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Improving the psychomotor performance of student nurses using remote clinical skills practice: a mixed-methods study

Ükke Karabacak[1] and Hilal Yıldız Çelik[1*]

Abstract

Introduction Innovative approaches are essential in nursing education to ensure the continuity of skill acquisition, particularly in situations where traditional face-to-face teaching methods are not feasible.

Objective This study aimed to evaluate the effectiveness of remote learning in enabling student nurses to acquire psychomotor skills, with a focus on 'blood pressure measurement'—a noninvasive procedure that can be practiced safely at home.

Methods Using an experimental design with group randomization and a mixed-method approach, 44 first-year nursing students participated, with 22 in the experimental group and 22 in the control group. After a theoretical course on blood pressure measurement, the control group followed a licensed video program, while the experimental group practiced with a simulated patient under an educator's guidance in an remote environment. The research was conducted between March 2021 and October 2021, encompassing all phases of the study. These phases included preliminary information, remote training, and feedback sessions in March 2021, the first assessment in April 2021, and the second assessment in October 2021. The 'Descriptive Characteristics Form,''Blood Pressure Measurement Skill Checklist,' and 'We Practice Remote Clinical Skills Together Online Comments Form' were used for data collection. Descriptive statistics (means, standard deviations, frequencies, percentages) and the Mann–Whitney U test were applied for quantitative data analysis, while qualitative data were analyzed inductively based on student opinions from both groups.

Results The first performance assessment showed no significant difference between the control and experimental groups' mean scores ($p = 0.440$). However, the second assessment revealed a significant difference favoring the experimental group ($p = 0.001$). The qualitative data were categorised into three main themes: emotions, learning and confidence, with a total of 34 codes. Emotions accounted for 50% of the codes, including happiness, stress, comfort and anxiety. Learning accounted for 41% and included awareness, interaction-communication, skill acquisition and information retention. Finally, self-confidence, represented by skill practice in the laboratory, accounted for 9% of the codes.

*Correspondence:
Hilal Yıldız Çelik
hilal.yildiz@acibadem.edu.tr

Full list of author information is available at the end of the article

Conclusion This study demonstrates that educator-guided remote skill training can positively impact students' psychomotor skill acquisition. It highlights the potential for effectively teaching specific nursing skills in remote environments when guided by an educator.

Keywords Psychomotor skill, Remote learning, Nursing education, Simulation

Introduction

The worldwide spread of coronavirus disease 2019 (COVID-19) during late 2019 and the proclamation of the pandemic affected nursing education, as in several other fields. The campuses of almost all the institutions were suddenly shut down owing to social distancing and other regulations [1]. During the pandemic, several educational institutions worldwide and in Turkey started providing hybrid or online education, which restricted students' practice in laboratory and clinical practice settings. This scenario has increased the need to revise curricula [2] to achieve student learning outcomes and develop new strategies for promoting student participation and interaction in education and training [3]. Therefore, the identification of alternative modalities that reduce transmission and increase safety, as substitutes for face-to-face practices, is needed. Methods that could replace face-to-face skill practices, including video-based learning, virtual simulation, computer-based simulation, limited face-to-face simulation, case studies, and hybrid online studies, have been utilized [2–4].

A cross-sectional multicenter international study on distance nursing education reported students' unmet cognitive, affective, and psychomotor learning needs [4]. Educational programs designed to address the three learning domains (cognitive, affective, and psychomotor) developed via face-to-face and remote learning methods are needed [5]. Taylor et al. (2020) reported significant differences between face-to-face and remote teaching methods in terms of the interaction between educators and students, with a focus on teaching and a student-centered approach [6]. Student nurses and faculty had to adopt remote learning, which involved the use of the internet, electronic devices such as laptops or tablets, and new web applications such as Zoom for e-learning [7].

Keeping new information in mind and practicing new skills is a complex cognitive process. By developing theoretical knowledge and practical skills in professional skill laboratories, nursing education ensures the achievement of this cognitive process. Several different trial models related to skill development are included in the literature. One study evaluated the contribution of distance education to professional practice and reported that 48% of the students stated that distance education partially contributed, whereas 44% stated that it made no contribution [4]. Studies reporting the positive effect of video-assisted skill teaching on skill acquisition in students are available [8, 9]. However, these videos are not substitutes for an educator but rather auxiliary tools that can be employed in skill education [10]. Therefore, using effective strategies and innovative approaches for the skill acquisition and development of student nurses through remote learning methods is important [10].

Educators should have goals and development targets to prepare students for safe practices in light of the COVID-19 pandemic and the anticipated changes and challenges of the future, including technological advancements and evolving educational methods. Owing to technology or other reasons, educational systems may change over time. Examining whether our current teaching methods are effective in teaching psychomotor skills and using methods such as simulation and designed practices for learning skills are imperative. Studies conducted to understand the learning of psychomotor skills during the pandemic are limited [4]. However, this study contributes to the literature by highlighting the importance of developing innovative teaching methods that take advantage of technological advances and address the evolving needs of learners beyond the pandemic period.

Conceptual framework

The National League for Nursing Jeffries simulation theory was chosen as the guiding framework for this study because of its comprehensive approach to simulation-based education, providing a structured method to evaluate skill acquisition and its outcomes in diverse learning environments. The National League for Nursing Jeffries simulation theory is a foundational framework that explains and examines the role of simulation in nursing education and the broader nursing profession [11]. It aims to establish a standardized approach to the implementation of simulation practices while continuously exploring effective methods and evaluating the outcomes of simulation-based teaching and learning in nursing. The theory identifies six key elements essential for its application: context, background, design, educational practices, simulation experience, and outcomes [11]. Therefore, this study aimed to evaluate the effectiveness of remote learning in enabling student nurses to acquire psychomotor skills, with a focus on 'blood pressure measurement'—a noninvasive procedure that can be practiced safely at home.

Methods and materials

Study design

This mixed-method study incorporated an experimental design for the quantitative phase and a phenomenological approach for the qualitative phase. The research was conducted between March 2021 and October 2021, encompassing all phases of the study. These phases included preliminary information, remote learning, and feedback sessions in March 2021, the first assessment in April 2021, and the second assessment in October 2021. The manuscript was prepared following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines [12].

Participants

The population of the study consisted of all the nursing students ($n=79$) enrolled in the nursing department of a foundation university during the 2021 academic year. The sample, however, was specifically composed of first-year undergraduate nursing students who met the inclusion criteria ($n=44$). The inclusion criteria were as follows: voluntary participation, no prior training in blood pressure measurement, and possession of a manual sphygmomanometer at home for measuring blood pressure.

Procedure

Measuring blood pressure—a critical nursing practice in patient assessment—is a foundational, noninvasive skill introduced in the first year of nursing programs. Mastery of manual blood pressure measurement requires substantial practice, particularly in accurately identifying Korotkoff sounds and achieving proficiency in the technique [13].

Students who met the inclusion criteria were identified, and the researcher, with no involvement in course evaluation or grading, contacted these students to obtain their informed consent and collect baseline data. The participants were assured of their right to withdraw from the study at any time without facing any consequences. Furthermore, their academic achievement scores remained unaffected by their participation in the study.

Sample size calculation

Sample size estimation was performed via G*Power analysis with a significance level of 0.05, a power of 0.80, a medium effect size of 0.25, two groups, and two measurement points. On the basis of these parameters, each group required a minimum of 15 participants [14]. In order to ensure greater reliability and to prevent possible dropout, 22 students who met the research eligibility criteria were included in each group.

Randomization

The participating students ($n=44$) were randomly assigned to either the control group ($n=22$) or the experimental group ($n=22$) via the Random® system. The assignment process was conducted by an independent researcher through the website https://www.random.org. The list of students who met the inclusion criteria was used to form two groups of 22 students each. The determination of which group would serve as the intervention or control group was made by drawing lots. At the beginning of the study, the researchers were blinded to the group assignments. The data were coded as "Group 1" and "Group 2," without specifying which was the intervention or control group. The coded data were analysed by an independent statistician.

Data collection and instruments

The 'Descriptive Characteristics Form,' 'Blood Pressure Measurement Skill Checklist,' and 'We Practice Remote Clinical Skills Together Online Comments Form' were used for data collection.

Descriptive Characteristics Form: The researchers prepared this form to assess the sociodemographic characteristics of the students. It comprises three questions: gender, age, and the name of the high school from which they graduated.

Blood Pressure Measurement Skill Checklist: This checklist was developed by the researchers utilizing the literature (The Control list is attached in supplementary file 1) [16, 17]. This is a 22-item checklist developed by researchers to evaluate the psychomotor skills of students in both the experimental and control groups during blood pressure measurement via the auscultation method. Each step was assessed during the blood pressure measurement procedure, and scoring was performed as follows: 2 points (performed correctly), 1 point (performed incompletely), and 0 points (not performed). During the assessment, for a step to be awarded a score of '2 points', the relevant skill must be performed completely, in the correct order and in accordance with the standards. A score of '1 point' was awarded if the step was performed partially correctly but contained deficiencies or errors. The total score for the checklist ranges from 0 to 44, with higher scores indicating greater proficiency in blood pressure measurement. The Cronbach's alpha value for the Skill Checklist, which was used to evaluate the students' performance in skill steps, was calculated as 0.93, indicating a high level of reliability and excellent internal consistency.

We practice remote clinical skills together online comments form To evaluate students' views on skill practice with an educator in an remote environment and skill learning through videos, an open-ended questionnaire was developed by the researchers. The questionnaire aimed

to collect qualitative data to understand students' experiences with and perceptions of these two remote learning approaches. The form was created via Google Forms for ease of access and included the following primary research question:

"What are the views of students on two different experiences in remote skill learning: video-based learning and educator-supported learning?"

Interventions

The implementation phase of the study was structured according to Jeffries' simulation theory, which is based on five fundamental elements: content, background, design, practice, and outcomes. These elements are detailed below [15].

Context and background

This study employed a simulation approach designed to transform the home environment into a setting closely resembling a real-life clinical environment. Adapting to remote learning conditions, this method allows students to practice blood pressure measurements under an educator's guidance, facilitating an interactive and systematic evaluation process.

To support the simulation, the Zoom Meetings platform and a Learning Management System (LMS) were utilized for theoretical and laboratory components. These platforms—commonly used for theoretical courses—offered features such as waiting rooms and recording capabilities. A dedicated Zoom link was created and shared with the students in advance of each session, ensuring both accessibility and organization.

The educational framework consisted of a 2-hour theoretical session followed by a 4-hour laboratory practice. During the laboratory session, the control group learned the skill by watching instructional videos, while the experimental group practiced the skill under the guidance of a trainer (Fig. 1).

To ensure the clarity and feasibility of the simulation design, a pilot study involving five students—none of whom were part of the final sample—was conducted. This pilot enabled the testing of instructional materials, evaluation criteria, and the simulation setup. On the basis of feedback from the pilot, minor modifications were made to better align the simulation with real-life clinical conditions and enhance reliability.

In preparation for the simulation, the students in the experimental group worked with the researcher to acquire the necessary materials, such as hand disinfectant, a pen and paper for recording data, a manual blood pressure measuring device, and a white gown. Each student identified a family member or housemate to serve as a role-play partner, given that the study did not employ simulated patients. Although role play differs from standardized patient simulations requiring formal training, it provides a viable alternative for practicing clinical scenarios in a home-based setting. The researcher promoted inclusivity by guiding students through material procurement. Because the study was conducted independently of the institution's official activities, no external funding was utilized; thus, collaboration between the researcher and students proved crucial.

The students in the control group watched a skill teaching video and did not engage in similar preparatory

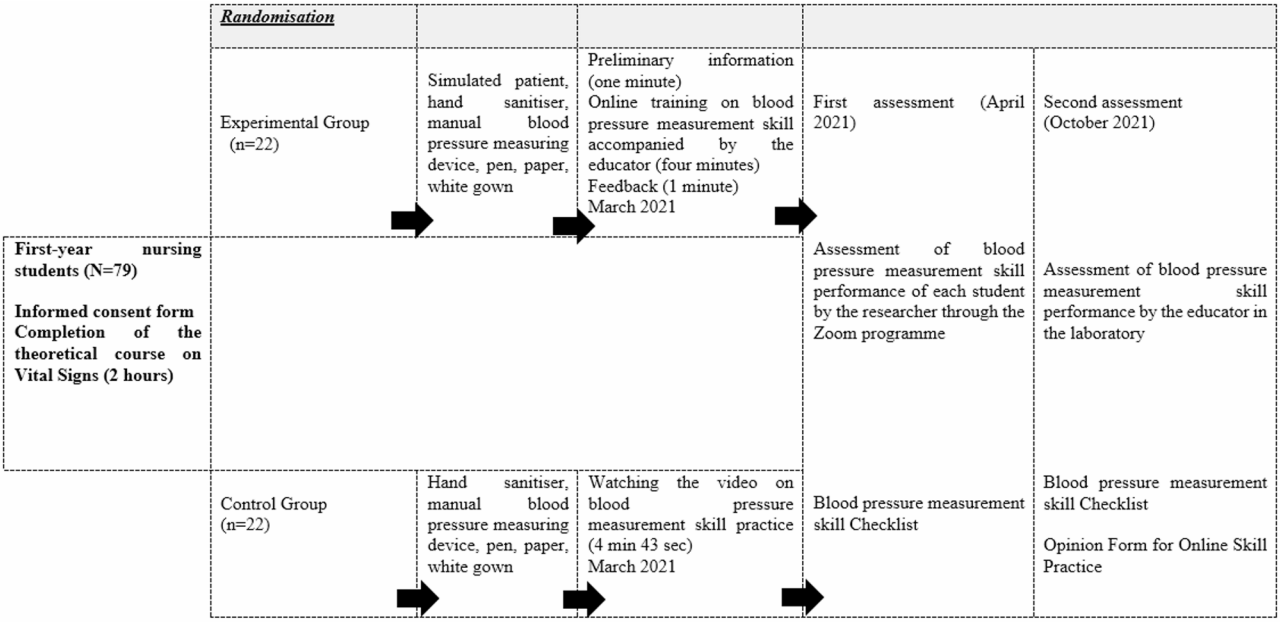

Fig. 1 Study design flowchart

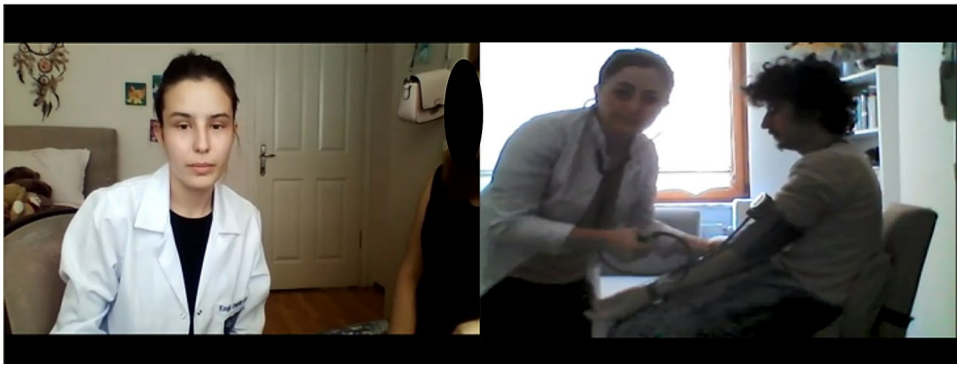

Fig. 2 The educator's demonstration of the ability to measure blood pressure to the student using the demonstration method*

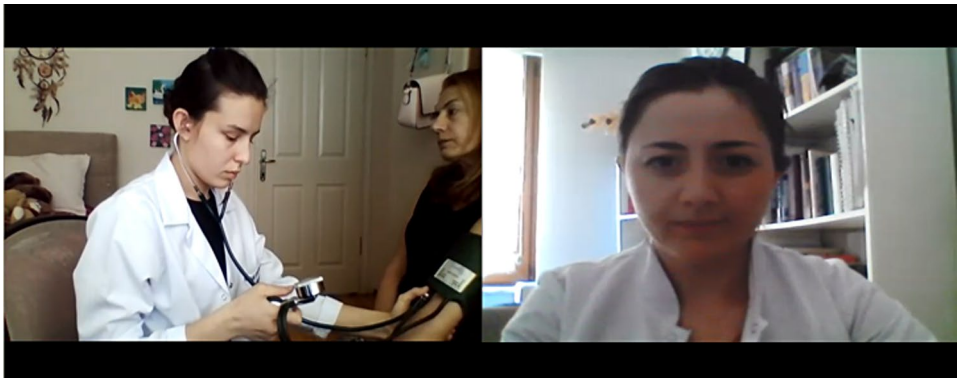

Fig. 3 The student practices the skill together with the educator*. (*with permission. We confirm that all photographs included in this manuscript have been used with the necessary permissions. The individuals in the photographs have given their written consent for the publication of these images as part of the manuscript)

activities. The video was sourced from an institutional database containing evidence-based skill videos. ClinicalSkills database includes prerecorded videos developed on the basis of evidence-based guidelines and recorded with real patients [16].

Design and simulation design

The students in both groups completed a theoretical course on blood pressure measurement skills, with lecture notes made available on the LMS. Skills laboratory sessions were scheduled and communicated to the students via email.

In the experimental group, the researcher provided preliminary information about blood pressure measurements during laboratory practice. The home setting where the students practiced was evaluated to ensure that it resembled a laboratory environment. Students wore white gowns, gathered their materials (e.g., hand disinfectant, a manual sphygmomanometer, and recording tools), and prepared a simulated patient for the practice. The family members who would play the role of the patient were informed about the simulation by the researcher. Similarly, researchers have prepared the same materials in their environment. The researcher demonstrated the steps of blood pressure measurement on the simulated patient (Fig. 2), and the students practiced the skill step by step alongside the educator, replicating face-to-face skill training (Fig. 3). Each student's practice was assessed individually, with personalized feedback provided. In the experimental group, the students practised taking blood pressure with the teacher once in the remote environment.

The control group also practiced blood pressure measurement skills at home. However, unlike the experimental group, their learning relied on prerecorded skill demonstration videos viewed on the Zoom platform. These videos, sourced from the ClinicalSkills database [17], lasted 4 min and 43 s and were created on the basis of evidence-based guidelines.

Engagement with the videos was monitored for all control group students. LMS completion reports verified that all the students had fully watched the videos. This approach ensured standardized and consistent training experience for the control group.

Outcomes

Students' skill acquisition in both groups was evaluated through two separate assessments: one conducted

online and the other conducted face-to-face. The first assessment was conducted online in the students' home settings one week after the completion of the skill teaching for both the experimental and control groups. The first assessment took place in April 2021. Students in the experimental and control groups were instructed to prepare a home environment that closely mimicked a real laboratory environment, following the guidelines provided during the skills training sessions (Fig. 3). The assessment utilized the Blood Pressure Measurement Skill Checklist, and each student's performance was evaluated individually during the online session. The second assessment was conducted face-to-face in the skills lab in October 2021, during our first face-to-face meeting with students. The reason for choosing this date is that students started face-to-face training in October. Also, since October is the beginning of the academic year, the assessment was planned during this period. This evaluation provided a more controlled environment where students demonstrated their skills under direct observation by the researchers. At the conclusion of the assessment process, the students were invited to provide feedback on their experiences by completing the 'We Practice Remote Clinical Skills Together Online Comments Form.'

Data analysis

To code and analyse the quantitative data, the Statistical Package for the Social Sciences (SPSS, version 21, IBM) was used. To assess whether the data were normally distributed, the Shapiro–Wilk test was applied ($p < 0.05$). The data are presented as descriptive statistics, including arithmetic means, standard deviations, minimum–maximum values, frequencies, and percentages. The Mann–Whitney U test, a nonparametric test, was used for group comparisons, as the data were not normally distributed. The Blood Pressure Measurement Skill Checklist was used as the primary quantitative instrument for evaluating skill performance. To determine the internal consistency of this tool, Cronbach's alpha coefficient was calculated, yielding a value of 0.95, indicating excellent reliability. The statistical significance level was set at $p < 0.05$. For the qualitative data, student opinions from the experimental and control groups were analysed via an inductive approach based on the method proposed by Lundman and Graneheim (2004) [18]. The qualitative analysis focused on identifying similarities and differences in the students' perspectives. To ensure confidentiality, code names were assigned to the students during the analysis process.

Table 1 Comparison of the mean scores of the students in the control and experimental groups on the blood pressure checklist

	Skill mean score in the first performance assessment	Skill mean score in the second performance assessment	Statistical test
	M ± SD	M ± SD	
Control group	74.01 ± 21.67	66.40 ± 18.51	Z = −1.046 P = 0.296
Experimental group	87.74 ± 11.82	85.37 ± 10.39	Z = −0.950 P = 0.342
	p = 0.440 Z = −2.010	p = 0.001 Z = −3.372	

Z, Mann–Whitney U test; M, mean; SD, standard deviation

Ethical issues

Before study initiation, ethics committee approval (2021-04/32), institutional permission, and verbal and online informed consent from the students were obtained. The research was conducted in accordance with the Declaration of Helsinki, the institutional Code of Ethics, and complied with all relevant guidelines and regulations. The students in the control group repeated the skill practice at the end of the process with a guide. The practice started with the verbal consent of the student and was recorded until its end.

Results

In this study, 98% of the students were females ($n = 43$), and 2% were males ($n = 1$). The students were aged between 19 and 22 years, and the mean age was 21 years.

An evaluation of the mean blood pressure checklist scores of the students in the control and experimental groups revealed that the mean scores of the students in the control group in the first and second performance assessments were 74.01 ± 21.67 points and 66.40 ± 18.51 points, respectively. No statistically significant difference was noted between the two assessments ($p > 0.05$). In the experimental group, the mean scores of the students in the first and second performance assessments were 87.74 ± 11.82 points and 85.37 ± 10.39 points, respectively. No statistically significant difference was observed between the two assessments ($p > 0.05$). In the first performance assessment, no statistically significant difference was observed between the mean scores of the students in the control and experimental groups. In the second performance assessment, a statistically significant difference was noted between the mean scores of the students in both groups ($p < 0.001$) (Table 1).

The responses of the students in the control and experimental groups to the 'We Practice Remote Clinical Skills Together Online Comments Form' were categorized into the following three themes: emotion, learning, and self-confidence, and 34 codes have been formed (Table 2).

Discussion

During the pandemic, the impact on psychomotor skills learning was a challenge for remote teaching and learning. Disciplines wherein skill practice plays a key role in

Table 2 Theme, categories, and some quotes from the students ($N = 34$)

Theme	Categories	*n*	Students' statements
Emotions	Happiness	6	• *It is more fun to practice skills in the laboratory than watching online videos, and I am very glad that I did it face-to-face (C1).* • *I was happy to perform what I had learned under the supervision of a teacher (C3).*
	Stress	4	• *After watching the video, I was thinking that I knew how to measure blood pressure; however, when I practiced it in the laboratory, I realized that I had shortcomings, I mean, there were factors such as confusion. However, I was overly stressed. If I had not practiced the skill in the laboratory, I would never have known what I lacked. Additionally, being face-to-face is more serious (C4).* • *In the online practice, I was less excited because I was in my comfort and safety zone in my own room at home; however, it was not the same in the face-to-face practice. I was highly excited, stressed, and nervous (E3).*
	Feeling comfortable	4	• *Frankly, I felt comfortable when I practiced online with my lecturer, and practicing with someone familiar to me further enhanced this comfort (E5).* • *I was excited while practicing in the laboratory, but I felt more comfortable since I practiced it online (E9).*
	Fear	3	• *It was our first practice online. Therefore, I was so excited and afraid that I could fail (E7).*
Total	***17 (50%)***		
Learning	Awareness	4	• *I believed that I learned the blood pressure skill when I watched the video. I realized that I learned it better when I practiced it in the laboratory (C5).* • *It was more instructive to practice the skill in the laboratory than to learn it by watching a video (C2).*
	Interaction–communication	4	• *In face-to-face practices, we can communicate more effectively with our educators, and I feel closer to nursing in these practices. I was not feeling so intense while watching videos; however, when I am in the laboratory setting, I feel more active and deeply learned (C12).*
	Skill acquisition	3	• *While watching the skill videos, I learned more about the theoretical side of practice; however, it was not as good as face-to-face (or one-on-one). I felt more fulfilled both theoretically and in terms of manual skills with face-to-face practices (C15).* • *I believe it was very useful for me to learn how to measure blood pressure, and I was able to practice it better (E14).*
	Information retention	3	• *I realized that the information gained by watching videos was not permanent while practicing in the laboratory (E17).* • *Practicing blood pressure measuring on Zoom together with my educator was a reminder of face-to-face practice (C10).*
Total	***14 (41%)***		
Self-confidence	Skill practice in the laboratory	3	• *I learned how to measure blood pressure in the online practice with our educator; however, I did not believe it was sufficient since it was online. I measured the blood pressure of my family members during the summer holidays. I was very pleased when I heard that we would practice it face-to-face when the school opened because I truly believed that I had learned it properly after the face-to-face practice, and I felt more confident (C21).* • *I was not so confident in online practices, and I wondered whether I was practicing them correctly; therefore, I strongly supported face-to-face practices (E16).*
Total	***3 (9%)***		
General total	***34 (100%)***		

E, code name of the students in the experimental group; C, code name of the students in the control group

the learning process, including clinical practice and laboratory practice, had to rethink their learning approaches. Although innovative online strategies for practical learning existed before the pandemic, the sudden shift in the use of online platforms presented new challenges. In several cases, a common response was postponement of practical learning activities. However, this situation has left a learning gap that raises concerns about students' future skills. Noninvasive skills combined with education are considered to affect the skill acquisition of students online in cases where meeting face-to-face in education, such as during the pandemic period, is not possible.

In this study, the blood pressure measurement skills of first-year student nurses who practiced the skill remote learning together with the educator during the pandemic resulted in significantly better learning success than did those who employed the video-based learning method ($p = 0.001$; $Z = -3.372$) (Table 1). Engaging in remote learning with educators offered students increased interaction and guidance. This method provides students with immediate feedback and the opportunity to ask questions, which is believed to support learning. Communication and interpersonal relationships between students and faculty are essential for effective remote learning [19]. Lima Lopes et al. (2019) used video-assisted bed bath simulation to improve the psychomotor skill performance of student nurses and reported that video-assisted practice accompanied by an educator was more effective in developing skills than practice alone with an educator [20]. Another study reported that first-year student nurses who combined online game-based learning and the watch–summarize–question strategy for learning aspiration skills during the pandemic had significantly

better learning success than did those who employed the video-based learning method [10].

Previous studies have demonstrated that active student engagement, educator feedback during practice, and guided learning significantly influence skill acquisition [10, 19, 20]. Our findings align with these results, highlighting the importance of providing students with access to appropriate materials to facilitate repeated practice and mastery of the skill. Although there was no significant difference between the pre- and posttest scores within each group, the experimental group demonstrated higher overall skill scores than did the control group. This outcome underscores the potential benefits of providing students in the experimental group with the necessary materials and a structured environment for skill practice. These findings suggest that access to materials, combined with active educator involvement, may enhance skill acquisition and performance. The guidance of the educator supports students to acquire both technical skills in their learning process and to develop their competences in applying these skills and adapting to assessment processes.

Consistent with these results, in the present study, the scores of the students in the experimental group on the blood pressure measurement skill checklist were similar to their scores on the first and second performance assessments (87.74 ± 11.82 points and 85.37 ± 10.39 points, respectively). The scores of the students in the control group decreased in the second performance assessment (74.01 ± 21.67 points and 66.40 ± 18.51 points). Wanner et al. (2016) evaluated the effect of the material that participants prepared at home by watching videos before cardiopulmonary resuscitation training on skill development. They emphasized that the participants' knowledge and psychomotor skills improved when they used the home-based video self-instruction method [21].

In the present study, the students in the experimental group received scores close to the maximum score that could be obtained from the checklist. Therefore, determining the performance of a simulated patient in the home setting by the students themselves, practicing the skill together with the educator on the simulated patient they determined, and the availability of a manual blood pressure measuring device positively affected the skill performance of the students in the qualitative skill assessment. The students in the experimental group evaluated remote skill learning together with the educator during face-to-face skill evaluation as a reminder and stated that it was highly useful during skill learning. The student's opinion on this matter was as follows: "*In the online practice, I was less excited because I was in my comfort and safety zone in my room at home; however, it was not the same in the face-to-face practice. I was highly excited, stressed, and nervous*" (Table 2). An analysis of the opinions of the students in the control and experimental groups about remote psychomotor skill education revealed that they supported the quantitative findings of this study. A previous study evaluated the ophthalmic examination skills of students and reported that the students emphasized that they could follow the remote clinical demonstration better using preeducation materials; however, they stated that the lack of an ophthalmoscope and a simulated patient to practice were barriers to learning [22].

Analysis of the results of the second face-to-face skill assessment revealed that the students who learned the skill remote together with the educator had greater skill retention in their minds than did those who learned the skill by watching videos alone. This conclusion was influenced by watching and listening to the skill of the educator and subsequently practicing the skill together with the educator in the experimental group. Moreover, this result may be associated with the safe atmosphere that the educator provided online while practicing the skill and the developmental feedback that the educator provided to the student while practicing the skill. Although the skill performance was better in the experimental group, the feedback of the students on the face-to-face experience was more positive (Table 2). The students stated their feelings in the second face-to-face assessment as follows: "*I was happy to perform what I had learned under the supervision of a teacher.*"

The students in the control group mentioned that watching online videos led to a lack of self-confidence in skill acquisition and that their knowledge was not permanent (Table 2). Their mean scores on the checklist were lower than those of the experimental group, with a statistically significant difference noted in the second performance assessment ($p = 0.001$; $Z = -3.372$). This finding suggested that knowledge permanence was also negatively affected when students were inactive in the learning process. A consistent theme that emerged across all the studies in this study was the essential nature of clinical placement and the necessity of learning practical skills in an in-person simulation environment, as distance education is insufficient for acquiring hands-on skills [23]. As stated by Aldridge and McQuagge (2021), 'oh, this is practice, but it is not. It is clicking on a button to introduce yourself or to take the blood pressure, and there is no emphasis on skills, in my opinion" [2]. One study indicated that videos demonstrating skill performance are useful as long as they are interesting and immersive and when students are not passive observers [24].

The failure to effectively maintain distance education, especially during the COVID-19 pandemic, is predicted to be a major public health concern for future nursing labor and quality of care [25]. A previous study reported that student nurses had difficulties learning skills owing to the lack

of materials for measuring blood pressure and inserting Foley catheters at home [2]. Conversely, studies indicate that if the remote teaching method is well managed, it can even become equivalent, if not better, than face-to-face education [26].

Implications for nursing education

For situations where face-to-face skill teaching is not possible, this study demonstrates that integrating remote skill practice, which supports active student engagement and provides educator feedback, offers an innovative approach to skill acquisition. By engaging students in real-time interactive sessions, this method not only improves skill performance but also fosters positive attitudes toward learning. While interactive sessions ensure active participation of students in learning processes, they also play an important role in terms of retention of knowledge and skills. Therefore, when evaluating the effectiveness of training methods, not only short-term achievements but also the level of retention of the knowledge acquired by individuals should be taken into consideration.

The fact that the control group experienced the skill independently during the application, and that the possibility of students in the experimental group watching similar videos on the web was not controlled, was accepted as a limitation of the study. However, the important point in the study is that the students in the experimental group performed this application for the first time in the presence of an instructor.

Conclusions

The method developed in this study offers a practical model for adapting remote teaching to simulate real-life clinical practice. By focusing on guided learning and active participation, this strategy can be applied to teach various skills in nursing education. The findings highlight the potential of integrating such innovative approaches into nursing curricula, especially when face-to-face teaching is not possible.

Further research is needed to explore the applicability of this method to different nursing skills and assess its effectiveness in diverse learning environments. Such studies could provide valuable insights to enhance the utility of guided remote skill practice in nursing education, paving the way for more adaptable and effective teaching strategies.

Abbreviations

COVID-19	Coronavirus disease 2019
LMS	Learning Management System

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12912-025-03028-6.

Supplementary Material 1

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Author contributions

HYÇ, ÜK: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing–original draft, Writing–review & editing.

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Data availability

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

Declarations

Ethical approval

The study was approved by the Medical Research Ethics Committee of Acıbadem University and Acıbadem Healthcare Institutions (Date: 24.02.2021 & No: ATADEK-2021-04/32). Informed consent was obtained from all participants before their inclusion in the study. The research was conducted in accordance with the Declaration of Helsinki, the institutional Code of Ethics, and complied with all relevant guidelines and regulations. We affirm that the protection of intellectual property related to this work has been thoroughly considered, and the regulations of our institutions have been fully adhered to. Additionally, any part of this study involving human subjects was conducted with the approval of all relevant ethical bodies, and these approvals are acknowledged in the manuscript.

Consent for publication

Not applicable.

Clinical trial number

Not applicable.

Photograph permissions

We confirm that all the photographs included in this manuscript have been used with the necessary permissions. The individuals in the photographs provided written consent for the publication of these images as part of the manuscript.

Competing interests

The authors declare no competing interests.

Author details

[1]Department of Nursing, Acibadem Mehmet Ali Aydinlar University, Istanbul, Türkiye

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