

Research Article

Nursing Instructors' and Students' Experiences of Transition from Face-to-Face Education to Virtual Education during the Coronavirus Disease 2019 Pandemic

Mohammad Salehpoor-Emran ¹, Azam Ghorbani ², Zahra Abbasi Dolatabadi ², and Marjan Delkhosh ³

¹Department of Community Health Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran

²Department of Medical-Surgical Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran

³Department of Community Health and Geriatric Nursing, School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran

Correspondence should be addressed to Marjan Delkhosh; delkhoshmarjan@gmail.com

Received 19 September 2023; Revised 9 January 2024; Accepted 8 February 2024; Published 13 February 2024

Academic Editor: Foroozan Atashzadeh-Shoorideh

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Introduction. The coronavirus disease 2019 (COVID-19) pandemic necessitated the suspension of most educational activities and a shift from face-to-face (FTF) education to virtual education (VE). These changes were associated with new educational experiences for both instructors and students. This study aimed to explore nursing instructors' and students' experiences of VE during the COVID-19 pandemic. **Method.** This descriptive qualitative study was carried out in 2021. Participants were 21 bachelor's, master's, and Ph.D. nursing students and six nursing instructors purposively selected from the Faculty of Nursing and Midwifery of Tehran University of Medical Sciences, Tehran, Iran. Data were gathered through FTF or online in-depth semistructured interviews and were analyzed through conventional qualitative content analysis as proposed by Graneheim and Lundman (2004). **Results.** Eight sub-themes and three main themes were developed during data analysis. The main themes and subthemes were VE as a double-edged sword (VE as a threat, VE as an opportunity, and necessity to improve VE), weaknesses in clinical education (reduced quality of clinical education and necessity to compensate for students' retarded clinical learning), and reduced reliability of virtual student evaluation (cheating as a problem of virtual evaluation, stresses and tensions of virtual evaluation, and necessity to use new strategies in virtual evaluation). **Conclusion.** Despite the different shortcomings and challenges of VE during the COVID-19 pandemic, educational experiences gained in this period can be used to improve the quality of nursing VE in future epidemics and pandemics.

1. Introduction

Nurses are the largest group of healthcare providers [1, 2]. The main mission of nursing education is to train committed and competent nurses [3]. Nursing education consists of theoretical and practical education [4, 5] and mainly aims at developing students' and nurses' professional knowledge, skills, and experience. Education for knowledge and skill development is usually provided in face-to-face (FTF) classes and skill labs, while education for experience development is provided in practical courses in clinical settings

[6]. The clinical setting is the only place for knowledge-practice integration [7].

The outbreak of the coronavirus disease 2019 (COVID-19) at the end of 2019 significantly changed all aspects of life, particularly education [8–10]. This emerging infectious epidemic first appeared in Wuhan, China, and rapidly turned into a pandemic. The news of the outbreak of this disease in Iran was announced at the end of January 2020 [11, 12]. On March 21, 2023, the total number of COVID-19-afflicted patients and COVID-19-related deaths in Iran was 7,580,858 and 145,091, respectively [13]. The high transmission rate of

the disease necessitated lockdowns in many countries, and the main COVID-19 prevention recommendation was to stay at home. The suspension of most educational activities affected many students around the world [14]. During the first wave of COVID-19, FTF education turned into virtual education (VE) [15], clinical education was suspended, and students lost the opportunity to practice some nursing skills [16, 17]. Accordingly, the COVID-19 pandemic highlighted the importance of developing modern educational environments and activities [18, 19].

VE is a technology-based modern teaching method [20] that can be both synchronous and asynchronous. Synchronous VE provides instructors and learners with the opportunity to have real-time interactions while real-time learning interactions are not possible in asynchronous VE [21]. The advantages of VE include easy accessibility, updated content, independence in learning, the possibility to select educational materials based on personal interest, and a greater possibility of documenting data, analyzing students' responses, and providing them with feedback [22, 23]. However, VE seems to be less effective than FTF education in developing students' practical skills [24], and hence the most important concern of nursing students during the pandemic was the suspension of their clinical courses [25, 26].

A study in the nursing school of Michigan University showed that VE was acceptable for learners and was effective in developing their knowledge and fulfilling their educational needs [27]. Moreover, a systematic review showed that VE can be a potentially beneficial method for the education of medical sciences students during the COVID-19 pandemic [28]. Nonetheless, the experiences of medical sciences instructors in Iran showed that VE faced different challenges such as organizational barriers, infrastructural problems, and legal and ethical challenges [29, 30].

To the best of our knowledge, there are limited data about the challenges of VE in nursing, and hence the present study was conducted to provide more in-depth data in this area. This study aimed to explore nursing instructors' and students' experiences of VE during the COVID-19 pandemic.

2. Methods

2.1. Design, Participants, and Setting. This descriptive qualitative study was carried out in April to December 2021. The study population comprised all nursing instructors and students of the Faculty of Nursing and Midwifery of Tehran University of Medical Sciences, Tehran, Iran. In total, 21 bachelor's, master's, and Ph.D. nursing students and six nursing instructors were purposively selected. Inclusion criteria were the ability to speak Persian, engagement in nursing studies at the time of the study (for students), ability to share experiences, and informed and voluntary agreement for participation.

2.2. Data Collection. Data were collected through 27 FTF or online in-depth semistructured interviews held at participants' preferred times. Online interviews were held using Skype or WhatsApp. The main interview questions included "Can you explain your experiences of virtual theoretical

education/learning during the COVID-19 pandemic?" "Can you explain your experiences of virtual practical education/learning during the COVID-19 pandemic?" "In your opinion, what were the strengths, weaknesses, and challenges of virtual education/learning during the COVID-19 pandemic?" and "What strategies did you use or do you recommend to improve the quality of VE?" Interviews lasted 60–90 minutes and were audio-recorded with participants' permission. All interviews were held by a single interviewer (i.e., the first author). Data saturation was considered the end of sampling and data collection.

All procedures performed in studies involving human participants followed the guidelines of the national/institutional research committee and the Helsinki Declaration. The Institutional Review Board of Tehran University of Medical Sciences approved the research project before we commenced data collection (Ethics approval code: IR.TUMS.VCR.REC.1399.501). Other ethical considerations include giving the right to withdraw from continuing participation at any time, ensuring data confidentiality, and providing the results at the request of the participants. To comply with the ethical principles of the research, informed consent was obtained from participants who intend to participate in the study. Interviews were also anonymized using numerical codes.

2.3. Data Analysis. Data analysis was performed concurrently with data collection using the five-step conventional qualitative content analysis as proposed by Graneheim and Lundman [31]. This method consists of 5 steps: first, the interviews were transcribed verbatim; second, the interview transcripts were reviewed several times to obtain a sense of the whole; third, based on the study objectives, the significant statements (meaning units) that were related to the participant's personal and educational experiences of VE in the COVID-19 pandemic were identified and each meaning unit was given an appropriate code (Table 1). To ensure coding agreement and address inter-rater reliability [32], two authors double-coded the first interview transcript. MSE and AG coded independently and concurrently. There was 85% agreement between the two reviewers. Then, they met and resolved minor disagreements after discussion; fourth, codes were grouped into subcategories according to their conceptual similarities and differences and next subcategories were extracted; fifth, subcategories were compared with each other several times, and the latent content was identified and three themes were extracted. The final subthemes and themes were examined by all authors to ensure a clear difference between categories and to fit the data within each category. Moreover, all authors discussed the generated codes, subcategories, subthemes, and main themes in group sessions to ensure their appropriateness. Data were managed using the MAXQDA software (v. 12.0).

2.4. Rigor. The trustworthiness of the data was maintained via the criteria proposed by Lincoln and Guba, namely, credibility, dependability, confirmability, and transferability [33]. The credibility of the present study was established

TABLE 1: The subcategories, subthemes, and main themes of nursing instructors' and students' experiences of virtual education during the COVID-19 pandemic.

Themes	Subthemes	Subcategories
VE as a double-edged sword	VE as a threat	Boring and nonattractive virtual education Challenges and problems of virtual education Students' and instructors' limited commitment to virtual education Instructors' limited control over the process of virtual education
	VE as an opportunity	Reduced quality of learning in virtual education Continuation of education in a safe environment Enjoyment education without serious limitations and coercion Possibility to attend different webinars without serious limitations
	Necessity to improve VE	Planning and revising at the macrolevel Empowerment of instructors and students Improvement of instructors' and students' commitment to education
Weaknesses in clinical education	Reduced quality of clinical education	Students' poor clinical skills due to nonattendance in hospital settings High risk of affliction by COVID-19 in clinical education Provision of clinical education through theoretical courses
	Necessity to compensate for students' retarded clinical learning	Clinical education in inappropriate and irrelevant wards Continuation of face-to-face education through adherence to COVID-19 prevention protocols Using complementary educational methods
Reduced effectiveness of virtual student evaluation	Cheating as a problem of virtual evaluation	Cheating through different methods The high probability of copying assignments from each other
	Stresses and tensions of virtual evaluation	Stress over the disconnection of the internet or the problems of the virtual evaluation system during exams Inadequate time to answer questions Arbitrary evaluation by instructors Flexibility in evaluation
	Necessity to use new strategies in virtual evaluation	Formative evaluation throughout the semester Giving assignments and class projects

using member and peer-checking, reviewers' prolonged engagement with data, immersion in the data, and maximum variance in participant selection. Regarding member-checking, we provided a brief report of the findings to participants. Then, we asked them to review the data and indicate the extent to which the analyzed data reflect their experiences and perspectives. The researcher was an MS student and had VE experience in the COVID-19 pandemic. To ensure the credibility and accuracy of the data and to avoid the influence of his prior experiences, assumptions, and beliefs, the member-checking method was used. The researcher also discussed with his colleagues and reached a consensus in each stage of analysis. His colleagues are experts in qualitative research. The dependability of the present study was obtained through peer-checking, and the inter-rater agreement between reviewers was calculated and approved. Multiple researchers with experience in qualitative research methods reflected on the analyzed data to meet researcher triangulation requirements. Conformability was ensured by members' checks and verification of codes by participants, long-term engagement, and multiple readings of interviews. To increase transferability, participants' characteristics and study context were explained in detail so that readers could decide whether to use the results in their desired environment.

3. Results

Participants were fifteen bachelor's nursing students, three master's nursing students, and three Ph.D. nursing students from different educational years as well as six nursing instructors. The age mean of students and instructors was, respectively, 25 ± 7.32 and 45.66 ± 10.81 years. All instructors and most students (52.4%) were female (Table 2).

During the content analysis of the data, 661 codes, 25 subcategories, 8 subthemes, and 3 main themes were developed. The main themes were VE as a double-edged sword, weaknesses in clinical education, and reduced reliability of virtual student evaluation (Table 1).

3.1. VE as a Double-Edged Sword. VE during the COVID-19 pandemic had both negative and positive outcomes and hence was a double-edged sword. Students reported a wide range of VE-related experiences from pleasure at experiencing no limitation of FTF education (such as time and place limitations) to fatigue and lack of motivation. The subthemes of this main theme were VE as an opportunity, VE as a threat, and the necessity to improve VE.

3.1.1. VE as an Opportunity. Education turned into a main challenge when COVID-19 was rapidly spreading and seriously threatening lives. Participants considered VE as a good solution to continue education in a safe and fear-free environment.

Generally speaking, a very dangerous situation suddenly occurred and we are really indebted to VE. We would

certainly miss many educational opportunities without VE (S1).

VE was also associated with better planning ability, greater latitude respecting the time and place of education, greater flexibility in learning, no need for long trips from home to academic settings and vice versa, no need to stay in university dormitories, and more time and money saving.

In VE, neither instructors nor students need to spend their time to come to the school and students can use classes everywhere (I6).

Unlimited access to educational materials in VE provided students with the opportunity to study anywhere and anytime and provided them with more time for the rest of their activities.

You will lose educational materials if you have an absence from FTF education. However, educational materials in VE are available at will and you can re-use them later (S10).

VE also improved the information technology abilities of both instructors and students.

As an instructor, I attempted to improve my skills. I mean I previously didn't greatly value how to make PowerPoint slides, leave voice messages, or make educational videos (I1).

Moreover, VE provided students and instructors with the opportunity to attend different national and international webinars and access their materials without the need to spend great time and money.

Webinars were one of the greatest advantages of VE. It was interesting that people from all countries of the world could attend and it provided an opportunity to improve the knowledge of both instructors and students (S5).

Besides creating a safe environment for education, VE gradually improved over time, its shortcomings were overcome, and it provided its users with better experiences.

Shortcomings were overcome over time and VE got better. Of course, VE still falls short of the ideal; but it is appropriate for our current conditions (S5).

We faced many different limitations in the early days of VE; but, it gradually improved and provided us with more options (I2).

3.1.2. VE as a Threat. Despite its advantages and opportunities, VE had some limitations and shortcomings such as poor infrastructure, low speed or frequent disconnection of the Internet, problems related to software and communication systems, not having a personal laptop or smartphone, and inability to afford the heavy costs of buying them.

TABLE 2: Participants' characteristics.

Code	Age (years)	Gender	Marital status	Interview type	Educational level	Semester	Employed	Work experience
I1*	33	Female	Married	FTF*	Assistant professor	—	Yes	13 years
I2	44	Female	Married	Online	Assistant professor	—	Yes	12 years
I3	54	Female	Married	Online	Assistant professor	—	Yes	20 years
I4	33	Female	Married	Online	Assistant professor	—	Yes	4 years
I5	58	Female	Married	Online	Master's	—	Yes	25 years
I6	52	Female	Married	FTF	Master's	—	Yes	28 years
S1*	22	Female	Single	FTF	Bachelor's	5	No	—
S2	21	Female	Single	FTF	Bachelor's	5	No	—
S3	20	Female	Single	FTF	Bachelor's	5	No	—
S4	23	Female	Single	FTF	Bachelor's	5	No	—
S5	21	Male	Single	Skype	Bachelor's	4	No	—
S6	21	Male	Single	Skype	Bachelor's	5	No	—
S7	23	Male	Single	FTF	Bachelor's	6	No	—
S8	20	Female	Single	FTF	Bachelor's	6	Yes	—
S9	21	Female	Single	FTF	Bachelor's	6	No	—
S10	22	Male	Single	FTF	Bachelor's	6	Yes	3 months
S11	21	Male	Single	FTF	Bachelor's	8	No	—
S12	23	Male	Single	FTF	Bachelor's	8	Yes	1 month
S13	45	Female	Married	FTF	Ph.D.	11	Yes	—
S14	22	Male	Single	FTF	Bachelor's	5	No	—
S15	22	Male	Single	FTF	Bachelor's	5	No	—
S16	21	Male	Single	FTF	Bachelor's	5	No	—
S17	24	Male	Single	Online	Master's	3	No	—
S18	23	Female	Single	Online	Master's	5	Yes	2 years
S19	35	Female	Married	Online	Master's	5	Yes	11 years
S20	43	Female	Married	Online	Ph.D.	5	Yes	10 years
S21	32	Female	Married	FTF	Ph.D.	5	Yes	4 months

I: instructor; S: student; FTF: face-to-face.

One of the biggest problems since the early days of VE was our concern with students' possession of smartphones. Moreover, some students who lived in remote villages had problems connecting to the Internet (I5).

The ability to attend educational sessions from anywhere was very good, but my biggest problem was the frequent disconnection of the Internet (S19).

Moreover, reduced quality of education, inadequate interpersonal interactions, inability to resolve ambiguities or find answers to questions, and lack of adequate feedback by instructors were among the problems of VE.

I, my friends, and my classmates all have problems in learning. I certainly prefer FTF education when I compare my FTF classes in the first semester and VE classes in these last three semesters. My first semester was associated with many better learning outcomes (S5).

Participants also reported students' poor commitment and sense of responsibility, poor performance, limited engagement in learning activities, and postponement of learning to the end of the semester as the problems of VE.

Some materials were uploaded and we postponed their use until the exam day and finally, we passed courses by studying those materials just before the exam. It was not an interesting experience (S5).

VE was also associated with boredom, nonattractiveness, and lack of motivation, competition, and vitality for students.

It is a little boring to just listen to the instructor's lecture. The inability to actively participate in the class is not attractive to me. I always used to be active, participated in discussions, and asked questions in [FTF] classes, while I should just listen now (S10).

Participants also reported different instructor-related challenges in VE such as limited control over the process of VE, limited accessibility, heavy assignments, failure to update the provided materials, and inability to understand students' needs.

For example, some of our courses are not the main courses of our field but their assignments are too heavy that some classmates prefer not to take them until they are offered FTF. I mean the assignments of a course that has nothing important to do with our grade point average are too heavy that we have no adequate time for the rest of our courses (S10).

The other problems of VE for instructors were uncertainty over the active participation of students, the time-consuming process of preparing educational materials and checking assignments, heavy costs of connection to the Internet, and fatigue.

FTF classes were held at determined hours and days. However, VE took all our time as if there was no leisure or break time for instructors (T2).

3.1.3. Necessity to Improve VE. Given the different shortcomings and challenges of VE, participants noted that VE needed improvements. Some of these improvements happened over time and resulted in the improvement of VE quality. However, participants highlighted the necessity of further VE improvements such as improvement of infrastructures, supervision of VE content production, provision of free access to the Internet, and financial support for students with poor financial status.

The school should have a supervision team. For example, there was a course for which four PowerPoint presentations were uploaded one week before the exam. They had better download and assess the quality of at least one of those voice clips uploaded by the instructors (S3).

One of the challenges of VE was the unfamiliarity of some instructors and students with VE. Therefore, participants highlighted the necessity of empowering instructors and students for the better use of virtual educational space.

I think some instructors had not received the necessary education for using the VE system and preparing appropriate files. Many of the files that were uploaded for us were cut into several pieces and some pieces had no voice (S4).

Moreover, participants noted that instructors needed to take measures to make VE more attractive and improve its quality and highlighted that students needed to plan to take full advantage of the VE materials. For example, they recommended measures such as troubleshooting sessions, communication through different software, use of multimedia materials, a combination of synchronous and asynchronous education, and improvement of students' commitment and responsibility towards learning.

It may be better that we combine VE and FTF education, hold a series of troubleshooting sessions, and require students to attend these sessions so that they understand that their practice is controlled and feel more responsibility towards studying courses (I2).

3.2. Reduced Reliability of Virtual Student Evaluation. A major challenge of VE was virtual student evaluation because there was no control over students' practice during exams and there were controversies over the accuracy of student evaluation results. The three sub-themes of this theme were cheating as a problem of virtual evaluation, stresses and tensions of virtual evaluation, and the necessity to use new strategies in virtual evaluation.

3.2.1. Cheating as a Problem of Virtual Evaluation. One of the challenges of virtual evaluation was the high probability of cheating through access to questions before exams, group answering to questions, using textbooks during exams, or searching the Internet to find answers. Cheating was associated with a false increase in scores and grade point average.

Evaluation has many problems. All students, including me, cheated for sure. For example, we sat together and took the exam, used books or class notes, or searched the Internet (S3).

Moreover, there was a high probability that students copied each others' answers to homework assignments.

Well, we did assignments in collaboration with each other. One student did them and others copied it. None of the students but one actually did the assignments (S2).

3.2.2. Stresses and Tensions of Virtual Evaluation. The techniques used to perform student evaluations and reduce students' cheating rates were associated with stress and challenges for students. For example, students had stress over the disconnection of the Internet or the problems of the virtual evaluation system during exams.

Exam stress is higher in virtual exams. My classmates also had the same stress. All of them were concerned with Internet disconnection, power outage/blackout, etc. (S17).

One of the strategies to reduce the probability of cheating in virtual evaluation was to reduce exam time. However, the lack of time to think about questions or correct the provided answers was stressful for students.

You have no time to recheck your answers. I mean each question was displayed just once. You may not remember the answer due to your stress. Exam time is very short and you are under constant stress (S4).

3.2.3. Necessity to Use New Strategies in Virtual Evaluation. Given the high probability of cheating in virtual evaluation, new strategies were needed to improve the reliability of the evaluation results. Examples of these strategies were using a large number of questions, random allocation of questions, using open-ended questions, using case-based and practical questions, and requesting verbal or hand-written answers to the questions.

In one of our exams, the instructor had provided around I guess one hundred questions to the evaluation system and the system randomly provided thirty of them to each student. After the exam, we noticed that our questions were not the same (S17).

We attempted to use strategies to reduce the possibility of cheating in assignments. For example, I asked students to provide personal verbal explanations instead of written responses (I1).

Other strategies to improve the effectiveness of virtual evaluation were the provision of creative or case-based assignments and asking students to do class projects.

For the final exam, I designed some cases based on which students had to answer some questions. Moreover, I asked them to provide hand-written responses to ensure that they would read all cases and questions (I4).

3.3. Weaknesses in Clinical Education. A major part of nursing education is provided in clinical settings, while the necessity of VE during the COVID-19 pandemic negatively affected the quality of clinical education. The two subthemes of this main theme were the reduced quality of clinical education and the necessity to compensate for students' retarded clinical learning.

3.3.1. Reduced Quality of Clinical Education. During the COVID-19 pandemic, the high risk of COVID-19 transmission required a substantial shift from FTF clinical education to virtual clinical education. This resulted in a wide theory-practice gap, reduced students' exposure to real clinical settings, and altered the development of their practical skills. Considering that nursing science is a combination of theoretical knowledge and clinical practice, it is not possible to separate. So, there was a predictable decrease in the quality of clinical education of nursing students along with virtual education.

In this period, we experienced a significant decline in [professional] skills among students. I mean fifth- or sixth-semester students couldn't accurately perform the basic nursing skills. They had either forgotten the learned skills or performed them very slowly or problematically (I2).

On the other hand, the reduced duration of some clinical courses, offering some courses in inappropriate and irrelevant hospital wards, and the inability to attend certain wards were associated with the reduced quality of clinical education.

For instance, three-week courses had been reduced to one-week courses, meaning that you had to teach the materials for three weeks in one week. This was really impossible (I6).

Due to the restrictions caused by Corona, the clinical courses were shortened and we had to undergo training related to different clinical departments including cardiac and respiratory in the same department (S15).

We could not see even a cardiac patient, we were in the internal department all the time and worked with diabetes patients (S6).

3.3.2. Necessity to Compensate for Students' Retarded Clinical Learning. Given the critical importance of clinical education in nursing, strategies were needed to improve students' skills

and abilities. An example of these strategies was shifting back to FTF clinical education with close adherence to COVID-19 prevention protocols and using personal protective equipment which enabled students to continue their clinical learning in the critical conditions of clinical settings during the pandemic.

Our students are medical sciences students and their clinical education is better to be provided in clinical settings with close adherence to the COVID-19 prevention protocols. They should learn not only to care for themselves but also to provide care to their patients and perform clinical tasks in critical situations (I2).

Participants also recommended strategies such as educational videos, exercises in skill laboratories, case studies, and group discussions to compensate for parts of students' retarded clinical learning.

One of the strategies that we could use was to hold case-based classes. I remember that we did this in the orthopedic nursing course, where instructors introduced a case and its problems, and then, they held a question-and-answer session. It was very good and all the students liked it (S5).

4. Discussion

This study explored nursing instructors' and students' experiences of VE during the COVID-19 pandemic. Findings showed that learning without serious limitations, no need for going to school and attending classrooms at a determined time, and no fear of affliction by COVID-19 created a good experience for most students. In agreement with this finding, a study showed that most nursing students had positive experiences of learning evidence-based practice skills through online technology [9]. Flexibility, easy access to educational materials, the ability to use materials anywhere and anytime, time and money saving, and the opportunity to attend national and international webinars were among the advantages of VE in the present study. Similarly, previous studies reported no time or place limitation, access to updated evidence, and the possibility of rapid feedback as the characteristics of VE [30, 34]. The phenomenon of urbanization, its resultant time and place limitations, and technological advances have increased interest in VE in many fields including nursing. VE is also a cost-effective method for providing education to learners in different geographical places. Nonetheless, our findings showed that VE during the COVID-19 pandemic had some limitations and shortcomings such as poor infrastructures, low speed or disconnection of the Internet, and problems with the VE system and software and, hence, faced students with different challenges. Previous studies also reported low speed or disconnection of the Internet, shortage of the necessary equipment, and heavy costs as barriers to VE [30, 35]. Moreover, students in the present study faced challenges such as reduced quality of education, nonclarification of their ambiguities, instructors' limited control over the

process of VE, heavy and useless assignments, and lack of effective feedback and interactions. In agreement with this finding, a study showed that more than 80% of students experienced anxiety in VE mainly due to the heavy burden of assignments [36]. Boredom, fatigue, and lack of interaction, motivation, and competition were other challenges of VE for students. This finding is in line with the findings of a study that reported the heavy strain of assignments, ineffective communications, sense of isolation, and lack of social interactions as the challenges of VE [37]. According to the Social Learning Theory, human beings are social creatures whose lives depend on social interaction [38]. Therefore, social interaction is an influential factor in students' tendency toward using VE.

The findings of the present study also showed that VE faced nursing instructors with challenges such as students' poor sense of responsibility, poor performance, high probability of cheating in virtual evaluation, and copying each others' answers to homework assignments. Previous studies also reported a high rate of cheating in virtual evaluation [39, 40]. Moreover, instructors in the present study faced challenges such as the time-consuming process of preparing educational materials and checking assignments, fatigue, and limited time to rest. Similarly, previous studies showed that instructors in VE faced time challenges in recording their lectures, revising and updating their educational materials, and learning how to use and produce virtual materials [41–43]. Educational authorities need to overcome these shortcomings and challenges through strategies such as the provision of appropriate VE infrastructures, supervision of VE, and production of quality educational materials. Instructors can also improve the quality of VE through strategies such as effective online communication with students, troubleshooting sessions, and multimedia educational materials. Previous studies noted that VE should be flexible and easily accessible and highlighted the necessity of instructors' effective communication with students to alleviate their concerns and problems [44–46]. We also found that both instructors and students faced financial problems in buying the necessary equipment for VE. Financial problems can move students towards part-time employment, undermine their academic performance, and reduce instructors' motivation for quality VE provision [47, 48]. Therefore, the provision of free access to the Internet and financial support to students with poor financial status as well as the provision of the necessary VE-related equipment to instructors is recommended to improve the quality of VE.

Study findings also indicated weaknesses in clinical education as one of the main challenges of VE. Wide theory-practice gap, students' reduced interactions with patients and reduced exposure to real clinical settings, short duration of clinical courses, and attendance at inappropriate and irrelevant hospital wards were associated with the poor development of students' clinical skills and self-confidence. Previous studies also reported that limited opportunities to exercise communication and technical skills [39] and students' confusion in clinical settings [49] are the challenges of VE during the COVID-19 pandemic. However, some studies

in previous epidemics reported that access to personal protective equipment improved students' desire for voluntary help and care provision to patients [50–52]. Moreover, clinical education during the pandemic can be provided in clinical laboratories [53] or vaccination clinics [54]. These strategies together with simulated environments, skill laboratories, educational videos, and discussions about clinical cases can be used to improve the quality of clinical education in epidemics.

The results of the present study showed the advantages and opportunities of virtual education such as flexibility and saving time and money; on the other hand, it showed disadvantages such as reduced interaction, quality of education, and student motivation. It also indicated the expectations of students and professors from this type of education. These results suggest that the quality of virtual nursing education should be increased through increasing creativity in preparing educational materials and using techniques to increase interaction with students. It also suggests planning to improve the quality of nonhospital clinical training such as skill laboratories and the use of simulation software.

In future studies, it is suggested to investigate the methods of increasing the quality of virtual education. It is also recommended to examine and compare the methods of nonhospital clinical training. Moreover, studies are needed to explore educational authorities' and policymakers' experiences of VE, its challenges, and strategies to manage the challenges.

4.1. Study's Limitations. One of the limitations of this study was the inability to hold FTF interviews with some participants which was managed through online interviews. Another limitation was the sampling from only one university, which was tried to manage with the maximum variance in terms of age, sex, and so on.

5. Conclusion

This study concludes that VE provided a safe, flexible, and fear-free environment for nursing education during the COVID-19 pandemic. However, it had some challenges and shortcomings such as poor infrastructures, high cost of access to the Internet, low speed of the Internet, students' limited commitment and sense of responsibility towards learning, limited student-instructor interactions, limited attractiveness of VE, limited reliability of the results of virtual student evaluation, students' and instructors' poor motivation and fatigue, and reduced quality of VE. Moreover, a very important shortcoming of VE in the COVID-19 pandemic was the reduced quality of clinical education, which is the core of nursing education. These shortcomings and challenges highlight the necessity of effective strategies to improve the quality of VE. Examples of these strategies are the provision of adequate infrastructures and equipment, increasing Internet bandwidth, provision of free access to the Internet, improvement of instructors' and students' abilities to use information technology, adequate supply of personal protective equipment, and creation of a safe environment for

clinical education. Moreover, improvement of instructors' and students' commitment, use of creativity in education, enhancement of VE attractiveness and quality, and improvement of student evaluation techniques are recommended.

Data Availability

The datasets generated and/or analyzed during the current study are not publicly available because some interviews contain information that reveals the identity of individuals but are available from the corresponding author on reasonable request.

Conflicts of Interest

The authors declare that there are no conflicts of interest in the present study.

Authors' Contributions

This study was designed by MSE, AG, ZAD, and MD. MSE and MD managed the project and collected all the interviews and field notes. AG and ZAD analyzed the qualitative data. MSE and MD were responsible for manuscript preparation. All authors read and approved the final manuscript.

Acknowledgments

The authors thank the Ethics Committee of Tehran University of Medical Sciences, Tehran, Iran, for approving this study as well as all instructors and students who participated in the study and School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran.

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