



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Undergraduate nursing students' perceptions on nursing education during the 2020 COVID-19 pandemic: A national sample

Alexandra Michel, PhD, CNM, FACNM^a, Nicole Ryan, BSN, RN^a,
Deborah Mattheus, PhD, NP^a, Amelia Knopf, PhD, MPH, RN^b,
Nadia N. Abuelezam, ScD^c, Kelly Stamp, PhD, NP, FAAN^d, Sandra Branson, PhD, RN^e,
Barbara Hekel, PhD, MPH, RN^e, Holly B. Fontenot, PhD, NP, FAAN^{a,*}

^aUniversity of Hawaii at Manoa, School of Nursing & Dental Hygiene, Honolulu, HI

^bIndiana University, School of Nursing, Department of Community and Health Services, Indianapolis, IN

^cBoston College, Connell School of Nursing, Chestnut Hill, MA

^dUniversity of North Carolina at Greensboro, School of Nursing, Greensboro, NC

^eCizik School of Nursing at The University of Texas Health Sciences Center at Houston (UTHealth), Houston, TX

ARTICLE INFO

Article history:

Received 3 March 2021

Received in revised form

14 April 2021

Accepted 2 May 2021

Available online May 11, 2021.

Keywords:

Nursing

Nursing students

Education

COVID-19

Pandemic

Workforce

ABSTRACT

Background: In 2020, nursing educational programs were abruptly interrupted and largely moved online due to the COVID-19 pandemic.

Purpose: To explore nursing students' perspectives about the effects of the pandemic on their education and intention to join the nursing workforce.

Methods: Undergraduate nursing students from 5 universities across 5 United States regions were invited to participate in an online survey to elicit both quantitative and qualitative data.

Findings: The final sample included quantitative data on 772 students and qualitative data on 540 students. Largely (65.1%), students reported that the pandemic strengthened their desire to become a nurse; only 11% had considered withdrawing from school. Qualitatively, students described the effect of the pandemic on their psychosocial wellbeing, adjustment to online learning, and challenges to clinical experiences.

Conclusion: Findings highlighted the need to develop emergency education preparedness plans that address student wellbeing and novel collaborative partnerships between schools and clinical partners.

Cite this article: Michel, A., Ryan, N., Mattheus, D., Knopf, A., Abuelezam, N.N., Stamp, K., Branson, S., Hekel, B., & Fontenot, H.B. (2021, September/October). Undergraduate nursing students' perceptions on nursing education during the 2020 COVID-19 pandemic: A national sample. *Nurs Outlook*, 69(5), 903–912. <https://doi.org/10.1016/j.outlook.2021.05.004>

*Corresponding author: Holly B. Fontenot; University of Hawaii at Manoa, School of Nursing & Dental Hygiene; 2528 McCarthy Mall, Webster Hall 412, Honolulu, HI 96822.

E-mail address: hfont@hawaii.edu (H.B. Fontenot).

0029-6554/\$ - see front matter © 2021 Elsevier Inc. All rights reserved.

<https://doi.org/10.1016/j.outlook.2021.05.004>

Background

In March 2020, the World Health Organization declared SARS-CoV-2 (COVID-19) a pandemic. Subsequently, as COVID-19 spread across the United States (US) colleges and universities began suspending in-person learning nationwide (Meckler, 2020). The abrupt move to what has been coined “Emergency Remote Teaching” disrupted teaching and learning throughout the world and at all education levels (Hodges, Moore, Locke, Trust & Bond, 2020). Particularly hard hit were academic programs in health sciences that rely heavily on students’ clinical training in order to prepare them as future health care providers. The shift to online learning was accompanied by hospitals and other clinical practice sites limiting nursing students’ access to in-person clinical experiences (National Council of State Boards of Nursing [NCSBN], 2020; National Education Progression in Nursing Collaborative [NEPIN], 2020).

In the US, nursing education is built on a framework of didactic and clinical experiences (American Association of Colleges of Nursing [AACN], 2008). Nursing regulatory bodies throughout the country set standards on the type and quantity of experiences required for students to successfully complete their specific nursing program (NCSBN, 2020). Thus, limiting nursing students’ access to clinical sites and in-person experiences threatens these students’ ability to complete their nursing education in a timely fashion.

There are approximately 1,000 baccalaureate nursing programs in the US (AACN, 2021). Of those, approximately 25% are traditional pre-licensure baccalaureate programs, while the remaining programs are meant for Registered Nurses (RN) to obtain a bachelor’s degree or higher (Vecchia, 2017). In 2019, the US added 252,311 new RNs to the US nursing workforce (NCSBN, 2019). However, it has been suggested that this is insufficient to address projected shortages which in large parts are caused by older nurses retiring (Buerhaus, Skinner, Auerbach & Staiger, 2017; Spurlock, 2020). Given the projected retirement rates, it is important to understand if the pandemic is also a barrier to the education and production of new nurses.

There have been recent reports that describe issues related to learning logistics, stress, anxiety, and coping capabilities among nursing students internationally (Aslan & Pekince, 2020; Huang et al., 2020; Savitsky, Findling, Erel, & Hendel, 2020, Singh et al., 2021; Subedi, Nayaju, Shah, & Sha, 2020). However, there is a dearth of research regarding the pandemic’s effect on US nursing students and their intentions to complete their education and join the nursing workforce. Therefore, the purpose of this national study was to (a) explore how the current pandemic affects nursing students’ intentions to complete their education and join the nursing workforce and (b) assess nursing students’ perspectives about the effects of the pandemic on their education. Findings will inform interventions to address these concerns and

develop educational strategies (contingencies and readiness plans) for effective and sustainable nursing education during times of crisis.

Methods

Design and Data Collection

In December 2020, undergraduate nursing students from universities in five different US regions (Northeast, Southeast, Southwest, Midwest, and West) were invited to participate in a cross-sectional online survey. All participating universities had provided traditional face-to-face undergraduate nursing education, but involuntarily transitioned to some form of online education during the pandemic. A site coordinator from each university was responsible for sending standardized emails to their student email distribution list. A total of 3 survey invitation emails were sent following Dillman’s Method (Dillman, 2007). Each email contained a link to the study’s webpage containing details about the study, informed consent procedures, and an assessment of eligibility. Students that were eligible and consented to participate were then directed to complete a 15-minute Research Electronic Data Capture (REDCap) survey. Participation was voluntary and all study data were collected anonymously. Individual universities were blinded to the rate of student participation. Participants were offered a \$5.00 Starbucks gift card as remuneration for their time and this data were kept confidential and separate from study data. The study was approved as exempt by the University of Hawaii at Manoa Institutional Review Board, November 20, 2020.

Sample

The sample consisted of undergraduate nursing students from two private and 3 public universities. Enrollment at each university ranged from 150 to 795 students. Students were eligible to participate if they were: (a) currently enrolled as an undergraduate nursing student, (b) 18 years of age or older, and (c) able to read and understand English. Students enrolled in graduate programs were excluded from this study.

Measure

The survey collected basic demographic information (e.g., age, gender, race, year in school), data on the effect the pandemic may have had on students’ desire to become a nurse, and if they had considered withdrawing from nursing school since the start of the pandemic. The survey also assessed if they were employed in health care outside of nursing school and if their parents were health care providers (see Table 1). Students were asked to answer one qualitative (text-based) question, “Starting Fall

2020 academic year, due to the ongoing pandemic, please list any/all things that have made it difficult or things that have helped for you to feel prepared academically and clinically to enter the nursing workforce after graduation.”

Analysis

Descriptive quantitative data were downloaded from REDCap and managed in Microsoft Excel. Analyses were conducted in IBM SPSS Statistics (Version 26.0). The sample was described using frequency distribution and percentages.

The qualitative data were analyzed using conventional content analysis (Cresswell, 2007). Qualitative data were downloaded from REDCap and managed in Microsoft Word. Data were analyzed using the following systematic steps: (a) Three investigators (AM, NR, HF) read and re-read the text data for overall orientation, (b) two investigators (AM, NR) formulated initial codes, (c) the entire team met to review codes, resolve inter-coder discrepancies, and reexamine the data, and (d) codes were then combined into broader categories. Then the entire team met again to review and develop the final themes.

Findings

Sample Characteristics

A total of 868 students opened the online survey, 866 gave consent, and 800 met eligibility criteria. The final sample included 772 students for the quantitative analysis of demographic data. The responses of 28 students were eliminated from the analysis for failing to answer the majority of questions. Out of the final sample, 540 (69.9%) students answered the qualitative question.

Participants predominantly identified as White (69.2%), female (87.6%), were seniors in nursing school (35.4%), and were 18 to 23 years of age (78.8%). Of the 5 US regions, 19.4% were enrolled in a university in the Northeast, 11.5% in the Southeast, 35.6% in the Midwest, 26.0% in the Southwest, and 7.4% in the West. Over one-third of students (36.4%) were employed in health care outside of school and 40.9% had a family member employed as a health care provider. Approximately two-thirds (65.1%) reported that the pandemic had strengthened their desire to become a nurse; however, 11% reported considering withdrawing from nursing school due to the pandemic. The primary reasons for considering withdrawal included: family or other economic strain (i.e., inability to pay for school) and unhappiness related to limited clinical educational experiences (see Table 1).

Table 1 – Demographics of National Sample

Demographics (N = 772)	Frequency n (%)
University/ US Region	
Northeast	150 (19.4)
West	57 (7.4)
Midwest	275 (35.6)
Southeast	89 (11.5)
Southwest	201 (26.0)
Identify as	
Female	676 (87.6)
Male	71 (9.2)
Other	4 (0.5)
No response	21 (2.7)
Year in Nursing School	
Freshman	87 (11.6)
Sophomore	132 (17.6)
Junior	230 (30.6)
Senior	266 (35.4)
Other (i.e., part-time)	36 (4.8)
Age	
18 to 23 years	608 (78.8)
24 to 29 years	99 (12.8)
30 and older	65 (8.4)
Race	
White	534 (69.2)
Asian	132 (17.1)
Black	45 (5.8)
NHOPI/Multiracial/Other	61 (7.9)
Ethnicity	
Hispanic	105 (13.6)
Non-Hispanic	633 (82.0)
Prefer not to answer/No response	34 (4.4)
Currently employed in health care	
Yes	272 (35.2)
No	475 (61.5)
No response	25 (3.2)
Family member employed as a health care provider	
Yes	306 (39.6)
No	466 (60.3)
The pandemic has strengthened my desire to become a nurse	
Strongly Disagree	18 (2.3)
Disagree	62 (8.0)
Neither disagree nor agree	176 (22.8)
Agree	209 (27.1)
Strongly Agree	293 (38.0)
No response	14 (1.8)
Have you considered withdrawing from Nursing School due to the pandemic?	
Yes	85 (11.0)
No	673 (87.2)
No response	14 (1.8)
Of those who said yes, reasons for considering withdrawing included**	
Family or other economic strain (i.e., inability to pay for school)	33 (38.8)
I am unhappy, because clinical	58 (68.2)
	7 (8.2)

(continued)

Table 1 – (Continued)

Demographics (N = 772)	Frequency n (%)
experiences have been limited	4 (4.7)
I don't want to be a nurse anymore	28 (32.9)
I've had to leave to help care for the health of a family member	
Other	

Note. NHOPI = Native Hawaiian or Pacific Islander; **Select all that apply

Three Emerging Themes

Three major themes emerged in the qualitative analysis: (a) effect of the pandemic on students' psychosocial wellbeing, (b) students' difficult adjustment to online learning during the pandemic, and (c) challenges to obtaining clinical experience and developing nursing skills. Qualitative results were consistent across all US regions.

Effect of the Pandemic on Students' Psychosocial Wellbeing

Students commented on how the pandemic has led to major stressors in their lives including financial concerns, the need to relocate, and/or lack of public transportation. Blurred lines between home and school environments and family commitments, such as taking care of children and their schoolwork, were noted stressors. Students also felt alone and isolated from peers which affected them personally and academically. One noted, "Not being able to meet freely with other students has been the worst effect of the pandemic. Not only has this added to feelings of isolation, but losing the benefits of group studying has made school more difficult." While some students commented on how difficult it was to connect with classmates and instructors using web-based applications, one student outlined that they specifically used the internet to virtually connect with other students and how that "[...] expanded my collaboration skills."

Constant changes in school schedules and school's clinical guidelines caused anxiety among some students. One stated: "There is so much uncertainty [...] I feel any day my school could go 100% online or we could be removed from clinical due to rising [COVID-19] cases. This has added significant stress and hindered my ability to learn." Students commented how communication from the school administration and faculty helped them navigate their current situation and alleviated anxiety, for example: "Communication between faculty and students, organization and updates are helpful."

Students also felt that having to adjust to the challenges of a pandemic taught them to be more flexible and open to new and unfamiliar situations. This came

with an understanding that as new nurses they will continue to learn skills once they enter the workforce. One noted, "What has helped is being reassured by personal friends and family who are working in health care, that most of my skill set will be learned on the job anyways." For some, watching "[...] badass nurses [...]" inspired them and underscored their career choice. One stated, "It has been helpful seeing nurses step up on the front lines during this pandemic, making me see that this is the field I want to be in."

Opinions about how the pandemic represented a threat to their physical health varied among nursing students. Some appreciated the school advocating for them to access COVID-19 testing, N95 fit testing, and a more general emphasis on personal protective equipment (PPE), while others voiced concerns and believed that it was the school's responsibility to supply them with the required testing and PPE. One student noted how schools missed a potential opportunity, "I would like to hear more from my professors on information regarding the pandemic, vaccines, and nursing; how the pandemic is affecting current nurses and how we should prepare." Students voiced concerns about being exposed to COVID-19 and potentially infecting patients and vulnerable family members. One stated, "My fear of potentially not knowing that I have the virus and bringing it to the hospital scared me every day." There was less of a concern for their own physical health.

Students' Difficult Adjustment to Online Learning During the Pandemic

Online learning posed concerns and required adjustments. Students commented both on their learning environment, as well as their ability to learn adequately online. Some students reported a lack of reliable internet access at home with limited or no access to libraries, computer labs, or other public internet access points. For some students with home internet access, there was the challenge of having to share that internet access with other family members who were also working or learning from home which was compounded by a lack of adequate study space and a disruptive home environment.

Many students voiced concern that their online education was inadequate. One commented, "I do not learn well in an online school environment, which is why I did not sign up for one. Being online has completely affected my GPA [Grade Point Average] which will probably result in not getting a job that I want." Students also expressed difficulties learning and retaining information when studying at home alone. Students felt that they had to teach themselves certain content and how it was a challenge to have courses online. One expressed, "I feel that I am missing a major component of learning the information by not being able to interact in person. It is difficult to stay engaged with the information and find motivation to study and complete assignments." Students also described being overwhelmed by the amount of work

they were asked to complete online. One stated, “[...] too much for me to handle. Too many assignments needed to be submitted and because there was no break, it was a constant ongoing process of studying, [doing] assignments, and clinical.” Another commented “I feel as though I am not truly learning content. I am simply completing assignments because my workload has doubled since starting virtual learning.” The feeling of being overwhelmed was influenced by a combination of course organization, communication, personal study style, as well as a lack of time management. One student outlined, “having to take classes that were not meant to be online was hard [because] there was little to almost no communication with professors about how to go about a big project. Instead we had to figure it out ourselves.”

While many students praised their faculty for going the extra mile and advocating for their needs, others criticized them for being ill-prepared to teach in an online environment, unresponsive to requests for help, and challenging to reach. However, students did not articulate how faculty and schools should provide a successful online education program. While there was a general dislike of online education, there was not one particular activity that stood out more than another. Despite all the critique, some students outlined the advantages of online schooling to include an increase of available study time, no commute, money saved on parking and gas, being able to take care of children and other family members, and the ability to continue their education.

Challenges to Obtaining Clinical Experience and Developing Nursing Skills. Students overwhelmingly voiced concerns about their ability to learn the hands-on clinical skills they deemed necessary to be ready to enter the workforce. One student outlined that “[it would be] very difficult to get a job as a new graduate [if she was known] as a nurse who did not get clinical during nursing school.”

Students commented on using a virtual environment and online simulation in lieu of direct patient care and shared their feelings about their decreased access to patients. Students strongly voiced the need for in-person clinical with one stating, “I am a student that needs to use my hands to learn, so remote labs have been a challenge for me.” Another noted, “Losing in-person clinical time and learning health assessment in a completely virtual setting has made me feel incredibly underprepared when it comes to many basic nursing skills [...]”

Students felt that their lack of clinical experiences may create barriers to finding nursing positions as new graduates. One student outlined that they were planning to use their clinical experience to “[...] make my decision in what unit I really enjoyed working in.” In-person and virtual simulations, though well received by some, did not fill the void created by canceling in-person clinical. One commented, “not being able to practice assessments on actual people has made it difficult. I have had to practice on pillows or

stuffed animals.” Another stated, “while simulated clinical experiences get us the clinical hours we need to graduate they are no real substitute for the wonderful learning experience of in-person clinical rotations.”

Students expressed that they deemed in-person clinical time as an essential component of their education. Several expressed how the hospital experience provided the opportunity for them to see what their jobs will be like after graduation and one stated, “all the book learning in the world will not change the necessity of hands-on experience.” Similarly, students who worked part-time at the hospital believed this experience was a larger benefit now than ever before, “working part time outside of school in a clinical environment has allowed me to feel confident entering the workforce during a time when a clinical education was compromised due to pandemic precautions.”

Discussion

This is the first study to assess US nursing students' perception on how the COVID-19 pandemic affected their nursing education and their continued desire to become a nurse and enter the nursing workforce. While 65.1% indicated that the pandemic strengthened their desire to become a nurse, 11% indicated that they were contemplating withdrawing from nursing school, largely due to unhappiness with limited clinical experiences and/or family/economic strain. A very small minority (approximately 1.0% of the total sample) indicated that they did not want to become a nurse anymore. Qualitatively, students identified how stressors related to the pandemic affected their psychosocial wellbeing and created difficulties in learning, plus they voiced frustrations related to a lack of in-person clinical educational experiences.

The participants noted barriers to learning that included feeling less engaged with their education, lack of communication from faculty and school administration, increased workloads, social and academic isolation, anxiety about learning, and several logistical issues (e.g., lack of reliable access to computers, internet, and necessary software to complete their schoolwork). This is consistent with national and international reports, which have noted similar barriers to learning (Aslan & Pekince, 2020; Bawa, 2020; Huang et al., 2020; Lovric et al., 2020, Savitsky et al., 2020, Subedi et al., 2020; Texas Board of Nursing, 2020; Ulenaers, Grosemans, Schrooten, & Bergs, 2021). Similar to reports among medical and pharmacy students, participants were concerned about the lack of in-person clinical experiences that they deemed necessary to successfully enter the workforce (Bączek, Zagańczyk-Bączek, Szpinger, Jaroszyński & Woźakowska-Kaplon, 2020; Farooq, Rathore & Mansoor, 2020, Khalil et al. 2020, Shawaqfeh et al., 2020, Singh et al. 2021, Ulenaers et al., 2021).

In the US, schools of nursing are tasked with educating future nurses and therefore play a critical role in supporting the nursing workforce with qualified graduates. Nursing education is supported via collaborative agreements between institutions of higher learning and health care systems (e.g., hospitals and community health centers) that grant students access to patient care and clinical experiences. Unfortunately for schools of nursing and currently enrolled students, this pandemic has highlighted a flaw in the nursing education process, as well as schools of nursing's educational emergency preparedness as evidenced by a somewhat haphazard move to emergency remote teaching and removal of students from in-person clinical experiences. There has been an ineffective transfer of courses developed explicitly for face-to-face instruction to the online environment (Hodges et al., 2020). Further, nursing in-person clinical education was canceled to a large degree across the US, as schools of nursing and health care systems were unprepared for how to proceed collaboratively during a national health emergency.

It is difficult to adequately plan for disasters. However, the students' experiences over this last year makes it abundantly clear that schools of nursing have to properly plan for future temporary and/or emergency shifts to online learning (Federal Emergency Management Agency, 2013). This includes addressing how a future long-term disaster may affect nursing students, clinical placements, collaborative clinical agreements, and regulatory requirements associated with educating nursing students.

Future planning should address course development (Fain et al., 2020; Hodges et al., 2020) to allow for equitable quality in the delivery of both face-to-face and online course content (Hodges, 2020). Faculty comfort and competence in teaching either face-to-face or online is essential, noting that mechanism of delivery will need to allow for adjustments in faculty-student workload, communication strategies between administrators, faculty, and students, and most importantly flexibility regarding assignments, assessments, and timelines (Schlesselman, 2020; Taha, Abdalla, Wadi, & Khalafalla, 2020). Approaches to decrease student stress noted in the literature include: check-in with students at the beginning and end of class, recording lectures for later viewing, flexibility in assignment deadlines, offering educational support services, and decreasing the amount of required readings and assignments (Babatunde & Soykan, 2020; Flaherty, 2020; Lederman, 2020; McMurtrie, 2021; Rahim, 2020).

Table 2

Future research should evaluate the effectiveness of emergency remote education and student adaptation to online methods for learning. It is necessary to ensure that educational activities align with students' identified needs and priorities (Bozkurt & Sharma, 2020; Fain et al., 2020), as well as university, state, and national guidelines for nursing education. Simulation

has been identified as an effective method to practice clinical skills, link didactics to practical skills, and increase student confidence (Brien, Charette & Goudreau, 2017; Larue et al., 2015; McGaghie et al., 2011). Prior to the pandemic, Hayden et al. (2014) reported that up to 50% of clinical hours could be replaced with simulation without negative impact on NCLEX pass rates and early nursing career performance. During the pandemic state nursing regulatory bodies permitted schools of nursing to substitute required clinical experiences with simulation experiences (NCSBN, 2020).

It is unclear if simply replacing face-to-face clinical time with simulation hours will meet nursing student's needs. Shin Park, and Kim, (2015) discuss that type of simulation (i.e., high fidelity, medium fidelity, standardized patient, etc.) may affect how successful simulation training is when teaching new skills. In our study, students appreciated being able to fulfill clinical requirements by completing simulations; however, they clearly preferred direct patient care experiences over simulations. Hence, simulations should preferably not replace, but rather enhance clinical experiences, and practices in the delivery of online simulations should be explored. Still, schools of nursing have to balance the students' desire for face-to-face didactics and clinical experiences with local public health demands as the health and welfare of students, staff, and the local population has to be ensured (AACN, 2020; Centers for Disease Control and Prevention, 2020).

Barriers to nursing education, like limiting and removing nursing students from clinical placements, run counter to any attempts to mitigate the current nursing shortage (Bogossian et al., 2020; NEPIN, 2020). Moving forward schools of nursing, partner health care organizations, and regulatory bodies need to examine creative partnerships and strategies to facilitate learning during times of crisis/emergency. In this study, about one-third of the students were already employed by a health care organization outside of school. These students noted feeling better prepared to enter the nursing workforce after graduation. Exploring nurse externship models for education and models where students are rapidly credentialed and assigned to hospital units (working under faculty and/or staff supervision) in response to temporary staff shortages as seen in some areas of the US and internationally and endorsed by AACN should be explored (AACN, 2020; Bogossian et al., 2020; Haslam, 2021; Rasmussen, Sperling, Poulson, Emerson & Andersen, 2020; Texas Board of Nursing, 2020).

Findings from this study should be viewed in terms of its limitations. We utilized a cross-sectional survey and a singular text-based qualitative question to elicit nursing students' perspectives and intentions. Participants were predominantly White, in their junior and senior year of education, and were not equally distributed across the 5 US regions. These factors limited generalizability. However, over 500 students provided

Table 2 – Additional Illustrative Quotes**Theme 1: Effect of the Pandemic on Students' Psychosocial Wellbeing**

Having an online environment made some things more flexible and was stress-reducing in the sense that I could do things in the comfort of my own home and reduce travel time.

The nursing school's inability to compromise, threats of late graduation have made it difficult to focus.

The pandemic has made it very difficult for me to make a consistent amount of money to pay for gas, school, and other important expenses.

Needing to move twice during this pandemic due to quarantine restrictions.

This has caused anxiety regarding the uncertainty of the completion of my education and feeling prepared entering the workforce.

Also, the general mental health [in] my family is at an all time low because of the length of the pandemic.

Constant changing of school schedule makes it near impossible to hold down a rotating shift type work schedule outside of school.

... not being able to use public transportation.

Not being around other students and having to conquer everything alone, group projects were very difficult due to inability to meet, feeling as though there was a lack of a support system in place.

Not having that feeling of connectedness and community with professors and staff.

It was difficult because of the isolation[.] I feel like I cannot make as strong a bond as I would like to have with my cohort and my nursing instructors.

There is no fun in online classes. It hurts team morale.

Stress of excessively blurred work/home boundaries and little to no work life balance.

One of the main things that has made it difficult is having my kids home. I must complete their school work and lessons before accomplishing any tasks of mine. I still feel prepared, but being pulled in every different direction while trying to accomplish a normal workload for school and work is difficult

Attending nursing school in the middle of a pandemic has made me realize how valuable nurses are to the health care system and has made me even more excited to become part of it. I feel more prepared to take the necessary precautions in order to [keep] myself and my patients safe.

I've considered taking a break from school until this is over because I want to be I'm fully prepared to be a nurse when I graduate

Transparency on the state of the school and what is required of us during the changing times has helped.

Experiencing a pandemic during school has shown me the importance of flexibility and working together to accomplish a goal.

I think watching nurses and staff adapt to new regulations during the pandemic has been really helpful academically and clinically, because adapting practice to current, evidence-based findings is important.

Sitting in a classroom that is NOT socially distanced, 6 feet all around me. Unlike other majors NOT having the opportunity or option to decline in-person classes for not feeling safe

It has been difficult and nerve-wracking at the possibility of spreading COVID to my non-nursing roommates or getting sick myself and having to quarantine and miss school and clinical.

The administration in the nursing school advocating for fit testing for PPE and more COVID testing for nursing student

I am just taking it one day at a time ad one course at a time

I am concerned that I do not have the skills or the confidence to be a successful nurse.

Theme 2: Students' Difficult Adjustment to Online Learning during the pandemic

What has helped me in the academic year is to do school activities in my own time. However, doing things on my own time was hard to get used to as it often leads to procrastination. It was difficult getting rid of the accountability of attending lectures in school and getting hands-on lab activities

Difficult: working from home (lack of hands on), sharing work space with family, being home caused lack of concentration/motivation, long hours staring at screen, zoom fatigue

I think trying to study at home was challenging because there were so many distractions. Online schooling has made it difficult to study at home with a disruptive environment.

Moving online has been very overwhelming and stressful, trying to teach myself foundational nursing concepts really took a toll on me.

Something that does help, though, is that lectures are always available online to view any time—it is much easier to take notes when it is all online

It has been difficult to feel like I'm retaining as much information as possible [.] To] feel prepared [I] work ahead by taking my notes before we have class.

It has been incredibly difficult learning to adjust to online coursework and the lack of peer support in person that I relied on when I started my nursing school experience.

It's been difficult because I like to study on campus with study groups or friends because it's easier for me to concentrate and study that way. I would like to be able to study nursing material with friends to be sure that I understand something in that moment.

Online nursing school has been a HOT mess. The professors are struggling and it shows. I've been so overwhelmed with the amount of useless busy work thrown at us. I literally taught myself this semester and [I]m very concerned about how prepared [I]ll be for the NCLEX next year.

I'm also just not an online learner and with this format, I felt unmotivated to go the extra mile to learn. I was only doing assignments for the grade and not really understanding.

Beneficial: using websites that, although are not as good as being in-person, educated us and tried to make our online education as close to in-person as possible (EHR go, ATI, etc.)

I find online course formats to be very difficult to use as a nursing student. Being in class is very important to my understanding of subjects, and I feel as though online school has no structure (making it hard to keep up with all your work)

It is harder to keep up with all assignments and tests when teachers organize things so differently online and there are reduced/no in-person reminders.

I guess keeping up with dates and staying organized helped me get through the semester.

(continued)

Being completely [online] taught me discipline but also procrastination because I can "go to class" on my own time. It has been difficult to navigate the new curriculum. I do not enjoy taking classes remotely and find it far less engaging. I like how we still have in-person labs but teachers have emphasized that we are missing out on a lot of things. Online learning has been difficult. This is due to the reduction in teaching by faculty and increase in autonomy when it comes to learning material. Lack of guidance for assignments and feedback on those assignments is poor. Online schooling for the nursing field makes no sense. - Nurses don't have online work. It's patient based. Video lectures and discussion posts help me feel more prepared academically, since I get to work at my own pace. While I never considered withdrawing, I did think about how online nursing school was going to work. I think, for the most part, schools are doing the best they can in the situation.

Theme 3: Challenges to obtaining clinical experiences and developing nursing skills

Taking rigorous nursing classes online has taken away the opportunity for me to learn hands-on skills that are so desperately needed in the medical field.

Not having in-person clinicals was terrible. It made me so nervous when we finally did. I think you learn best in person.

I feel more prepared entering the workforce upon graduation because of my time working in the hospital setting throughout the entire pandemic up to now.

Losing clinical time allowed me to be at home with my dad who was in hospice from cancer and I gained a lot of understanding and respect for home health nurses and technicians. I gained experience caring for a loved one.

Due to limited exposure to clinical settings, I feel like the transition from nursing school to the nursing workforce will be especially challenging for the students required to complete their coursework online.

Online school sucks, and limited clinical experience time I feel like leaves me somewhat unprepared for the real world. Learning nursing assessment at home was the absolute worst.

It has been difficult because our in-person clinical hours have been reduced and we can't do as many things in the hospitals as we would have normally. I sometimes feel like I won't be as prepared to enter the workforce as I would've been without the pandemic.

Virtual clinical is not equivalent to hands on nursing skills.

I [do not] feel prepared at all clinically since the covid-19 pandemic. I have and still am considering taking a leave of absence in order to hopefully receive clinical hours at a later date

Lack of hospital experience make it difficult to get a job as a new grad nursing student.

I think that the reduction in clinical days has definitely had an impact on our education. Having clinical time helps us to see what that particular part in nursing is like, and I feel it has been a disadvantage to us this semester. I also believe that this semester has been hard on all of us nursing students. We have been under extreme stress over the semester.

Things that have made it difficult are reduced clinical hours, limited clinical sites, decreased willingness of patients to let students care for them, and extra paperwork required. Things that have helped are my work experience outside of school and having close friends who are nurses.

Our University has done an exemplary job at keeping us on course with our education. However, the lack of hands on clinical experience has been an obstacle. It has presented challenges, but overall the challenges are welcome, and I choose to implement what I have learned during this pandemic to apply to my nursing practice.

Not having clinicals to reinforce what I am learning in lab.

I was blessed with in-person clinicals, which are key. Clinicals can't be done online. Labs can't be done online. Lectures shouldn't be done online.

Having experience in the clinical setting as a nursing student during the pandemic and feeling confident in my skills and care has really helped me

Lack of clinical experience, no access to the computer lab and lack of skills practice labs due to the pandemic.

My program has supplemented these clinical experiences with some online simulations, as well as in-person simulations at school. I have found that the online simulations (through ATI) have not been very helpful in supplementing the lost clinical time, however, the in-person simulations in our simulation lab have helped.

It has been more difficult interacting with patients because they have declined student[s] or do not want you in the room for extended periods of time.

Due to this lack of in-person clinical training I fear that I will not be as knowledgeable and prepared to become a nurse.

Things that have been difficult is the uncertainty surrounding clinical.

I love online learning. I work in a local specialty hospital and online learning gave me more time to work and get experience in a specialty that isn't taught in nursing school. My ATI scores have also dramatically increased since I learn WAY more on the job at work than in nursing school. I feel more prepared to enter the workforce because I have made lots of connections in the specific hospital and unit I want to work at after school.

I'm lucky enough to be able to attend skills labs and have clinical semester. I feel like being unable to learn in person and interact with peers is hindering my ability to learn.

I think that getting experience in the hospital is still the best way to gain an understanding of what my job will be when I graduate.

insightful qualitative comments on how the pandemic affected their education and their perspectives were consistent across the nation. Future research should explore themes identified in this study further, using a robust qualitative methodology (e.g., focus groups). This would allow for the expansion of ideas, discourse, and clarifying of thoughts, attitudes, and opinion.

Conclusion

Findings from this study indicate that the pandemic has largely strengthened students' desire to become nurses; however, the pandemic and subsequent transition to emergency remote teaching has negatively affected students' overall wellbeing, created

difficulties in learning, and highlighted challenges to obtain clinical experiences and develop nursing skills. Schools of nursing need to develop effective emergency plans that allow for seamless transfers of courses from in-person to an online environment and vice versa. These plans need to address the needs of the nursing students, schools of nursing, and regulatory bodies requirements for graduation and licensure. Future research is needed to determine the effectiveness of online simulation and alternative ways of providing online clinical education. Novel collaborative partnerships between schools of nursing and health care organizations are needed to ensure the nation is producing an adequate supply of new nurses to offset the pending workforce shortage.

Funding source

This work was supported by the Frances A. Matsuda Chair, University of Hawaii at Manoa School of Nursing.

Research data for this article

The datasets used and/or analyses during the current study are available from the corresponding author on reasonable request.

Author contributions

AM, NR, DM, and HBF have all made substantial contributions to the conception and design of the work, as well as the acquisition, analysis, and interpretation of the data. These authors have drafted the work and substantively revised it. AK, NNA, KS, SB, and BH made substantial contribution to the design of the work, acquisition of the data, and have made substantive revisions to the work. All authors approve the submitted versions and agree both to be personally accountable for the author's own contributions and to ensure that questions related to the related to accuracy or integrity were resolved.

REFERENCES

- American Association of Colleges of Nursing (2008). *The essentials of baccalaureate education for professional nursing practice*. Retrieved from: <https://www.aacnnursing.org/portals/42/publications/baccessentials08.pdf>. Accessed 3/3/2021
- American Association of Colleges of Nursing (2020, July 28). *Considerations for reopening of U.S. schools of nursing during COVID-19* (Position Statement). Retrieved from: <https://www.aacnnursing.org/Portals/42/News/AACN-Guidance-Reopening-Schools-COVID-19-July-2020.pdf>. Accessed 3/3/2021
- American Association of Colleges of Nursing (2021). *Baccalaureate education*. Retrieved from: <https://www.aacnnursing.org/Nursing-Education-Programs/Baccalaureate-Education>. Accessed 3/3/2021
- Aslan, H., & Pekince, H. (2020). Nursing students' views on the COVID-19 pandemic and their perceived stress levels. *Perspectives in Psychiatric Care*. Advance Online Publication. doi:10.1111/ppc.12597.
- Bączek, M., Zagańczyk-Bączek, M., Szpinger, M., Jaroszyński, A., & Wozakowska-Kaplon, B. (2020). Students' perception of online learning during the COVID-19 pandemic: a survey study of Polish medical students. *Medicine*, 100(7), 1–6, doi:10.1016/MD.0000000000024821.
- Bawa, P. (2020). Learning in the age of SARS-COV-2: a quantitative study of learners' performance in the age of emergency remote teaching. *Computers and Educ Open*, 1, doi:10.1016/j.caeo.2020.100016 Article 100016.
- Babatunde, Adedoyin, O., & Soykan, E. (2020). Covid-19 pandemic and online learning: the challenges and opportunities. *Interactive Learning Environments*, doi:10.1080/10494820.2020.1813180.
- Bozkurt, A., & Sharma, R. (2020). Emergency remote teaching in a time of global crisis due to corona virus pandemic. *Asian J Distance Education*, 15(1), doi:10.5281/zenodo.3778083 i-vi.
- Bogossian, F., McKenna, L., & Levett-Jones, T. (2020). Mobilizing the nursing student workforce in COVID-19: the value proposition. *Collegian*, 27(2), 147–149, doi:10.1016/j.colegn.2020.04.004.
- Brien, L.-A., Charette, M., & Goudreau, J. (2017). Nursing students' perceptions of the contribution of high-fidelity simulation and clinical placement in a critical care course. *Clin Simulation in Nursing*, 13(9), 436–441, doi:10.1016/j.ecns.2017.05.005.
- Buerhaus, P., Skinner, L., Auerbach, D., & Staiger, D. (2017). Four Challenges Facing the Nursing Workforce in the United States. *J Nursing Regulation*, 8(2), 40–46, doi:10.1016/S2155-8256(17)30097-2.
- Centers for Disease Control and Prevention (2020, 31 Dec). *Considerations for institutions of higher education*. Retrieved from: <https://www.cdc.gov/coronavirus/2019-ncov/community/colleges-universities/considerations.html>. Accessed 3/3/2021
- Creswell, J. (2007). *Qualitative inquiry & research design: choosing among five approaches* (2nd Ed.). Thousand Oaks, CA: Sage Publications.
- Dillman, D. A. (2007). *Mail and internet surveys: The Tailored Design Method 2007 update with new internet, visual, and mixed-mode guide*. Hoboken, NJ: Wiley.
- Fain, M., Georges, N., Golob Deeb, J., Mathews-Ailsworth, L., Shiang, R., & Smith, P. (2020). Evaluating academia during a pandemic. *The Grace E. Harris Leadership Institute*. Virginia Commonwealth University. Retrieved from https://scholarscompass.vcu.edu/cgi/viewcontent.cgi?article=1064&context=gehli_pubs. Accessed 3/3/2021.
- Farooq, F., Rathore, F., & Mansoor, S. (2020). Challenges of online medical education in Pakistan during COVID-19 pandemic. *J Coll Physicians and Surgeons Pakistan*, 30(6), 67–69, doi:10.29271/jcsp.2020.Supp1.S67.
- Federal Emergency Management Agency (2013). *Guide for developing high quality emergency operations plans for institutions of higher learning*. Retrieved from: https://www.ready.gov/sites/default/files/2020-03/emergency-operations-plans_institution-higher-education.pdf. Accessed 3/3/2021

- Flaherty, C. (2020, 23 April). *Grading for a pandemic*. Retrieved from <https://www.insidehighered.com/news/2020/04/23/how-lenient-or-not-should-professors-be-students-right-now>. Accessed 4/12/2021
- Haslam, M. (2021). What might COVID-19 have taught us about the delivery of nurse education, in a post-COVID-19 world? *Nurse Educ Today*, 97 104707, doi:10.1016/j.nedt.2020.104707.
- Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R. (2014). The NCSBN National Simulation Study: a longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *J Nursing Regulation*, 5(2), doi:10.1016/S2155-8256(15)30062-4 Suppl. S3-S40..
- Hodges, C., Moore, S., Locke, B., Trust, T., & Bond, A. (2020, 27 March). *The difference between emergency remote teaching and online learning*. Retrieved from: <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>. Accessed 3/3/2021
- Huang, L., Lei, W., Xu, F., Liu, H., & Yu, L. (2020). Emotional responses and coping strategies in nurses and nursing students during Covid-19 outbreak: a comparative study. *PLoS*, 15(8) e0237303, doi:10.1371/journal.pone.0237303.
- Khalil, R., Mansour, A., Fadda, W., Almisnid, K., Aldamegh, M., Al-Nafeesah, A., Alkhalifah, A., & Al-Wutayd, O. (2020). The sudden transition to synchronized online learning during the COVID-19 pandemic in Saudi Arabia: a qualitative study exploring medical students' perspectives. *BMC Med Educ*, 20, 285, doi:10.1186/s12909-020-02208-z.
- Larue, C., Pepin, J., & Allard, E. (2015). Simulation in preparation or substitution for clinical placement. A systematic review of the literature. *J Educ and Practice*, 5(9), 132-140, doi:10.5430/jnep.v5n9p132.
- Lederman, D. (2020, 22 April). *How teaching changed in the (forced) shift to remote learning*. Retrieved from <https://www.insidehighered.com/digital-learning/article/2020/04/22/how-professors-changed-their-teaching-springs-shift-remote>. Accessed 4/12/2021
- Lovrić, R., Farčić, N., Mikšć, Š., & Včev, A. (2020). Studying during the COVID-19 pandemic: a qualitative inductive content analysis of nursing students' perceptions and experiences. *Educ Sciences*, 10(188), 1-18, doi:10.3390/educsci10070188.
- McGaghie, W., Issenberg, S., Cohen, E., Barsuk, J., & Wayne, D. (2011). Does simulation-based medical education with deliberate practice yield better results than traditional clinical education? A meta-analysis comparative review of the evidence. *Acad Medicine*, 86(6), 706-711 <https://doi.org/10.1097/ACM.0b013e318217e119>.
- McMurtrie, B. (2021). Teaching after the pandemic. What innovations are worth keeping? *The Chronicles of Higher Education*. Retrieved from: <https://www.chronicle.com/newsletter/teaching/2021-04-01>.
- Meckler, L. (2020). Seven states, D.C. order all schools closed in effort to prevent spread of covid-19. *The Washington Post* Retrieved from: https://www.washingtonpost.com/local/education/ohio-maryland-order-all-schools-closed-in-effort-to-prevent-spread-of-covid-19/2020/03/12/e4078b3a-6499-11ea-845d-e35b0234b136_story.html. Accessed 3/3/2021.
- National Council of State Boards of Nursing (2019). 2019 NCLEX pass rate. Retrieved from: <https://www.ncsbn.org/13495.htm>. Accessed 3/3/2021
- National Council of State Boards of Nursing (2020, June 22). *Changes in education requirements for nursing programs during COVID-19*. Retrieved from: https://www.ncsbn.org/Education-Requirement-Changes_COVID-19.pdf. Accessed 3/3/2021
- National Education Progression In Nursing Collaborative (2020, March 30). *Innovations in nursing education: recommendations in response to the COVID-19 pandemic* (Position Paper). Retrieved from: <https://nepincollaborative.org/wp-content/uploads/2020/08/Nursing-Education-and-COVID-Pandemic-March-30-2020-FINAL.pdf>. Accessed 3/3/2021
- Rahim, A. F. A. (2020). Guidelines for online assessment in emergency remote teaching during the COVID-19 pandemic. *Educ in Med J*, 12(2), 59-68, doi:10.21315/eimj2020/12.2.6.
- Rasmussen, S., Sperling, P., Poulson, M., Emerson, J., & Andersen, S. (2020). Medical students for health-care staff shortages during the COVID-19 pandemic. *Lancet*, 395, e79-e80, doi:10.1016/S0140-6736(20)30923-5 (10234).
- Savitsky, B., Findling, Y., Erel, A., & Hendel, T. (2020). Anxiety and coping strategies among nursing students during the covid-19 pandemic. *Nurse Education in Practice*, 46 e102809, doi:10.1016/j.nepr.2020.102809.
- Schlesselman, L. (2020). Perspective from a teaching and learning center during emergency remote teaching. *Am J of Pharmaceutical Educ*, 84(8), 8142, doi:10.5688/ajpe8142.
- Singh, H. K., Joshi, A., Malepati, R. N., Najeeb, S., Balakrishna, P., Pannervelam, N. K., Singh, Y. K., & Ganne, P. (2021). A survey of e-learning methods in nursing and medical education during COVID-19 pandemic in India. *Nurse Educ Today*, 99 104796, doi:10.1016/j.nedt.2021.104796.
- Shawaqfeh, M., Al Bekairy, A., Al-Azayzih, A., Alkatheri, A., Qandil, A., Obaidat, A., Harbi, S., & Muflih, S. (2020). Pharmacy students perceptions of their distance online learning experience during the COVID-19 pandemic: a cross-sectional survey study. *J Med Educ and Curricular Devel*, 7, 1-9, doi:10.1177/2382120520963039.
- Shin, S., Park, J.-H., & Kim, J.-H. (2015). Effectiveness of patient simulation in nursing education: meta-analysis. *Nurse Educ Today*, 35(1), 176-182, doi:10.1016/j.nedt.2014.09.009.
- Spurlock, D. (2020). The nursing shortage and the future of nursing education is in our hands. *The J Nursing Educ*, 59 (6), 303-304, doi:10.3928/01484834-20200520-01.
- Subedi, S., Nayaju, S., Subedi, S., Shah, S., & Sha, J. (2020). Impact of e-learning during COVID-19 pandemic among nursing students and teachers of Nepal. *International J Science and Healthcare Res*, 5(3), 68-76.
- Taha, M., Abdalla, M., Wadi, M., & Khalafalla, H. (2020). Curriculum delivery in medical education during an emergency. A guide based on the responses to the COVID-19 pandemic. *MedEdPublish*, 9(1), 69, doi:10.15694/mep.2020.000069.1.
- Texas Board of Nursing. (2020). *Effects of COVID-19 on nursing education in Texas*. *Texas Board of Nursing Bulletin* Retrieved from: https://www.bon.texas.gov/pdfs/newsletter_pdfs/2020/July%202020%20Bulletin%20Web.pdf. Accessed 3/3/2021.
- Vecchia, E. (2017). Learning Experiences of Nursing Students in Online RN-BSN Programs in the United States. *Res in Health Sci*, 2(3), 291-313, doi:10.22158/rhs.v2n3p291.
- Ulenaers, D., Grosemans, J., Schrooten, W., & Bergs, J. (2021). Clinical placement experience of nursing students during the COVID-19 pandemic: a cross-sectional study. *Nurse Educ Today*, 99 104746, doi:10.1016/j.nedt.2021.104746.