ORIGINAL RESEARCH ARTICLE

Effectiveness of online simulation-based versus face-to-face training on episiotomy skills among midwifery students in Turkey

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Abstract

This study evaluated the effectiveness of synchronous online simulation compared with face-to-face instruction in teaching episiotomy repair skills to midwifery students. It also assessed learning satisfaction and self-confidence. A randomized controlled study was conducted with undergraduate students enrolled in a childbirth course. Participants were randomly assigned to either a synchronous online or face-to-face training group. Both groups received structured instruction using standardized simulation models. Outcomes were measured using the Student Satisfaction and Self-Confidence in Learning Scale and the Episiotomy Skill Evaluation Form. Both training formats resulted in similarly high levels of skill performance. The online group demonstrated significantly higher self-confidence and overall learning satisfaction, while skill outcomes were comparable between groups. No significant associations were found between demographic characteristics and study outcomes. Synchronous online simulation is a feasible and effective alternative to face-to-face training for developing procedural skills while also enhancing learner confidence and satisfaction. *(Afr J Reprod Health 2026; 30 [14]: 94-102).*

Keywords: Synchronous, Online Simulation, Midwifery Education.

Résumé

Cette étude a évalué l'efficacité de la simulation synchrone en ligne par rapport à l'enseignement en présentiel pour l'apprentissage des techniques de réparation d'épisiotomie chez les étudiantes sages-femmes. Elle a également évalué la satisfaction et la confiance en soi des apprenantes. Une étude contrôlée randomisée a été menée auprès d'étudiantes de premier cycle inscrites à un cours de préparation à l'accouchement. Les participantes ont été réparties aléatoirement dans un groupe de formation synchrone en ligne ou en présentiel. Les deux groupes ont reçu un enseignement structuré utilisant des modèles de simulation standardisés. Les résultats ont été mesurés à l'aide de l'échelle de satisfaction et de confiance en soi des étudiantes et du formulaire d'évaluation des compétences en épisiotomie. Les deux modalités de formation ont permis d'atteindre des niveaux de performance élevés et similaires. Le groupe en ligne a démontré une confiance en soi et une satisfaction globale significativement plus élevées, tandis que les résultats en matière de compétences étaient comparables entre les groupes. Aucune association significative n'a été trouvée entre les caractéristiques démographiques et les résultats de l'étude. La simulation synchrone en ligne est une alternative faisable et efficace à la formation en présentiel pour le développement des compétences procédurales, tout en renforçant la confiance et la satisfaction des apprenantes. *(Afr J Reprod Health 2026; 30 [14]: 94-102).*

Mots-clés: Simulation en ligne synchrone, formation en maïeutique

Introduction

Midwifery education in Turkey is delivered at the undergraduate level through a four-year program that integrates theoretical coursework with progressive clinical training. Students begin their clinical placements in the second year, gaining supervised experience in antenatal, intrapartum, and postnatal care. By graduation, midwifery students are expected to meet both national and international competency standards, which include the ability to perform essential obstetric procedures when clinically indicated. [1-4] Competency development in these procedures is critical not only for clinical readiness but also for ensuring safe, evidence-based maternity care.

Practical skill acquisition in midwifery education is most commonly supported through

simulation-based learning in laboratory environments. These sessions use synthetic models or animal tissue to replicate clinical scenarios, allowing students to practice and refine their psychomotor skills before performing them in real-life settings. Simulation has been shown to reduce performance anxiety, improve self-confidence, strengthen self-efficacy, and enhance student satisfaction.[5-11] Traditionally, such sessions are conducted face-to-face, enabling direct supervision and immediate feedback from instructors.

However, extraordinary events in recent years have disrupted the continuity of this traditional approach. During the COVID-19 pandemic, for example, Turkey's universities—including health sciences programs—were required to transition rapidly to online learning environments.[12] Similarly, the 2023 Kahramanmaraş earthquake and other natural disasters created prolonged interruptions to on-campus teaching. These circumstances revealed the vulnerability of skill-based education to external disruptions and highlighted the need for alternative, resilient modes of delivery.

Virtual and hybrid learning environments have emerged as viable options for mitigating such disruptions.[13,14] In particular, synchronous online education—where students participate in live, interactive sessions—offers opportunities for real-time demonstration, immediate questioning, and personalized feedback. This format allows for greater engagement than asynchronous approaches and can be adapted to support psychomotor skill acquisition.[15] Importantly, synchronous online training may also improve educational equity by reaching students in remote or underserved areas who cannot easily attend on-campus sessions.

Despite these advantages, there is a limited body of research on the effectiveness of synchronous online simulation for technical skill development in midwifery education. Previous studies have evaluated home-based learning packages and "home suture kits"[16], but these typically lacked live educator–student interaction, were developed in high-income countries, and often carried high implementation costs. Synchronous online simulation, by contrast, may represent a cost-effective and scalable approach that is adaptable to different socio-economic contexts.

In the present study, episiotomy training was selected as the procedural skill for evaluation. While the global frequency of episiotomy has declined and is relatively low in many countries[17], and is included in both national and international competency frameworks for midwifery practice.[1] In this research, episiotomy training serves as a representative model for assessing the broader question: Can synchronous online simulation effectively support psychomotor skill acquisition, student satisfaction, and self-confidence in a midwifery education context?

This study aimed to evaluate the effectiveness of synchronous online episiotomy simulation training, compared with traditional face-to-face instruction, on midwifery students' skill performance, satisfaction with the teaching method, and self-confidence. The findings may provide valuable insights for the integration of synchronous online simulation into health professions education, particularly in contexts where access to in-person training is limited or disrupted.

Methods

Study design and sampling

This study was designed as a comparative randomised controlled trial (ClinicalTrials.gov ID: NCT06283537). The study was conducted during the 2023–2024 academic year with third-year midwifery students from the Department of Midwifery, Faculty of Health Sciences at Kastamonu University in northern Turkey. The study population comprised all third-year undergraduate midwifery students (n = 60) enrolled in the *Normal Birth and Postpartum Care* course. Of these, 30 students were randomly assigned to the online education group and 30 to the face-to-face education group. Students were eligible to participate if they (1) had no prior experience with episiotomy, (2) were enrolled in the *Normal Birth and Postpartum Care* course, and (3) volunteered to take part in the study.

Randomization

Participants were randomly allocated to either the synchronous online simulation group or the face-to-face training group in a 1:1 ratio. The random allocation sequence was generated using a computer-based random number generator. After

confirming eligibility, each participant was assigned to a study group according to the predetermined randomization sequence.

Data collection tools

Data were collected using the *Student Information Form*, the *Episiotomy Skill Evaluation Form*, and the *Student Satisfaction and Self-Confidence in Learning Scale*.

Student information form

This form was developed by the researcher based on a review of the literature.[4,7,8] It consists of 10 questions designed to collect socio-demographic data and descriptive characteristics related to episiotomy. The form included questions on age, course grade average, marital status, family structure, perceived income level, and the presence of a healthcare provider in the family, as well as prior online clinical skills training, observation of episiotomy in clinical settings, the method of training received, and the type of materials used for practice.

Episiotomy skill evaluation form

Developed by Yılar Erkek and Öztürk Altınayak (2021), this form includes 40 procedural steps involved in performing an episiotomy.[8] Following the demonstration, each correctly performed step is awarded 2.5 points, while unperformed steps receive 0 points. The maximum possible score is 100, with higher scores indicating greater skill performance. In the original study, the Cronbach's alpha coefficient was 0.855. In the present study, it was calculated as 0.817.

Student satisfaction and self-confidence in learning scale

This scale was originally developed by Franklin, Burns, and Lee (2014) under the National League for Nurses to assess students' perceptions of simulation-based learning.[18] The Turkish adaptation and validation were conducted by Karaçay and Kaya (2017), reporting a Cronbach's alpha of 0.88.[19] The scale includes 13 items across two sub-dimensions: *satisfaction with learning* and *self-confidence*. It uses a five-point Likert scale, with total scores ranging from 17 to 61. Higher scores indicate greater satisfaction and self-confidence. In this study, the Cronbach's alpha coefficient was 0.859.

Procedure

Students in the online group were provided with an episiotomy suture kit—including surgical scissors, forceps, a straight needle holder, and two 2/0 silk catgut sutures—and were instructed to take it home. The same suture kit was distributed to students in the face-to-face group during the on-campus practice session.

Episiotomy simulation training for the online group was delivered via a virtual classroom using the university's free online education platform. In contrast, the face-to-face group received traditional in-person simulation training on campus.

To prevent cross-group interaction, the study was conducted during the semester break. Online training was carried out at home during the break period, while face-to-face training was conducted at the university after the break.

Following the completion of all training sessions, the evaluation phase began. To minimise potential bias, a blinding technique was employed: skill assessments were conducted by a different midwifery instructor, independent from the training sessions, using the *Episiotomy Skill Evaluation Form*. After this evaluation, students were asked to complete the *Student Information Form* and the *Student Satisfaction and Self-Confidence in Learning Scale*.

Data analysis

The data were analyzed using SPSS for Windows, version 22. Descriptive statistics, including frequencies, percentages, minimum and maximum values, means, and standard deviations, were calculated. The normality of data distribution was assessed using skewness and kurtosis coefficients, with ±2 considered an acceptable range.

For data that did not meet the assumption of normality, the Mann–Whitney U test and the Kruskal–Wallis test (for comparisons involving more than two independent groups) were used. For normally distributed data, the Independent Samples t-test and Analysis of Variance (ANOVA) were employed. To assess relationships between variables, Spearman correlation analysis was conducted.

Ethical considerations

The study was approved by the Kastamonu University Clinical Ethics Committee (Decision No: 2023-KAEK-49; Date: 03/05/2023). All participants were informed about the purpose and procedures of the study. Informed consent was obtained from those who voluntarily agreed to participate. Participants were also informed that they could withdraw from the study at any time. No payment was offered for participation.

Results

A total of 60 third-year midwifery students were included in the study, with 30 participants in each group. The mean age of participants was 21.8 years in both the face-to-face and online groups. All participants were single, and the majority reported living in nuclear families. Most students had a grade point average in the 70–84 (BB) range and reported moderate income levels.

A higher proportion of participants in the face-to-face group had previously observed episiotomy in a clinical setting compared to the online group (70.0% vs. 50.0%); however, this difference was not statistically significant ($p > 0.05$). None of the participants had received prior online clinical skills training, and most did not have a healthcare professional in their family.

Overall, there were no statistically significant differences between the groups in terms of baseline demographic characteristics, indicating that the groups were comparable at baseline (Table 1).

Student satisfaction and self-confidence in learning

The overall mean score on the Student Satisfaction and Self-Confidence in Learning Scale was 52.5 ± 5.5. The mean scores for the Satisfaction with Learning and Self-Confidence sub-dimensions were 21.9 ± 2.5 and 30.6 ± 3.5, respectively (Table 2).

Comparison between groups revealed that the online group had significantly higher scores in the Self-Confidence sub-dimension and total scale scores compared to the face-to-face group ($p < 0.05$). Although the online group showed higher self-confidence and total scores, the magnitude of the difference was moderate. However, no statistically significant difference was found between the groups in terms of Satisfaction with Learning ($p > 0.05$) (Table 3).

These findings suggest that synchronous online simulation may be more effective in enhancing students' self-confidence and overall learning perception.

Episiotomy skill performance

The mean score on the Episiotomy Skill Evaluation Form was 89.1 ± 10.1, indicating a high level of skill performance across participants (Table 2). There was no statistically significant difference between the online and face-to-face groups in skill scores ($p > 0.05$) (Table 3).

This finding indicates that both instructional methods were similarly effective in supporting procedural skill acquisition.

Post-training self-confidence

The mean post-training self-confidence score was 5.4 ± 1.5 in the face-to-face group and 4.8 ± 1.5 in the online group. The difference between groups was not statistically significant ($p > 0.05$).

Analysis by descriptive characteristics

No statistically significant differences were found in Student Satisfaction and Self-Confidence in Learning Scale scores or Episiotomy Skill scores based on demographic variables such as academic performance (normal birth lecture notes), income level, or the presence of a healthcare professional in the family ($p > 0.05$) (Table 4).These findings indicate that none of the examined demographic variables had a measurable impact on either learning outcomes or skill performance.

Correlations analysis

Pearson correlation analysis revealed a statistically significant, positive, and low-level relationship between post-training self-confidence and both the Episiotomy Skill scores and total Student Satisfaction and Self-Confidence in Learning Scale scores ($p < 0.05$).In addition, a significant positive correlation was observed between Student Satisfaction and Self-Confidence in Learning Scale scores and Episiotomy Skill scores ($p < 0.05$).These

Table 1: Baseline characteristics of participants by study group

Variable	Category	Face to Face Group (n=30) n (%)	Online Group (n=30) n (%)	Test	Significance
Normal Birth Lecture Notes	90-100 (AA)	5 (16.7)	9 (30.0)	x^2=7.376	p=0.117
	85-89 (BA)	9 (30.0)	4 (13.3)		
	70-84 (BB)	13 (43.3)	16 (53.3)		
	60-64 (CC)	0 (0.0)	1 (3.3)		
	55-59 (DC)	3 (10.0)	0 (0.0)		
Age	20-24 years	30 (100.0)	30 (100.0)	-	
Marital Status	Single	30 (100.0)	30 (100.0)	-	
Family Type	Core	22 (73.3)	26 (86.7)	x^2=1.667	p=0.197
	Extensive	8 (26.7)	4 (13.3)		
Income Level	Low	0 (0.0)	3 (10.0)	x^2=5.861	p=0.053
	Moderate	23 (76.7)	25 (83.3)		
	High	7 (23.3)	2 (6.7)		
Online Clinical Skills Training	No	30 (100.0)	30 (100.0)	-	
Clinical Episiotomy Observation	Yes	21 (70.0)	15 (50.0)	x^2=2.500	p=0.114
	No	9 (30.0)	15 (50.0)		
Healthcare Provider in Family	Yes	6 (20.0)	4 (13.3)	x^2=0.480	p=0.488
	No	24 (80.0)	26 (86.7)		

Table 2: Descriptive statistics of learning satisfaction, self-confidence, and episiotomy skill scores

Scale/Subscales	n	Min.	Max.	Mean	SD.
Learning Satisfaction	60	16.0	25.0	21.9	2.5
Self-Confidence	60	16.0	38.0	30.6	3.5
Total Scale Score	60	35.0	63.0	52.5	5.5
Episiotomy Skill Score	60	52.5	100.0	89.1	10.1

Table 3: Comparison of learning satisfaction, self-confidence, and episiotomy skill scores between groups

Variable	Face to Face Group (n=30)		Online Group (n=30)		Test	Significance
	Mean	SD.	Mean	SD.		
Satisfaction with Learning	21.3	2.2	22.4	2.6	t=-1.648	p=0.105
Self-Confidence	29.6	3.9	31.6	2.9	U=291.500	p=**0.018**
Total Scale Score	51.0	5.5	54.0	5.2	t=-2.209	p=**0.031**
Episiotomy Skill Score	88.6	11.1	89.6	9.3	U=440.500	p=0.887

t: Independent groups t test, U: Mann Whitney U test

Table 4: Comparison of outcome scores across participant characteristics

		Learning Satisfaction and Self-Confidence Scale Total Score		Episiotomy Skill Score		Test	Significance
		Mean	**SD.**	**Mean**	**SD.**		
Normal Birth	90-100 (AA)	55.1	4.7	92.7	5.7	F=1.186	p=0.327
Lecture Notes	85-89 (BA)	52.1	4.4	90.2	9.3	x^2_{KW}=3.394	p=0.494
	70-84 (BB)	51.5	6.2	87.4	11.1		
	60-64 (CC)	56.0	-	95.0	-		
	55-59 (DC)	51.3	4.2	81.7	18.7		
Income Level	Low	55.3	5.1	96.7	3.8	F=0.657	p=0.522
	Moderate	52.2	5.6	88.3	10.0	x^2_{KW}=4.685	p=0.096
	High	53.6	5.1	90.8	11.7		
Healthcare Provider in Family	Yes	52.0	5.8	88.3	10.2	t=-0.323	p=0.748
	No	52.6	5.5	89.3	10.2	*U*=224.000	p=0.603
Clinical Episiotomy Observation	Yes	52.8	4.6	90.5	9.1	t=0.371	p=0.713
	No	52.2	6.7	86.9	11.4	*U*=333.000	p=0.132

t: Independent groups t test, F: Variance analysis, U: Mann Whitney U test, x2KW: Kruskall Wallis analysis.

Table 5: Correlation between self-confidence, learning satisfaction, and episiotomy skill scores

Variable	Post-Training Self-Confidence (n=60)	Learning Satisfaction and Self-Confidence Scale Total Score (n=60)	Episiotomy Skill Score (n=60)
Learning Satisfaction and Self-Confidence Scale Total Score	-	r=0.404 (p=**0.001**)	r=0.406 (p=**0.001**)
Episiotomy Skill Score	0.404 (p=**0.001**)	-	0.433 (p=**0.001**)

findings indicate that higher self-confidence and satisfaction levels were associated with better skill performance (Table 5). However, the strength of these correlations was low, indicating a modest association.

Discussion

Simulation-based education is widely recognized as an effective approach for developing both technical competence and psychosocial readiness in health professions education.[20] In the present study, the effectiveness of synchronous online simulation was compared with face-to-face training in teaching episiotomy repair skills among midwifery students. The findings demonstrated that while both educational approaches resulted in similarly high levels of skill performance, the synchronous online simulation group reported significantly higher self-confidence and overall learning perception.

The absence of statistically significant differences in baseline characteristics between the groups indicates that the observed outcomes are attributable to the intervention rather than participant-related factors. This supports the internal validity of the study and strengthens the comparability of the two educational approaches.

One of the most notable findings is the higher level of self-confidence observed in the online group. This result aligns with previous studies demonstrating that simulation-based training enhances students' self-efficacy and reduces anxiety.[5,7] The online learning environment may provide additional advantages, such as flexibility, repeated practice opportunities, and access to recorded instructional content, all of which can facilitate self-paced learning and reduce performance pressure. Similarly, Brereton et al. (2022) reported that students participating in blended learning environments felt more confident practising clinical skills in less restrictive and more autonomous settings.[16] These findings suggest that synchronous online simulation may offer particular benefits in supporting confidence development, which is a critical component of clinical readiness.In contrast, no statistically significant difference was

found between the groups in terms of satisfaction with learning. This finding is consistent with previous research indicating that simulation-based training is generally well accepted by students, regardless of the delivery method.[9] The comparable satisfaction levels observed in this study suggest that both synchronous online and face-to-face simulation approaches can effectively meet learners' expectations and provide meaningful educational experiences.

With regard to skill acquisition, both groups achieved high episiotomy skill scores, with no significant difference between them. This finding is consistent with previous randomized controlled studies showing that simulation-based training can produce comparable skill outcomes across different instructional formats.[8] Similarly, recent multi-center evidence has demonstrated the effectiveness of simulation-based episiotomy training in improving procedural skills.[11] These findings indicate that when simulation training is well structured and supported by appropriate materials and instructional design, the mode of delivery may not significantly influence skill performance outcomes.

Importantly, the absence of significant differences in outcome scores across demographic variables such as academic performance, income level, and the presence of a healthcare professional in the family suggests that the effectiveness of the training is independent of individual background characteristics. This finding enhances the generalizability of the results and supports the applicability of synchronous online simulation across diverse student populations.

The correlation analysis revealed statistically significant but low-level positive relationships between self-confidence, learning satisfaction, and skill performance. These findings are consistent with previous research indicating that psychological factors such as self-confidence are associated with improved clinical performance, although the strength of these relationships may be modest.[18] This suggests that while self-confidence contributes to skill development, it is only one of several factors influencing learning outcomes.

Taken together, the findings of this study support the growing body of evidence that simulation-based education is an effective method for teaching clinical skills in midwifery education. More importantly, the results demonstrate that synchronous online simulation is not only a viable alternative during extraordinary circumstances such as pandemics but also a practical and effective strategy for routine educational practice. Its flexibility, scalability, and potential to enhance learner confidence make it particularly valuable in contexts where access to traditional clinical training environments may be limited.

Strengths and limitations

This study has several limitations that should be considered when interpreting the findings. First, the sample size was limited to midwifery students from a single university in Turkey, which may restrict the generalizability of the results to other institutions or educational contexts. Second, skill performance was assessed using simulated models rather than in real clinical settings, and therefore, the results may not fully reflect students' performance in practice. Third, the study did not evaluate the long-term retention of skills, so it is unclear whether the observed benefits of synchronous online training persist over time. Fourth, while self-confidence and satisfaction were measured through validated self-report tools, these outcomes are subjective and may have been influenced by personal preferences for learning format. Finally, the study focused on one specific procedure—episiotomy repair—which may limit the applicability of findings to other clinical skills. Future research, including larger, multi-site samples, diverse clinical procedures, and follow-up assessments, is recommended to strengthen the evidence base for synchronous online simulation in midwifery education.

Implications to public health practice

The findings of this study have important implications for midwifery education and health professions training. The demonstrated effectiveness of synchronous online simulation suggests that it can be integrated into educational curricula as a complementary or alternative teaching method. This is particularly relevant in contexts where access to clinical training is limited due to logistical, geographical, or public health constraints.

From a policy perspective, the integration of online simulation into health professions education programs may enhance the resilience and flexibility of educational systems. Educational institutions should consider investing in digital infrastructure,

simulation materials, and faculty training to support the effective implementation of such approaches. In addition, aligning simulation-based training with national and international competency frameworks, such as those outlined by professional bodies, may further strengthen the quality and standardization of midwifery education.

Recommendations

Based on the study findings, several practical recommendations can be made to enhance skill-based education in midwifery. Supplementing both synchronous online and face-to-face training with accessible recorded videos may help students review content and reinforce learning. Providing students with practice materials for home use can support continued hands-on skill development outside of scheduled sessions. Additionally, for students unable to attend face-to-face classes, synchronous online episiotomy skill education can serve as an effective alternative for acquiring procedural competence.

Conclusion

This study demonstrated that synchronous online simulation training is an effective alternative to face-to-face instruction for developing episiotomy practice skills in midwifery students. The online format was associated with higher self-confidence and satisfaction, while skill acquisition outcomes were comparable across both delivery modes. These findings indicate that offering both synchronous online and face-to-face formats can enhance flexibility and accessibility in midwifery education. Overall, the results support the integration of synchronous online simulation into skill-based curricula as a complementary approach alongside traditional methods.

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Conflicts of interest

The author declares no conflict of interest.

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Authors' contributions

NA; Conceptualization, methodology, data curation, investigation, validation, visualization, supervision, writing – original draft, writing review and editing, formal analysis, project administration, resources.

Data availability

Data available on request from the author**.**

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