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Readiness for practice in undergraduate nursing students during the COVID-19 pandemic: a cross-sectional study

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Key words: Coronavirus, nursing education, readiness for practice, clinical experience, nursing students

Parole chiave: Coronavirus, formazione infermieristica, preparazione alla pratica, esperienza clinica, studenti di infermieristica

Abstract

Background. *The Coronavirus disease 2019 (COVID-19) pandemic negatively impacted nursing students' opportunity to gain experience through clinical placement, potentially threatening their readiness for practice and their clinical competence. The aim of this study was to explore whether and to what extent the third-year undergraduate nursing students perceived that their readiness for practice was impacted by changes to clinical placement and classroom learning implemented in response to the COVID-19 pandemic.*

Study design. *Cross-sectional study.*

Methods. *The study was conducted in a university of North-western Italy that provides nursing education across five sites. All sites stopped in-person classroom learning at the beginning of March 2020, but each site was free to decide whether to continue in-person clinical placement based on the local epidemiological situation. All 228 third-year nursing students who completed their degree by June 2020 were invited to*

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participate. Data were collected via online questionnaire, which included the question "What impact do you think that COVID-19 safety measures employed by your nursing programme had on your readiness for practice?" Answers were given on a 5-point Likert scale (none, minimal, moderate, major, and severe). Explanatory variables were collected at the individual, nursing programme, and university site levels.

Results. *A total of 126 (response rate 55.3%) nursing students completed the questionnaire. Overall, 84 (66.7%) perceived that COVID-19 safety measures had a moderate to severe impact on their readiness for practice. These students often had lower grade point averages (p=0.037) and received no clinical placement during the pandemic (72.6% vs 90.5% of students who reported no or minimal impact, p=0.022). Average duration of third-year clinical placement was also lower among these students, though it was not statistically significant. No differences emerged at the university site level.*

Conclusions. *Despite important advances in technology-based educational activities, clinical placement remains the best educational strategy to allow nursing students to feel prepared to work effectively during a pandemic.*

Introduction

Coronavirus disease 2019 (COVID-19) forced academic institutions - including undergraduate nursing programmes - to implement new, drastic measures to prevent and control the spread of the pandemic and ensure that nursing programmes were carried out safely (1, 2). Worldwide lockdowns, and the sudden closure of universities, led to rapid, unplanned changes in how education was delivered; in-person (front) learning was replaced by remote education (3), and educators and students had to transition suddenly from in-person to distant learning, using technologies like podcasts or video-conferencing platforms such as Zoom, Moodle, or Google Meet (4). Nursing curricula were also modified to fit with this remote approach, often without clear guidelines from the Institutions. This led to heterogeneous changes across nursing programmes, which were influenced by the staff's digital competences, the availability of Information Technology support, and the amount of local resources (2).

Clinical placement faced even greater changes. Some countries suspended such placements altogether (5) and replaced them with simulation labs or virtual academic activities (6-8). Other countries made clinical placement voluntary for third-year nursing students, with the goal of alleviating the pressure on healthcare workers while maintaining flexibility in the educational system (9). Several students answered the call and were employed as front-line staff in high-risk healthcare settings, including nursing homes and emergency departments (10). However, this quick entry into a chaotic clinical environment meant that they did not receive support or guidance from more senior nurses during their transition to clinical practice, as they normally would (10). In places that suspended clinical placement, nursing students, in their final year, missed their last opportunity to gain hands-on experience. The goal of clinical placement is to increase students' confidence in their skills and help them achieve professional autonomy. The loss of clinical placement has increased anxiety and fear among nursing students (11, 12), and likely impacted their perceived readiness for practice.

Readiness for nursing practice is conceptualised as a mix of cognitive, clinical, and professional capabilities (13). The overlap of these capabilities positively impacts students' perceived self-efficacy in assuming the role of a nurse (13). Successful transition from nursing student to graduate nurse is related to factors at both the individual and educational level. Individual-level factors, include students' background in terms of previous education, working experience, and feelings and

expectations (14). Clinical placement has been suggested as the main educational-level factor influencing readiness for practice, in addition to perceived professional competence (14). During clinical placement, nursing students can master technical skills and improve their clinical thinking (15). Not having the opportunity to practice in the field may negatively impact nursing students' technical proficiency, which was already an area of concern before the COVID-19 pandemic (16). Assuming the professional role of a nurse is a challenging milestone for third-year nursing students (17), and despite the existence of structured transition programmes meant to prepare them, readiness for practice continues to be a demanding achievement (16). Even in non-pandemic times, the first year after entering the professional nursing field is usually a stressful and challenging period, and many nursing students report that they would have benefited from additional clinical placement during their education to further develop their professional competence (18, 19).

Undergraduate nursing programmes are responsible for preparing students for the nursing profession, while ensuring high academic standards (13, 20), and a lack of clinical placement may negatively influence students' readiness for practice and their clinical competence (21). Therefore, to inform policy decisions on nursing education, this cross-sectional study aimed to explore whether and to what extent third-year undergraduate nursing students perceived their readiness for practice, was impacted by changes to clinical placement and classroom learning implemented in response to the COVID-19 pandemic.

Methods

Study design

This is a cross-sectional study, based on data collected from an online questionnaire between July and August 2020. It is reported according to the STROBE (STrengthening the Reporting of OBservational studies in Epidemiology) Statement (22).

Setting and procedure

This study was conducted in a university of North-western Italy, which provides a three-year undergraduate nursing programme across five sites. As per national law (23), nursing education is composed of theoretical education, i.e., classroom learning at the university, and clinical education, which is offered through clinical rotations in the National Healthcare Services (clinical placement). Third-year nursing students must devote a minimum of 750 hours (approximately 90 days) to clinical placement.

The onset of the COVID-19 pandemic led to changes in educational practices. On 8 March 2020, the Italian Government decided to suspend in-person learning at all schools and universities, which were left to find a way to replace in-person classroom learning (i.e., lectures, skill laboratory training, and examinations) with remote learning. At the five university sites in the present study, in-person theoretical education was moved online; but each site was free to decide whether to continue clinical placement of third-year students based on the local epidemiological situation, and students were free to choose if they wanted to attend. Students who agreed to attend clinical placement and were exposed to COVID-19-positive patients had their clinical placement stopped immediately and were quarantined as preventative measure.

The research team sent an email to all third-year nursing students who completed their degree as of June 2020, inviting them to complete an online questionnaire. Good practice procedures for online data collection were followed (Supplementary Table 1) (24). Before they were able to complete the questionnaire, students had to read information about the study aims and data collection procedures and provide consent to

Table 1 - Strategies employed to prevent bias

(a)	Selection bias prevention - several strategies were used to involve all eligible students: i) the chief nurses of each site promoted the study among their students, ii) all eligible students received an invitation to the study via email, iii) a reminder was sent 1 week after the initial invitation
(b)	Information bias prevention - the following strategies were employed: i) data collection was performed after standardized information was offered to all participants by the chief nurses of each site, ii) students were free to participate without any pressure or benefits, and iii) study aims and data collection procedures were described at the beginning of the online questionnaire and a paper copy was also sent to the chief nurses
(c)	Recall bias prevention - students were invited to complete the questionnaire within one month after graduation.

participate. A reminder to fill in the survey was sent 1 week after the initial invitation. Strategies to prevent bias were applied (Table 1, Supplementary Table 1).

Explanatory variables

Explanatory variables were collected at the individual, nursing programme, and university site levels (Table 2).

Among the nursing programme variables, students' perceived readiness for practice was assessed by the Casey-Fink Readiness for Practice tool, which is the reference standard recommended by the literature (27). This tool asks students to report their comfort/confidence in key practice skills across four factors: 'Clinical problem-solving' (seven items); 'Learning techniques' (two items); 'Professional identity' (five items); and 'Trials and tribulations' (six items). Responses to all items are given on a 4-point Likert scale (1=strongly disagree; 4=strongly agree). Overall, the Casey-Fink Readiness for Practice score may range from 1 to 4; with a higher score indicating a higher perceived readiness for practice. Previous confirmatory analysis of the English version of the tool showed adequate fit (Confirmatory Fit Index=0.86, Root Mean Square Error of Approximation=0.06) (27).

For this study, the Casey-Fink Readiness for Practice tool was translated into Italian by employing the recommended forward-backward approach, then evaluated by the authors and cross-culturally adapted. Content validity of the Italian version was assessed by the Scale-Content Validity Index. A panel of six experts in nursing education was asked to rate to what extent each item was congruent with the readiness for practice construct using a 4-point scale (1=not relevant; 4=highly relevant). Expert ratings were dichotomised into not relevant (score ≤2) and relevant (score ≥3), and the Scale-Content Validity Index was computed using the conservative requirement, by averaging the proportion of the relevant items and dividing them by the number of items. A minimum value of 0.80 was considered acceptable (26). The Scale-Content Validity Index was 0.92 (ranging from 0.67 to 1.00) (26), while the overall internal consistency, assessed by Cronbach alpha, was 0.83.

Endpoint

Nursing students' perceived readiness for practice following changes employed by the nursing programme in response to the COVID-19 pandemic was the endpoint of the study. It was assessed through the following question included in the questionnaire: "What impact do you think that COVID-19 safety measures employed by your nursing programme had on your readiness for practice?" Answers were given on a 5-point Likert scale (0=none, 1=minimal, 2=moderate, 3=major, and 4=severe) (25).

The endpoint was considered as a categorical variable in the bivariate analysis, dichotomised into *(i)* students who perceived no or minimal impact and *(ii)* students who perceived a moderate to severe impact.

Table 2 - Explanatory variables

(a) Individual level: socio-demographic variables (i.e., age, gender, nationality), previous education (i.e., university degree courses, concluded or not), working experience during nursing education and number of hours worked per week, current employment, experience in the healthcare setting during nursing education (e.g., civil service, emergency volunteering), whether nursing degree was obtained within the prescribed time, whether the student was a scholarship beneficiary, and grade point average.
(b) Nursing programme level: overall duration of third-year clinical placement (days), clinical placement experience during the COVID-19 pandemic and its duration (days), opportunity to express preferred settings for clinical placement and clinical placement in at least one of the preferred settings, Casey-Fink Readiness for Practice factor score (27).
(c) University site level: the university sites where students had their clinical learning environment were collected. The university sites were consecutively numbered (e.g., Site 1, Site 2) to ensure confidentiality.

Data analysis

The IBM SPSS Statistical Package Version 24 (IBM Corp., Armonk, NY, USA) was used to perform descriptive and inferential statistical analyses. First, categorical variables were computed as absolute numbers and percentages; continuous variables were computed as means with standard deviations (SD).

Normality of data distribution was tested using the Kolmogorov-Smirnov test. The chi-square test or Fisher's exact test was used to compare categorical variables, as appropriate, and the t-test for independent samples was used to compare continuous variables. The significance level (α) was set at 0.05.

Results

Participants and endpoint

Of the 228 third-year undergraduate nursing students invited, 126 completed the online questionnaire (response rate 55.3%). Overall, 84/126 (66.7%) students reported that the COVID-19 safety measures employed by the nursing programme had a moderate to severe impact on their perceived readiness for practice (14 (11.1%) students reported no impact, 28 (22.2%) minimal impact, 47 (37.3%) moderate impact, and 34 (27.0%) major impact, and three (2.4%) severe impact).

Bivariate analysis

At the individual level, students who perceived a moderate to severe impact on their readiness for practice tended to have a lower grade point average (p=0.037) than those who perceived no or minimal impact. At the nursing programme level, a higher proportion of students who perceived a moderate to severe impact on their readiness for practice received no clinical placement during the pandemic compared to their peers who perceived no or minimal impact (72.6% vs 90.5%, p=0.022). Moreover, students who perceived a moderate to severe impact had a lower average overall duration of third-year clinical placement, although it was not statistically significant [72.5 (95% confidence interval 67.0-78.0) days vs 87.5 (95% confidence interval 58.8-116.2) days]. No differences emerged at the university site level (p=0.435) (Table 3).

Discussion

This study explored whether, and to what extent, third-year nursing students perceived that the COVID-19 safety measures employed by the nursing programme impacted their

Table 3 - Comparison of background variables among participants according to perceived impact on readiness for practice

	I perceive that COVID-19 safety measures adopted by the nursing programme impacted my readiness for practice		
	None or minimally (n=42, 33.3%)	Moderately to severely (n=84, 66.7%)	P
Individual level			
Age, years, mean (SD)	23.9 (0.7)	23.5 (0.5)	0.642
Female gender, n (%)	32 (76.2)	67 (79.8)	0.651
Italian, n (%)	40 (95.2)	78 (92.9)	0.718
Previous education, n (%)			0.063
None	33 (78.6)	68 (80.9)	
Uncompleted *degree*	5 (11.9)	15 (17.9)	
Graduated in other fields	4 (9.5)	1 (1.2)	
Working experience during nursing education, n (%)	15 (35.7)	18 (21.4)	0.092
Number of hours worked per week, mean (SD)	15.8 (3.9)	15.2 (3.1)	0.907
Current employment, n (%)	4 (9.5)	6 (7.1)	0.730
Experience in the healthcare setting during nursing education, n (%)	8 (19.0)	20 (23.8)	0.652
Nursing degree obtained within prescribed time, n (%)	29 (69.0)	67 (79.8)	0.191
Scholarship beneficiary, n (%)	11 (26.2)	18 (21.4)	0.654
Grade point average, mean (SD)	24.7 (0.2)	24.0 (0.2)	**0.037**
Nursing programme level			
Overall duration of third-year clinical placement, days, mean (SD)	87.5 (14.6)	72.5 (2.8)	0.164
Clinical placement during the COVID-19 pandemic, n (%)	38 (90.5)	61 (72.6)	**0.022**
Duration of clinical placement during the COVID-19 pandemic, days, mean (SD)	27.9 (2.8)	24.5 (2.3)	0.381
Opportunity to express preferred settings for clinical placement, n (%)	24 (57.1)	44 (52.4)	0.705
Clinical placement in at least one of the preferred settings, n (%) (n=73)	22 (81.5)	39 (84.8)	0.751
CaseyFink Readiness for Practice factor score, mean (SD)†			
Clinical problem-solving	3.12 (0.07)	2.99 (0.05)	0.105
Learning techniques	2.38 (0.12)	2.44 (0.07)	0.634
Professional identity	3.35 (0.06)	3.32 (0.05)	0.744
Trials and tribulations	2.37 (0.07)	2.34 (0.04)	0.774
Overall CaseyFink Readiness for Practice score†	2.80 (0.05)	2.77 (0.04)	0.619
University site level, n (%)			
Site 1, n (%)	4 (9.5)	10 (11.9)	0.435
Site 2, n (%)	19 (45.2)	30 (35.7)	
Site 3, n (%)	7 (16.7)	26 (31.0)	
Site 4, n (%)	5 (11.9)	9 (10.7)	
Site 5, n (%)	7 (16.7)	9 (10.7)	

Abbreviations. SD, Standard deviation; COVID-19, COronaVIrus Disease 19
†On a 4-point Likert scale (1 = strongly disagree; 4 = strongly agree).

readiness for practice, and showed that more than half of students perceived a moderate to severe impact.

Students who perceived a moderate to severe impact less often received clinical placement during the pandemic, or had shorter clinical placements than their peers who perceived no or limited impact on their readiness for practice. This suggests the importance of clinical placement in developing future nurses' professional role (28, 29). A qualitative study of Spanish nursing students in the first phase of the pandemic revealed that a part of them desired to postpone their graduation if they could not attend their clinical placement (12), suggesting that nursing students recognise the value of clinical placement even during a health emergency (12, 30).

Most European students expressed their willingness to contribute during the pandemic (31), and those who entered the clinical setting judged their experience positively (32, 33). They gained confidence and skills under the supervision of an experienced nurse without feeling the burden of responsibility that comes with decision-making as a graduated nurse (32, 33). Moreover, nursing students felt that they were helping in the fight against the pandemic (28-31). This suggests that, to some extent, the COVID-19 pandemic positively reinforced nursing students' altruistic and moral motivations (12, 34). The decision to pursue a career in nursing is often sustained by the desire to help others during times of pain and suffering (35); suspending clinical placement may have fostered feelings of frustration and powerlessness among nursing students.

Some authors raised ethical dilemmas about exposing students to such a great risk, as they had not yet completed their education and could not be fully prepared (36). In normal circumstances, clinical and university preceptors support students during their clinical placement, helping them solve problems and make sense out of their experience. During the COVID-19 pandemic, nursing students are having to adapt to uncertain and dynamic clinical contexts with limited human resources and supplies. They are often asked to deal with moral issues on their own and are thus exposed to a greater risk of burden and emotional distress (32). Moreover, concerns have arisen about the adequacy of measures employed by universities to support students during their clinical placement and to regularly evaluate their well-being (37).

Although in-person classroom learning for nursing students has resumed in most universities around the world (38), clinical placement remains a challenge, with some healthcare institutions accepting a limited number of students due to the shortage of clinical preceptors' and the need to train new staff (39). This is alarming, since certain essential skills (e.g., observational skills) and competencies (e.g., prioritising or patient assessment) can only be achieved in real-practice contexts. Clinical placement allows students to develop professional competence and readiness for practice before fully entering the occupation, promotes role transition, and increases retention (40). Improving nurse retention is an increasingly debated issue, particularly for novice nurses, since 10% to 50% of new graduates decide to leave their first place of employment within 1 year (41).

Policymakers and universities need to establish a partnership through with they can collaborate to ensure that healthcare settings are able to host students for their clinical placement. When clinical placement is not possible, other methods may be explored to reach learning objectives (1). The National Council of State Boards of Nursing has suggested that simulation can be a valid alternative for up to half of required clinical placement hours in undergraduate nursing education (42). Simulation allows students to have a realistic experience in a safe environment and achieve learning objectives

established in the curricula, such as critical thinking, self-efficacy, self-confidence, clinical judgment, and motivation, under the guidance of a facilitator during a reflective debriefing session (43).

At the individual level, students with a higher-grade point average were more likely to perceive no or minimal impact of COVID-19 safety measures on their readiness for practice, probably because they were more self-directed and had a higher level of professional confidence. This result is consistent with previous research showing that students who were confident in their ability to provide safe and effective care before the COVID-19 pandemic found the transition toward remote learning easier (44).

Limitations

To the best of our knowledge, this is the first study which explores the impact of COVID-19 safety measures on students' perceived readiness for practice. Despite its novelty, this study suffers from several limitations. First, the cross-sectional design suggests the need to be cautious in considering missed or shorter clinical placement as a determinant of increased changes in perceived readiness for practice. A determination of causality requires different study designs (e.g., intervention studies) and may be addressed in the future. Secondly, the small study sample from only one university limits the generalisability of the findings, may not have allowed to identify relevant differences and precluded to analyse the nursing students' perceived readiness for practice following changes employed as a function of multiple predictors. Thirdly, the study explored a 'subjective' perception of nursing students' readiness for practice rather than an 'objective' evaluation of their clinical competence. However, 'subjective' perception of knowledge and preparedness for the new role has been identified as a main factor that influences retention in the nursing profession (45).

Conclusions

In the last year, nursing programmes had to reimagine how to offer educational opportunities while still fulfilling academic requirements. Despite the important advances in remote clinical education strategies, such as virtual scenarios and high-fidelity simulation in nursing education, our findings suggest that clinical placement remains the best educational strategy to allow nursing students to feel competent and to feel prepared to work effectively during a pandemic. Future research should explore the right blend of remote and in-person tools that should be employed during clinical placement to guarantee that nursing students achieve clinical competence and professional confidence.

Ethics: The research protocol was approved by the teaching commission of the nursing programme. The president of the programme and the chief nurse at each university site were asked to promote the study among students after being informed about its aims and data collection procedures. Students were free to participate without any pressure or benefits, and data were collected anonymously. Data were analysed ensuring the anonymity of sites and students. The study was conducted according to the guidelines of the Declaration of Helsinki. Ethical Committee approval was not requested since the study was conducted for internal purposes to improve the quality of nursing students' clinical learning and anonymity was guaranteed.

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Riassunto

La preparazione alla pratica degli studenti di infermieristica durante la pandemia di COVID-19: uno studio trasversale

Introduzione. L'infezione da SARS-CoV-2 (COVID-19) ha condizionato la possibilità di svolgere il tirocinio clinico per gli studenti di infermieristica, minando potenzialmente il loro senso di preparazione alla pratica e competenza clinica. L'obiettivo dello studio era quello

Supplementary Table 1 - Checklist for Reporting Results of Internet e-Surveys (CHERRIES) (24)

Dimension	Item	Our study
Design	Describe survey design	The target population was third-year undergraduate nursing students enrolled at one North-west Italian university which provided education across five sites. A convenience sample was used.
Institutional Review Board approval and informed consent process	Approval	Study approval was obtained from the teaching commission of the nursing programme on 27 May 2020.
	Informed consent	Participants were informed regarding the (a) aims of the study; (b) the length of time to complete the survey; (c) the investigator; and (d) who stored the data.
	Data protection	Students' personal data (i.e., age, gender, academic year attended) were managed anonymously.
Development and pre-testing	Development and testing	The online version of the Casey-Fink Readiness for Practice Survey was created using Google Forms, a free survey application. The online version included compulsory informed consent, which the students had to provide before they were able to answer the questions. The questionnaire was preliminary tested in two sites on a sample of nursing students who voluntarily checked the tool and provided feedback. No negative comments were received about technical aspects, ease of use, or comprehension of the online questionnaire. Therefore, no changes were introduced.
Recruitment process and description of the sample having access to the questionnaire	Open survey versus closed survey	We used a closed survey; it was open only to students attending the nursing programme who met the inclusion criteria.
	Contact mode	The first contact was via email, performed by the chief nurse of each site, via the official email assigned to each student by the university.
	Advertising the survey	The survey was announced online by the chief nurse of each site.

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Survey administration	Web/E-mail	The survey was sent via email: the responses were entered automatically in the database and all responses were recorded.
	Context	The survey was administered online. Students were sent an email to the official address assigned to each student by the university; it contained a link to the questionnaire located on Google Forms. Responders did not need to install any additional software or have specific computer equipment. Data were recorded automatically by Google Forms software and kept on a server, without the responders being able to see other participants' answers.
	Mandatory/voluntary	Participation was voluntary.
	Incentives	No incentives were offered.
	Time/Date	The survey was available between July and August 2020.
	Randomization of items or questionnaires	Only one version of the questionnaire was used. Moreover, given that the items were conceived to map specific dimensions in a predefined order, no randomisation was implemented.
	Adaptive questioning	Some questions depended on the response to the previous item (e.g., the number of working hours was required only when the student reported that they were working during the nursing programme)
	Number of Items	The survey consisted of 43 items. All the items were presented in one page, so the participant could see how long the questionnaire was. However, not all of these items were used for the present analysis.
	Number of screens (pages)	The survey was composed of one webpage.
	Completeness check	All items except two (i.e., the number of working hours was required only when the student reported that they worked during the nursing programme). The first question asked to provide informed consent and contained a short summary of the study aims, including privacy issues according to Italian law. No items had non-response options such as "Not applicable" or "I don't know".
	Review step	Respondents could not change their answers, but they were able to see the summary chart after survey submission.

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Response rates	Unique site visitor	The Internet Protocol address and the email address of each respondent were used to determine the visitors as "unique" (see below).
	View rate (Ratio of unique survey visitors/unique site visitors)	The application did not provide data regarding the number of visitors to the first page.
	Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	
	Completion rate (Ratio of users who finished the survey/users who agreed to participate)	Since the application did not provide data regarding the number of visitors who started the questionnaire, completion rate was not calculated. A total of 126 (response rate 55.3%) out of the 228 undergraduate nursing students invited to participate completed the questionnaire.
Preventing multiple entries from the same individual	Cookies used	Cookies were not used in this survey.
	IP check	The Internet Protocol address of the client computer was used to identify the users. No user was allowed to access the survey more than once from the same Internet Protocol address.
	Registration/ Log file analysis	Given that the survey was "closed" (non-open), each participant entered by his/her personal login first. This prevented duplicates.
Analysis	Handling of incomplete questionnaires	Questionnaires were checked for completeness and then included in the analysis.
	Questionnaires submitted with an atypical timestamp	No timeframe was used as a cut-off point after the email was sent to students.
	Statistical correction	Responses were collected and analysed after survey closure. We did not used any statistical correction.

di esplorare se e in quale misura gli studenti di infermieristica che frequentavano il terzo anno di corso hanno percepito un cambiamento nel proprio senso di preparazione alla pratica a causa delle misure implementate dal Corso di Laurea per il contrasto e il contenimento del COVID-19.

Disegno di studio. Studio osservazionale descrittivo trasversale.

Metodi. Lo studio è stato condotto in una Università Italiana del Piemonte che si articola in cinque poli formativi. All'inizio di marzo 2020, tutte le attività didattiche in presenza sono state sospese, lasciando a ciascun polo formativo la possibilità di continuare o interrompere il tirocinio clinico in base alla situazione epidemiologica locale. Tutti i 228 studenti di infermieristica che avevano completato il percorso formativo a giugno 2020 sono stati invitati a partecipare. La raccolta dati è avvenuta utilizzando un questionario online. La percezione di cambiamento nel senso di preparazione alla pratica è stata indagata chiedendo "pensi che le misure di sicurezza adottate dal Corso di Laurea per il contrasto del COVID-19 abbiano influenzato la tua preparazione alla pratica clinica?". Gli intervistati dovevano esprimere la propria opinione su scala Likert a 5 punti (da "per nulla" a moltissimo"). Sono state indagate variabili esplicative a livello del singolo studente, programma di corso e polo formativo.

Risultati. Hanno partecipato all'indagine 126 studenti (tasso di risposta 55.3%). Complessivamente, 84 (66.7%) studenti hanno percepito un cambiamento nella loro preparazione alla pratica da "molto" a "moltissimo". Gli studenti che avevano percepito che le misure di sicurezza per contrastare e contenere la pandemia di COVID-19 avevano condizionato la loro preparazione alla pratica avevano una media di voti più bassa ($p = 0.037$) e meno frequentemente avevano svolto il tirocinio clinico durante la pandemia (72.6% vs 90.5%, $p = 0.022$). Inoltre, riportavano una minor durata media del tirocinio al terzo anno, sebbene la differenza non fosse statisticamente significativa. Non sono emerse differenze a livello del polo formativo.

Conclusioni. Nonostante i significativi progressi nello

sviluppo di attività educative basate sulle tecnologie, il tirocinio clinico rimane la miglior strategia educativa per consentire agli studenti di infermieristica di sentirsi pronti per operare in prima linea durante una pandemia.

References

1. Seah B, Ang ENK, Liaw SY, Lau ST, Wang W. Curriculum changes for pre-registration nursing education in times of COVID-19: For the better or worse?. Nurse Educ Today. 2021; **98**: 104743. doi: 10.1016/j.nedt.2020.104743.
2. Carolan C, Davies CL, Crookes P, McGhee S, Roxburgh M. COVID 19: Disruptive impacts and transformative opportunities in undergraduate nurse education. Nurse Educ Pract. 2020; **46**: 102807. doi: 10.1016/j.nepr.2020.102807.
3. Leigh J, Vasilica C, Dron R, et al. Redefining undergraduate nurse teaching during the coronavirus pandemic: use of digital technologies. Br J Nurs. 2020; **29**(10): 566-9. doi: 10.12968/bjon.2020.29.10.566.
4. Yancey NR. Disrupting Rhythms: Nurse Education and a Pandemic. Nurs Sci Q. 2020; **33**(4): 299-302. doi: 10.1177/0894318420946493.
5. Cervera-Gasch Á, González-Chordá VM, Mena-Tudela D. COVID-19: Are Spanish medicine and nursing students prepared?. Nurse Educ Today. 2020; **92**: 104473. doi: 10.1016/j.nedt.2020.104473.
6 Palancia Esposito C, Sullivan K. Maintaining Clinical Continuity Through Virtual Simulation During the COVID-19 Pandemic. J Nurs Educ. 2020; **59**(9): 522-5. doi: 10.3928/01484834-20200817-09.
7. Fogg N, Wilson C, Trinka M, et al. Transitioning from direct care to virtual clinical experiences during the COVID-19 pandemic. J Prof Nurs. 2020; **36**(6): 685-91. doi: 10.1016/j.profnurs.2020.09.012.
8. Haslam MB. What might COVID-19 have taught us about the delivery of Nurse Education, in a post-COVID-19 world?. Nurse Educ Today. 2021; **97**: 104707. doi: 10.1016/j.nedt.2020.104707.
9. Nursing and Midwifery Council**.** Information for students and educators. (2021). Available on: https://www.nmc.org.uk/news/coronavirus/information-for-students-and-educators/ [last accessed: 2021 July 21].
10. Monforte-Royo C, Fuster P. Coronials: Nurses who graduated during the COVID-19 pandemic. Will they be better nurses?. Nurse Educ Today. 2020; **94**: 104536. doi: 10.1016/j.nedt.2020.104536.
11. Sun Y, Wang D, Han Z, Gao J, Zhu S, Zhang H. Disease Prevention Knowledge, Anxiety, and Professional Identity during COVID-19 Pandemic in Nursing Students in Zhengzhou, China. J Korean Acad Nurs. 2020; **50**(4): 533-40. doi:10.4040/jkan.20125.
12. Ramos-Morcillo AJ, Leal-Costa C, Moral-García JE, Ruzafa-Martínez M. Experiences of Nursing Students during the Abrupt Change from Face-to-Face to e-Learning Education during the First Month of Confinement Due to COVID-19 in Spain. Int J Environ Res Public Health. 2020; **17**(15): 5519. doi:10.3390/ijerph17155519.
13. Mirza N, Manankil-Rankin L, Prentice D, Hagerman LA, Draenos C. Practice readiness of new nursing graduates: A concept analysis. Nurse Educ Pract. 2019; **37**: 68-74. doi: 10.1016/j.nepr.2019.04.009.
14. Järvinen T, Eklöf N, Salminen L. Factors related to nursing students' readiness to enter working life - A scoping literature review. Nurse Educ Pract. 2018; **29**: 191-9. doi: 10.1016/j.nepr.2018.01.010.
15. Jeppesen KH, Christiansen S, Frederiksen K. Education of student nurses - A systematic literature review. Nurse Educ Today. 2017; **55**: 112-21. doi: 10.1016/j.nedt.2017.05.005.
16. Missen K, McKenna L, Beauchamp A. Registered nurses' perceptions of new nursing graduates' clinical competence: A systematic integrative review. Nurs Health Sci. 2016; **18**(2): 143-53. doi: 10.1111/nhs.12249.
17. Graf AC, Jacob E, Twigg D, Nattabi B. Contemporary nursing graduates' transition to practice: A critical review of transition models. J Clin Nurs. 2020; **29**(15-16): 3097-3107. doi: 10.1111/jocn.15234.
18. Warne T, Johansson UB, Papastavrou E, et al. An exploration of the clinical learning experience of nursing students in nine European countries. Nurse Educ Today. 2010; **30**(8): 809-15. doi: 10.1016/j.nedt.2010.03.003.
19. Milton-Wildey K, Kenny P, Parmenter G, Hall J. Educational preparation for clinical nursing: the satisfaction of students and new graduates from two Australian universities. Nurse Educ Today. 2014; **34**(4): 648-54. doi: 10.1016/j.nedt.2013.07.004.

20. Jamieson I, Sims D, Basu A, Pugh K. Readiness for practice: The views of New Zealand senior nursing students. Nurse Educ Pract. 2019; **38**: 27-33. doi: 10.1016/j.nepr.2019.05.007.
21. Ortiz J. New graduate nurses' experiences about lack of professional confidence. Nurse Educ Pract. 2016; **19**: 19-24. doi: 10.1016/j.nepr.2016.04.001.
22. von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: guidelines for reporting observational studies. Int J Surg. 2014; **12**(12): 1495-9. doi: 10.1016/j.ijsu.2014.07.013.
23. Ministry of Education, University and Research. Ministerial Decree 19 February 2009. Establishing decrees of bachelor's for the health professions. Available on:
24. Eysenbach G. Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) [published correction appears in doi:10.2196/jmir.2042]. J Med Internet Res. 2004; **6**(3): e34. doi: 10.2196/jmir.6.3.e34.
25. Sullivan GM, Artino AR Jr. Analyzing and interpreting data from likert-type scales. J Grad Med Educ. 2013 Dec; **5**(4): 541-2. doi: 10.4300/JGME-5-4-18.
26. Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? Critique and recommendations. Res Nurs Health. 2006 Oct; **29**(5): 489-97. doi: 10.1002/nur.20147.
27. Casey K, Fink R, Jaynes C, Campbell L, Cook P, Wilson V. Readiness for practice: the senior practicum experience. J Nurs Educ. 2011; **50**(11): 646-52. doi: 10.3928/01484834-20110817-03.
28. Cooper J, Courtney-Pratt H, Fitzgerald M. Key influences identified by first year undergraduate nursing students as impacting on the quality of clinical placement: A qualitative study. Nurse Educ Today. 2015; **35**(9): 1004-8. doi: 10.1016/j.nedt.2015.03.009.
29. Dimitriadou M, Papastavrou E, Efstathiou G, Theodorou M. Baccalaureate nursing students' perceptions of learning and supervision in the clinical environment. Nurs Health Sci. 2015; **17**(2): 236-42. doi: 10.1111/nhs.12174.
30. Cushen-Brewster N, Barker A, Driscoll-Evans P, Wigens L, Langton H. The experiences of adult nursing students completing a placement during the COVID-19 pandemic. Br J Nurs. 2021 Nov 25; **30**(21):1250-5. doi: 10.12968/bjon.2021.30.21.1250.
31. Collado-Boira EJ, Ruiz-Palomino E, Salas-Media P, Folch-Ayora A, Muriach M, Baliño P. "The COVID-19 outbreak"-An empirical phenomenological study on perceptions and psychosocial considerations surrounding the immediate incorporation of final-year Spanish nursing and medical students into the health system. Nurse Educ Today. 2020; **92**: 104504. doi: 10.1016/j.nedt.2020.104504.
32. Roca J, Canet-Vélez O, Cemeli T, Lavedán A, Masot O, Botigué T. Experiences, emotional responses, and coping skills of nursing students as auxiliary health workers during the peak COVID-19 pandemic: A qualitative study. Int J Ment Health Nurs. 2021; 10.1111/inm.12858. doi: 10.1111/inm.12858. Epub 2021 Apr 1.
33. Casafont C, Fabrellas N, Rivera P, et al. Experiences of nursing students as healthcare aid during the COVID-19 pandemic in Spain: A phemonenological research study. Nurse Educ Today. 2021; **97**: 104711. doi: 10.1016/j.nedt.2020.104711.
34. Dos Santos LM. How Does COVID-19 Pandemic Influence the Sense of Belonging and Decision-Making Process of Nursing Students: The Study of Nursing Students' Experiences. Int J Environ Res Public Health. 2020; **17**(15): 5603. doi:10.3390/ijerph17155603
35. Jackson D, Bradbury-Jones C, Baptiste D, et al. Life in the pandemic: Some reflections on nursing in the context of COVID-19. J Clin Nurs. 2020; **29**(13-14): 2041-3. doi: 10.1111/jocn.15257.
36. Goni-Fuste B, Wennberg L, Martin-Delgado L, Alfonso-Arias C, Martin-Ferreres ML, Monforte-Royo C. Experiences and needs of nursing students during pandemic outbreaks: A systematic overview of the literature. J Prof Nurs. 2021; **37**(1): 53-64. doi: 10.1016/j.profnurs.2020.12.004.
37. Hayter M, Jackson D. Pre-registration undergraduate nurses and the COVID-19 pandemic: Students or workers?. J Clin Nurs. 2020; **29**(17-18): 3115-6. doi: 10.1111/jocn.15317.
38. United Nations Educational, Scientific and Cultural Organization (UNESCO). Education: From disruption to recovery**.** Available on: https://en.unesco.org/covid19/educationresponse [Last accessed: 2021 July 21].
39. Zerwic JJ, Montgomery LA, Dawson C, Dolter

KJ, Stineman A. Planning and implementing a practice/academic partnership during COVID-19. J Prof Nurs. 2021; **37**(1): 24-8. doi: 10.1016/j.profnurs.2020.11.007.
40. Reebals C, Wood T, Markaki A. Transition to Practice for New Nurse Graduates: Barriers and Mitigating Strategies. West J Nurs Res. 2021;193945921997925. doi: 10.1177/0193945921997925. Epub 2021 Mar 16.
41. Van Camp J, Chappy S. The Effectiveness of Nurse Residency Programs on Retention: A Systematic Review. AORN J. 2017; **106**(2): 128-44. doi: 10.1016/j.aorn.2017.06.003.
42. Hayden JK, Smiley RA, Alexander, M, Kardong-Edgren S, Jeffries PR. The NCSBN national simulation study: a longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. J Nurs Regulat. 2014; **5**(2): S3-S40. https://doi.org/10.1016/S2155-8256(15)30062-4.
43. Hanshaw SL, Dickerson SS. High fidelity simulation evaluation studies in nursing education: A review of the literature. Nurse Educ Pract. 2020; **46**: 102818. doi: 10.1016/j.nepr.2020.102818.
44. Gaffney MK, Chargualaf KA, Ghosh S. COVID-19 Disruption of Nursing Education and the Effects on Students' Academic and Professional Confidence. Nurse Educ. 2021; **46**(2): 76-81. doi: 10.1097/NNE.0000000000000986.
45. Collard SS, Scammell J, Tee S. Closing the gap on nurse retention: A scoping review of implications for undergraduate education. Nurse Educ Today. 2020; **84**: 104253. doi:10.1016/j.nedt.2019.104253.

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