) years.

Data collection

The research was conducted by an electronic survey (Google forms) during online courses from April 16 to June 16, 2021. An invitation to participate in the study was sent to all nursing students in Croatia through national social groups of nursing students in the Republic of Croatia. Participants were guaranteed anonymity and participation was voluntary. In the introductory part of the questionnaire, which included the explanation and purpose of the study, participants were offered the chance to contact the researcher with any questions and comments.

Instrument

The survey questionnaire consisted of two parts. The first contained questions about the general characteristics of the respondents, such as age, gender, employment, type of study (full-time / part-time), and place of study. The second part of the questionnaire included items from the Brumini et al. (2012) questionnaire, measuring students' attitudes toward online teaching (distance education using IT technology), for which prior consent was obtained from its author. The questionnaire was designed to explore respondents' experiences with distance education. The questionnaire used contained a total of 22 questions. Eleven questions related to students' positive attitudes towards online teaching, while the other 11 questions measured students' negative attitudes towards online teaching. The responses to all questions were expressed on a Likert scale with five categories, whereby 1) represented the response "do not agree at all"; 2) represented "do not agree"; 3) represented "neither agree nor disagree"; 4) represented "agree"; and 5) represented "completely agree". The total score was composed of the sum of responses to the 22 items, with the 11 items measuring negative attitude previously recoded so that a higher total score (sum) indicated a more positive / less negative attitude. Attitude values were expressed in three categories: low (23 to 52 points), moderate (53 to 82 points), and high (83 to 110 points) (Brumini et al., 2012).

Additionally, students' preferences for each form of teaching (online teaching, classroom teaching, combined online and classroom teaching) and their assessments of the amount of knowledge and skills acquired during online teaching were examined

(will not affect / will reduce / will increase the amount of specific knowledge I will acquire during my study). Respondents also answered questions about computer ownership and the quality of their Internet connection.

Data analysis

First, the descriptive data (arithmetic mean, standard deviation, and percentages) were calculated. Due to the normal distribution of the results, tested with the Kolmogorov-Smirnov test, a t-test was used when testing the differences between the participant groups ($p < 0.05$). Statistical analysis of the collected results was performed using the computer application Statistica 13 (TIBCO Software Inc., Palo Alto, USA 2018).

Results

Characteristics of participants

Of the 208 students, from nine Universities, 162 (77.8%) were 25 years old or younger, while 46 (22.2%) students were over 25 years old. The majority of students (80.8%) had previously completed vocational nursing education, and more than half (53.8%) were studying as full-time students at a university. The sample was dominated by undergraduate students, (n = 170 / 81.7%). A total of 86 (41.3%) of the students were employed.

Students' attitude towards online teaching

The overall student attitude score towards online teaching was 79.74 (SD = 12.44; range 46–110). The values of attitude in relation to the dimensions per degree of Likert scale from one to five are shown in Table 1.

Low values (negative attitude) were expressed by two participants (0.96%), while well over half (n = 122 / 58.66%) had moderately positive attitudes, and 84 (40.38%) participants had highly positive attitudes toward online teaching (Table 2).

Students' attitude towards online teaching with regard to general characteristics

There was no difference in the value of attitudes ($p = 0.324$) towards online teaching with respect to participants' gender, work and study ($p = 0.196$), and their previous experience with online teaching ($p = 0.356$). However, a significant difference in the value of attitudes towards online teaching was found between full-time and part-time students ($p = 0.003$) (Table 3).

Table 1 Values of students' attitudes towards online teaching (n = 208)

Variable	mean	SD	min.	max.
Average – positive attitude	3.62	0.65	2.1	5
Average – negative attitude	3.62	0.59	2.0	5
Total score	79.74	12.44	46	110

SD – standard deviation; min. – minimum; max. – maximum

Table 2 Distribution of students in terms of attitude towards online teaching (n = 208)

Category	Total score	Average score of respondents	n (%)
Low attitude	23–52	48.50	2 (0.96)
Moderate attitude	53–82	72.08	122 (58.66)
High attitude	83–110	91.64	84 (40.36)

Table 3 Students' attitude towards online teaching with regard to general characteristics (n = 208)

Characteristic		n (%)	mean (SD)	t	df	p-value*
Gender	male	14 (6.7)	76.57 (7.45)	0.98	206	0.324
	women	194 (93.3)	79.96 (12.7)			
Education level	undergraduate	170 (81.7)	78.96 (12.7)	0.35	168	0.720
	graduate	38 (18.3)	78.29 (11.6)			
Students' status	full-time	112 (53.8)	77.45 (11.6)	2.91	206	0.003
	part-time	96 (46.2)	82.40 (12.9)			
Employed	yes	86 (41.3)	81.06 (13.1)	1.29	206	0.196
	no	122 (58.7)	78.80 (11.8)			
Previous experience in online teaching	yes	23 (11.1)	82.00 (14.2)	0.92	206	0.356
	no	185 (88.9)	79.45 (12.2)			

*SD – standard deviation; *t-test*

Students differed in the values of attitudes towards online instruction in relation to computer-related conditions. Students who owned a computer for personal use had significantly higher positive attitude scores than students who shared a computer with other members of the household (p = 0.003). No difference was found between participants regarding the estimated quality of Internet connection (p = 0.844) (Table 4).

Students differed significantly in their attitudes towards online teaching in relation to their own beliefs about various forms of teaching (p < 0.001). Students who preferred online teaching were found to have the highest (most positive) attitude score (mean = 92.31; SD = 12.51) towards online teaching, which was significantly more positive than for students who typically preferred traditional face-to-face classroom teaching (mean = 71.78; SD = 10.48) (t = 8.47; df = 105; p < 0.001) and students who preferred combined online and face-to-face teaching (mean = 83.69; SD = 10.48) (t = 3.39; p < 0.001). Students preferring traditional face-to-face classroom teaching were found to have a lower attitude score (more negative) than students preferring combined teaching (t = 8.15; df = 184; p < 0.001) (Table 5).

In addition, students differed significantly in the values of attitudes towards online teaching in relation to their own expectations and assessments of the impact of online teaching on the acquisition of specific professional knowledge required (p = 0.001). Students who expected online teaching to decrease the amount of specific knowledge they acquired during their studies gave a lower score (mean = 74.88; SD = 10.48) for attitude (less positive attitude) towards online teaching than students who expected online teaching to increase their specific knowledge (mean = 86.00; SD = 16.57), (t = 3.30; df = 131; p = 0.001) and students who did not expect online teaching to change the amount of knowledge they would acquire (mean = 86.69; SD = 11.02) (t = 7.43; df = 194; p < 0.001).

There was no difference in attitudes towards online teaching between students expecting an increase in knowledge (mean = 86.00; SD = 16.57) and those expecting there to be no impact on knowledge (mean = 86.57; SD = 11.02) they would acquire during the pandemic (t = 0.15; df = 85); p = 0.877) (Table 5).

Table 4 Attitude of students towards online teaching with regard to computer-related conditions (n = 208)

Condition		n (%)	mean (SD)	t	df	p-value*
The computer I use at home	I share with other members of the household.	58 (28.01)	75.63 (13.06)	2.94	205	0.003
	Serves only my needs.	149 (71.09)	81.15 (11.41)			
Internet connection I use at home	Speed is satisfactory, without technical difficulties.	138 (66.66)	79.92 (12.93)	0.19	204	0.844
	Speed is not satisfactory, technical difficulties occur.	67 (33.44)	79.55 (11.41)			

*SD – standard deviation; *t-test*

Table 5 Students' attitudes towards online teaching with regard to personal beliefs and expectations (n = 208)

Beliefs and expectations		n (%)	mean (SD)
I would prefer	online teaching	22 (10.57)	92.31 (12.51)
	classroom teaching	85 (40.86)	71.78 (9.44)
	combined online and classroom teaching	101 (48.55)	83.69 (12.51)
Assessment of online teaching	It will not affect the amount of specific knowledge I will acquire during my studies.	75 (36.05)	86.57 (11.02)
	It will reduce the amount of specific knowledge I will acquire during my studies.	121 (58.17)	74.88 (10.48)
	It will increase the amount of specific knowledge I will acquire during my studies.	12 (5.76)	86.00 (16.57)

SD – standard deviation

Discussion

The nursing students who participated in this study expressed moderately positive attitudes towards online teaching. These findings are consistent with the results of a previous study (Brumini et al., 2012) in Croatia that included nursing students as well as students from other study programs. In the aforementioned study, which highlighted students' generally positive attitudes toward online teaching, nursing students gave significantly lower attitude scores than dental medicine and engineering students (Brumini et al., 2012). Such outcomes in nursing

students compared to those of other students may be attributed to students' awareness of the importance of clinical education in a real face-to-face environment (Lovrić et al., 2020). Previous research also confirms the belief of healthcare students that online teaching does not provide them with the high-quality knowledge they need and is not an effective educational method for nursing studies (Olum et al., 2020). Thus, in other studies, nursing students expressed concern about the consequences that the pandemic and the organization of non-routine, alternative forms of teaching would have on the acquisition of specific required skills and their future professional development (Lovrić et al., 2020; Puljak et al., 2020). Research indicates that students hope to return to working directly with patients in clinics soon (Lovrić et al., 2020), but also that some students believe they can make up for time lost in clinics when they enter the workforce (Puljak et al., 2020).

Despite students' awareness of the impossibility of adequately replacing clinical teaching under real-life conditions at clinical sites, it can be concluded that nursing students perceive some advantages in online teaching, such as flexibility and greater independence in learning, as indicated in a study by Bdair (2021). In fact, only two students gave low scores, suggesting negative attitudes towards online teaching, while most students had a moderately positive attitude. In addition, a total of 84 students expressed highly positive attitudes towards online teaching. It is possible that this result was due in part to students' fear of possible infection (Lovrić et al., 2020; White & Ruth-Sahd, 2020), but it is also likely that students welcomed the opportunity to replace some of their teaching in online form and recognized the potential benefits (Olum et al., 2020). In contrast to the findings of this study, a study conducted in Egypt involving a total of 627 nursing students from different years of study found that more than half (61.6%) of nursing students had negative attitudes towards online teaching (Mohamed Abd El-Hamed Diab & Fouad Elgahsh, 2020). In the aforementioned study, only 38.4% of students, mostly third-year students, had a positive attitude (Mohamed Abd El-Hamed Diab & Fouad Elgahsh, 2020). Students' negative attitudes towards online education in Egypt were mostly related to the technological obstacles that students encountered when participating in online education (Mohamed Abd El-Hamed Diab & Fouad Elgahsh, 2020). The differences between the results of our study and the study conducted in Egypt may be related to the better technological infrastructure and the more developed skills required by our students in order to participate in online teaching and learning. This is also noted in the results of another study that included nursing students in Croatia (Puljak et al., 2020). Students who participated in this study did not differ in their attitudes towards online teaching in terms of gender, level of study (undergraduate, graduate), employment, and previous experience of online teaching. These results are not consistent with the findings of the study in Egypt. The authors note that there was a significant difference in nursing students' attitudes towards online teaching in relation to gender, and it is important to note that the gender distribution of students in our sample was different to that of the Egyptian sample (Mohamed Abd El-Hamed Diab & Fouad Elgahsh, 2020). Our sample of respondents was dominated by women, which fully corresponds to the usual gender distribution of nursing students in Croatia (Gusar et al., 2020). However, in our study, differences in attitudes towards online education were found between full-time and part-time students, with part-time students expressing stronger positive attitudes towards online teaching than full-time students. These findings, which indicate that part-time students express more positive attitudes towards online teaching, might be seen to relate to the results of a study by Puljak et al. in which working students suggested that online teaching could be a useful substitute for traditional forms of face-to-face teaching, even after the pandemic has ended (Puljak et al., 2020). Compared with part-time students, full-time students, who do not work and do not have an alternative way to acquire and improve the specific clinical skills they need, are likely to be concerned and fearful that they will not be able to make up for the missed portion of hands-on clinical training in clinics (Puljak et al., 2020). Furthermore, in addition to being able to acquire the specific clinical skills needed in their own workplace, part-time students tend to be more open to alternative forms of teaching, which is possibly why they chose to become part-time students.

Technical equipment is extremely important in online teaching, as the results of our study confirm. Students who had their own computer had more positive attitudes towards online teaching. This result is consistent with the findings of other authors (Mohamed Abd El-Hamed Diab & Fouad Elgahsh, 2020; Olum et al., 2020), who also found that technical equipment and support are important in influencing students' attitudes towards online teaching.

Despite previous claims by some authors that quality of Internet connection also influences students'

attitudes towards online teaching (Achmad et al., 2021; Khagi et al., 2021; Mukasa et al., 2021; Olum et al., 2020), the data collected in this study did not yield such a result. No difference was found between the students in terms of the quality and speed of the Internet connection they had while observing online classes. This result can be explained by the relatively good coverage of Croatia by high-speed Internet connections, but possibly also by high motivation to learn during the pandemic Covid-19 (Puljak et al., 2020). Indeed, in a study conducted earlier in Croatia involving nursing students, as with other health students, it was found that learning motivation was at least as high or even higher during online teaching compared to classroom learning (Puljak et al., 2020). In addition, the students included in this study differed significantly in their attitudes towards online teaching in terms of their preferred form of teaching and their evaluation of the impact of online teaching on the acquisition of the professional knowledge required. Most students believed that combined teaching was the best form of education, and they believed that part of their tuition should be conducted in the traditional form of classroom instruction and part should be conducted online. This is probably explained by the fact that more than half of the students perceived that online teaching during a pandemic would reduce the amount of requisite knowledge they would acquire during their studies, while only a small number of students believed that the form of teaching would have no effect on their knowledge. Similar findings were reported in a study of medical and nursing students at Makerere University College of Health Sciences in Uganda (Olum et al., 2020). About half of the medical and nursing students in the study believed that online teaching reduced the quality of their knowledge and was not an effective teaching method. Similarly to our study, about 75% of students expressed a preference for combined teaching (Olum et al., 2020).

The results of previous studies, in addition to our own study, have indicated that online teaching will play a more significant role in the future (Weberg et al., 2021), but when it comes to nursing education, it cannot completely replace traditional face-to-face teaching (Kulal & Nayak, 2020).

Although the results of this study may be helpful in planning and implementing future nursing student education, this study has some limitations. A cross-sectional study was conducted, and data were collected over a relatively short period of time using an online questionnaire. Students who were unaware or did not have access to the Internet at the time of data collection were not able to participate. It is possible that due to the long duration of the pandemic, students adapted to the new form of education as the only one available and were, hence, less critical of it. It would be useful to consider a longitudinal study to continue to examine the effectiveness of online teaching and students' attitudes toward the effectiveness of online teaching.

Conclusion

Despite the lack of time in preparing teachers and students for online teaching, the majority of nursing students who participated in this study expressed moderately positive attitudes towards online teaching. However, most undergraduate, and graduate nursing students considered a combined form of teaching to be the most effective and appropriate model of teaching, consisting of a portion of teaching through online education and a portion of teaching in the traditional form of face-to-face lessons. Although teaching in nursing studies in the Republic of Croatia is usually in the form of face-to-face teaching, higher education institutions should pay attention to the views and attitudes of students represented by such findings and adapt study programs, especially for part-time students. For the quality of teaching to reach a satisfactory level, systematic education of teachers and students is important to produce an effective combination of teaching methods.

Ethical aspects and conflict of interest

All students were informed about the purpose of the study. The proposed research was voluntary and anonymously. The study was conducted in accordance with ethical principles of research involving human subjects based on the principles of the Helsinki Declaration and in accordance with all applicable guidelines of the code of ethics of the profession. The implementation of this research was approved by the Ethics Committee of the University of Zadar at a regular session held on April 15, 2021. Class: 114 – 06/21 – 01/13, Reg. No.: 2198-1-79-62-21-02.

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Author contributions

Concept and design (IG, KG), data collection (IG, KG), analysis and interpretation of data (IG, AT), manuscript draft (IG, KG, AT), critical revision of the manuscript (IG, AT), final approval of the manuscript (IG, KG, AT).

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