ORIGINAL ARTICLE

Nurses' knowledge, attitudes, and practices regarding sexually transmitted infection: a comparison between online and group education

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Background: Sexually transmitted infections (STI) have numerous complications. Nurses can play a crucial role in educating people to prevent and treatment. This study aimed to compare the impact of online and group education on nurses' knowledge, attitudes, and practices regarding STI.
Method: This quasi-experimental study was conducted at Women and Children hospital in Diwaniyah, Iraq, in 2023. Pre-test and post-test were conducted using a questionnaire. Follow-up design was also performed. The participants were divided into two groups (n = 50/group) as a WhatsApp-based training program, and the group-based training by random allocation. Data were analyzed in SPSS 22 using repeated-measures ANOVA, the Bonferroni correction, Kolmogorov-Smirnov, Levene's tests, Fisher's exact test, and Mann-Whitney U test.
Results: The results showed that both groups had significant improvements in knowledge, attitude, and practice from before to after the intervention ($p < 0.001$). The group teaching group had significantly higher knowledge and attitude scores (19.80, 42.32) than the online teaching group (18.06, 39.00) ($p = 0.008$; $p = 0.012$). Both teaching methods were effective in improving practice scores.
Conclusion: Both methods led to significant improvements in all three domains; however, the group-based method was more effective, particularly in improving knowledge and attitudes. Future research should also explore the long-term effects of hybrid models on learners' competencies and patient outcomes.

Keywords: Nursing Education, Online Learning, Group Process, Knowledge, Attitudes, Practices, Sexually Transmitted Infection

معرفة الممرضات ومواقفهن وممارساتهن فيما يتعلق بالأمراض المنقولة جنسياً: مقارنة بين التعليم عبر الإنترنت والتعليم الجماعي

ملخص: للأمراض المنقولة جنسيًا مضاعفات عديدة. ويمكن للممرضات أن يلعبن دورًا محوريًا في تثقيف الناس للوقاية منها وعلاجها. هدفت هذه الدراسة إلى مقارنة تأثير التعليم الإلكتروني والجماعي على معارف الممرضات ومواقفهن وممارساتهن المتعلقة بالأمراض المنقولة جنسيًا.
الطريقة: أُجريت هذه الدراسة شبه التجريبية في مستشفى النساء والأطفال في الديوانية، العراق، عام ٢٠٢٣. أُجري اختبار قبلي واختبار بعدي باستخدام استبيان. كما طُبّق تصميم متابعة. قُسّم المشاركون إلى مجموعتين (ن = ٥٠/مجموعة) كبرنامج تدريبي قائم على تطبيق واتساب، وتدريب جماعي بالتوزيع العشوائي. حُللت البيانات باستخدام برنامج SPSS 22 باستخدام تحليل التباين المتكرر (ANOVA)، وتصحيح بونفيروني، واختبار كولموغوروف-سميرنوف، واختبار ليفين، واختبار فيشر الدقيق، واختبار مان-ويتني يو.
النتائج: أظهرت النتائج تحسنًا ملحوظًا في المعرفة والسلوكيات والممارسة لدى كلتا المجموعتين قبل وبعد التدخل (قيمة الاحتمال < ٠,٠٠١). وحققت مجموعة التدريس الجماعي درجات أعلى بكثير في المعرفة والسلوكيات (١٩,٨٠، ٤٢,٣٢) مقارنةً بمجموعة التدريس عبر الإنترنت (١٨,٠٦، ٣٩,٠٠) (قيمة الاحتمال = ٠,٠٠٨؛ قيمة الاحتمال = ٠,٠١٢). وكانت كلتا طريقتي التدريس فعالتين في تحسين درجات الممارسة.
الاستنتاج: أدت كلتا الطريقتين إلى تحسينات ملحوظة في جميع المجالات الثلاثة؛ إلا أن الطريقة الجماعية كانت أكثر فعالية، لا سيما في تحسين المعرفة والمواقف. ينبغي أن تستكشف الأبحاث المستقبلية أيضًا الآثار طويلة المدى للنماذج الهجينة على كفاءات المتعلمين ونتائج المرضى.

الكلمات المفتاحية: تعليم التمريض، التعلم عبر الإنترنت، العملية الجماعية، المعرفة، المواقف، الممارسات، الأمراض المنقولة جنسيًا

جنسی طور پر منتقل ہونے والے انفیکشن کے بارے میں نرسوں کا علم، رویہ، اور طرز عمل: آن لائن اور گروپ ایجوکیشن کے درمیان موازنہ

پس منظر: جنسی طور پر منتقل ہونے والے انفیکشن (STI) میں متعدد پیچیدگیاں ہوتی ہیں۔ نرسیں لوگوں کو روک تھام اور علاج کی تعلیم دینے میں اہم کردار ادا کر سکتی ہیں۔ اس مطالعہ کا مقصد STI کے بارے میں نرسوں کے علم، رویوں اور طریقوں پر آن لائن اور گروپ ایجوکیشن کے اثرات کا موازنہ کرنا تھا۔
طریقہ: یہ نیم تجرباتی مطالعہ ۲۰۲۳ میں عراق کے دیوانیہ میں خواتین اور بچوں کے اسپتال میں کیا گیا تھا۔ پری ٹیسٹ اور پوسٹ ٹیسٹ ایک سوالنامے کا استعمال کرتے ہوئے کیا گیا تھا۔ فالو اپ ڈیزائن بھی کیا گیا۔ شرکاء کو واٹس ایپ پر مبنی تربیتی پروگرام کے طور پر دو گروپوں (n = 50/گروپ) میں تقسیم کیا گیا تھا، اور گروپ کی بنیاد پر تربیت بے ترتیب مختص کی گئی تھی۔ اعداد و شمار کا تجزیہ SPSS 22 میں بار بار کے اقدامات انووا، بونفیرونی اصلاح، کولموگوروف-سمرنوف، لیوین کے ٹیسٹ، فشر کے عین مطابق ٹیسٹ، اور مان-وہٹنی یو ٹیسٹ کا استعمال کرتے ہوئے کیا گیا۔
نتائج: نتائج سے پتہ چلتا ہے کہ دونوں گروپوں نے مداخلت سے پہلے سے لے کر بعد تک علم، رویہ اور عمل میں نمایاں بہتری لائی ہے (p <۰٫۰۰۱)۔ گروپ ٹیچنگ گروپ کے پاس آن لائن ٹیچنگ گروپ (۱۸٫۰۶، ۳۹٫۰۰) (p = 0.008؛p = 0.012) سے نمایاں طور پر زیادہ علم اور رویہ کے اسکور (۱۹٫۸۰، ۴۲٫۳۲) تھے۔ دونوں تدریسی طریقے پریکٹس کے اسکور کو بہتر بنانے میں موثر تھے۔
نتیجہ: دونوں طریقوں سے تینوں ڈومینز میں نمایاں بہتری آئی۔ تاہم، گروپ پر مبنی طریقہ زیادہ موثر تھا، خاص طور پر علم اور رویوں کو بہتر بنانے میں۔ مستقبل کی تحقیق کو سیکھنے والوں کی قابلیت اور مریض کے نتائج پر ہائبرڈ ماڈلز کے طویل مدتی اثرات کو بھی تلاش کرنا چاہیے۔

مطلوبہ الفاظ: نرسنگ کی تعلیم، آن لائن سیکھنے، گروپ عمل، علم، رویے، طرز عمل، جنسی طور پر منتقل ہونے والا انفیکشن

دانش، نگرش و عملکرد پرستاران در مورد بیماری های منتقل شونده جنسی: مقایسه بین آموزش آنلاین و گروهی

زمینه و هدف: بیماری های منتقل شونده جنسی (STI) عوارض متعددی ایجاد می کنند و پرستاران نقش مهمی در آموزش عموم جامعه در پیشگیری از این بیماری ها دارند. هدف از این مطالعه مقایسه تأثیر دو نوع آموزش آنلاین و گروهی بر دانش، نگرش و عملکرد پرستاران در مورد STI بود.
روش: این مطالعه نیمه تجربی در سال ۲۰۲۳ در بیمارستان زنان و کودکان شهر دیوانیه عراق انجام شد. پیش‌آزمون و پس‌آزمون با استفاده از پرسشنامه انجام گردید. شرکت کنندگان با استفاده از نرم افزار تخصیص تصادفی به دو گروه ۵۰ نفره آموزش واتساپ و آموزش گروهی تقسیم شدند. تجزیه و تحلیل داده ها با نرم افزار SPSS نسخه ۲۲ و با روش های آماری آزمون آنالیز واریانس، تعقیبی بونفرونی، کولموگروف اسمیرنوف، لوین، آزمون فیشر انجام شد.
یافته ها: هر دو گروه بعد از مداخله بهبود چشم گیری در دانش، نگرش و عملکرد نسبت به قبل از مداخله داشتند ($p < 0.001$). هم چنین، میانگین امتیاز دانش و نگرش پرستاران در گروه آموزش گروهی (۱۹/۸۰ و ۴۲/۳۲) به طور معناداری بیشتر از پرستاران در گروه آموزش آنلاین (۱۸/۰۶ و ۳۹) بود (p=۰/۰۱۲، p=۰/۰۰۸)، ولی میانگین امتیاز عملکرد پرستاران دو گروه تفاوت معناداری نداشت (p=۰/۵۹۹).
نتیجه گیری: هر دو روش باعث پیشرفت قابل توجهی در هر سه حوزه شدند؛ اما روش گروهی در بهبود دانش و نگرش موثرتر بود. از این رو پیشنهاد می شود آثار بلند مدت آموزش ترکیبی در پژوهش های آینده بررسی شود.

واژه های کلیدی: آموزش پرستاری، آموزش آنلاین، آموزش گروهی، دانش، نگرش، عملکرد، بیماری های منتقل شونده جنسی

INTRODUCTION

Sexually transmitted infections (STI) are caused by more than 30 types of bacteria, viruses, and parasites, which are spread through sexual contact or from mother to child. According to estimates from the World Health Organization (WHO), Over 1 million curable STI occur daily worldwide among people aged 15-49. In 2020, there were 374 million new cases. By 2022, 8 million had syphilis, 500 million people had genital herpes and 1.1 million pregnant women were infected with syphilis (1). A study conducted in 2023 by Maitham reported an HPV prevalence of 17.96% among Iraqi women aged 15-50. Among 362 participants, 65 tested positive-mostly women aged 30-35, housewives, and from socioeconomic backgrounds (2). STI are often asymptomatic and can lead to infertility, fetal malformations (3), pelvic inflammatory disease, and cervical dysplasia (4), impacting physical and emotional health (5).

High rates of STI remain a concern for healthcare professionals and health educators (5). Sul et al., as cited by Trickett, state that health literacy interventions are vital for STI's prevention, as they help individuals understand information and make informed health decisions (6). Incorporating health education can promote lifestyle changes, control modifiable risk factors, and improve treatment adherence (7). Nurses play a key role in STI prevention and treatment by educating patients and enhancing care through effective knowledge transfer (8-10). Therefore, nurses must be trained effectively.

A range of resources exists for nursing education, including the internet. Among these digital resources, mobile applications such as WhatsApp have demonstrated effectiveness owing to their ease of use, accessibility, and real-time interaction, particularly for nurses who work varying shifts and have restricted free time (11-13). In comparison, group-based education, promotes peer learning, critical thinking, and practical skill development through discussions and case-based scenarios (14). While both methods offer unique advantages, their comparative effectiveness has remained unclear. This study aims to fill this gap by directly comparing WhatsApp-based online education with group-based education. Furthermore, considering the increasing prevalence of STI in Iraq, and the lack of sufficient studies on this topic, this study seeks to assess the impact of these two educational approaches on nurses' knowledge, attitudes, and practices regarding STI.

METHODS

This quasi-experimental study used a pre-test, post-test, and follow-up design with 600 nurses from the women and children hospital in Diwaniyah, Iraq, in 2023.

This study was approved by the Ethics Committee of Islamic Azad University Isfahan (Khorasgan) Branch, Iran (Code: IR.IAU.KHUISF.REC.1401.350) and the Diwaniyah Health Department/ Education and Human Development/ knowledge and research section of the women's and children's hospital in Iraq. Informed consent was obtained from all participants, ensuring confidentiality, secure data storage, and the right to withdraw at any time (no withdrawals occurred).

The study used a validated questionnaire by Navidi et al. in 2019 (15), whose validity and reliability were also confirmed, to assess nurses' knowledge, attitudes, and practices regarding STI. Although a standardized questionnaire was used, its translation into Arabic was carried out under the supervision of an Iraqi academic advisor. The questionnaire consisted of four parts: demographic information (6 items), knowledge (12 items), attitudes (10 items), and practices (10 items). Scores were categorized into three levels: knowledge (0-12 = poor, 13-18 = average, 19-24 = desirable), attitude (10-25 = poor, 26-40 = average, 41-50 = desirable), and practice (10-20 = poor, 20-30 = moderate, 30-40 = favorable).

The study inclusion criteria were nurses with at least two years of work experience in pediatric and maternity hospitals; exclusion criterion was withdrawal from the study.

In this study, all sampling were conducted in Iraq, and participants (600 nurses) were divided into two groups (n = 50/group) by random allocation software. Sample size estimation using G*Power software (version 3.1.1) calculated a total of 84 participants (42 per group) with a 20% dropout rate, increasing the final sample size to 100. The study used a two-group repeated measures ANOVA with effect size of f=0.2, α=0.05, power (1−β)=0.95, and correlation r=0.5.

The research was carried out from November 3 until the end of February. After the participants were divided and their consent was obtained, a pre-test was conducted utilizing the questionnaire. Subsequently, one group participated in online instruction via a WhatsApp-based program, while the other group engaged in group-based teaching, which was divided into five subgroups of 10 participants each. The training on group-based teaching was delivered through group discussions, lectures, question-and-answer sessions, and the use of educational materials such as PowerPoint presentation slides and videos. The educational content for both groups encompassed an introduction to STIs, their causes, symptoms, diagnosis, treatment, and the nursing role in STIs. The number of sessions was modified according to the completion of the discussions. While 3 sessions were adequate for addressing the key topics in the online group, 4-5 sessions were planned for each subgroup in the group-based education model, resulting in a total of 20-25 sessions to facilitate more comprehensive discussions, with each session lasting

between 35 to 40 minutes.

After the training, a two-week follow-up was conducted through phone to clarify any questions about STI, using educational materials like images and posters. After that, a post-test was administered using the questionnaire.

Finally, data were analyzed using SPSS software (version 22; SPSS Inc., Chicago, Ill., USA). Descriptive statistics (mean, standard deviation, and frequency distribution tables) were used for initial analysis. A two-way repeated measures analysis of variance (ANOVA) was conducted to examine the effects of group and time, along with their interaction. Post-hoc pairwise comparisons with Bonferroni correction identified group differences and time differences within each group. Normality, error distribution, and homogeneity of variances were tested using Kolmogorov-Smirnov and Levene's tests. Chi-square, Fisher's exact, and Mann-Whitney U tests were used to compare individual characteristics between groups.

RESULTS

Our findings showed no significant differences between the two groups in gender distribution ($p = 1.00$), mean age ($p = 0.792$), education level ($p = 0.072$), marital status ($p = 0.545$), or work experience ($p = 0.344$). Additionally, half of the nurses in both groups had no prior STI training, and the timing of the last teaching course was similar ($p = 0.658$) (Table 1). Additionally, both groups showed improvements in knowledge, attitude, and practice scores after the intervention. In the group teaching group, knowledge scores increased from12.02 ± 1.98 to 19.80 ± 3.23, attitude scores from 32.20 ± 4.83 to 42.32 ± 6.51, and practice scores from 30.32 ± 3.22 to 36.56 ± 2.77. In the online teaching group, knowledge scores increased from 11.90 ± 2.74 to 18.06 ± 3.18, attitude scores from 33.96 ± 4.20 to 39.00 ± 6.40, and practice scores from 30.32 ± 4.48 to 36.22 ± 3.62 (Table 2).

The results of the repeated measures ANOVA, summarized in Table 3, showed the following:

For knowledge scores, a significant effect of time was found, with scores increasing from before to after the intervention ($F (1, 98) = 292.207$, $p < 0.001$, $\eta^2 = 0.749$). The teaching method also had a significant effect ($F (1, 98) = 5.623$, $p = 0.020$, $\eta^2 = 0.054$), and there was an interaction between teaching method and time ($F (1, 95) = 3.946$, $p = 0.039$, $\eta^2 = 0.039$). Both groups showed significant improvements in knowledge after the intervention ($p < 0.001$). However, the group teaching group had significantly higher knowledge scores than the online teaching group ($p = 0.008$) (Table 3).

Table 1. Frequency distribution of research units based on individual characteristics in the study groups

Variable	Category	Group teaching Number (Percentage)	Online teaching Number (Percentage)	Statistic	P-value
Gender	Female	37 (74.0)	37 (74.0)	000.	1.00[a]
	Male	13 (26.0)	13 (26.0)		
Age	Under 25 years	25 (50.0)	23 (46.0)	264.	792.[b]
	25-30 years	16 (32.0)	23 (46.0)		
	Over 30 years	9 (18.0)	4 (8.0)		
	Mean ± Standard deviation	27.60±5.16	26.92±4.01		
Education	Mid School degree	17 (34.0)	11 (22.0)	5.270	072.[a]
	Diploma	20 (40.0)	15 (30.0)		
	Bachelor's degree	13 (26.0)	24 (48.0)		
Marital status	Single	20 (40.0)	23 (46.0)	367.	545.[a]
	Married	30 (60.0)	27 (54.0)		
Work experience	Less than 5 years	22 (44.0)	27 (54.0)	2.135	344.[a]
	5-10 years	21 (42.0)	20 (40.0)		
	More than 10 years	7 (14.0)	3 (6.0)		
Last teaching course related to STI	No teaching courses	25 (50.0)	26 (52.0)	----	658.[c]
	Last year	15 (30.0)	11 (22.0)		
	The past 2 years	3 (6.0)	6 (12.0)		
	The past 3-5 years	7 (14.0)	7 (14.0)		
Total		50 (100.0)	50 (100.0)		

*Calculated using a: the Chi-square test, b: Mann-Whitney test, and c: Fisher's exact test

Table 2. Descriptive Statistics of Knowledge, Attitude, and Practice Scores of Nurses Regarding Sexually Transmitted Diseases in the study groups, Before and After the Intervention

Variable		Group teaching	Online teaching
		Mean (SD)	Mean (SD)
Knowledge	Before the intervention	12.02 (1.98)	11.90 (2.74)
	After the intervention	19.80 (3.23)	18.06 (3.18)
Attitude	Before the intervention	32.20 (4.83)	33.96 (4.20)
	After the intervention	42.32 (6.51)	39.00 (6.40)
practice	Before the intervention	30.32 (3.22)	30.32 (4.48)
	After the intervention	36.56 (2.77)	36.22 (3.62)

Table 3. Results of Repeated Measures ANOVA Examining the Effect of Teaching Method on Knowledge, Attitude, and Practice Scores of Nurses Regarding Sexually Transmitted Infections

Variable	Source of Variation	Effect	Statistic (F)	Degree of Freedom	p-value	Effect Size (η^2)
Knowledge	Between Groups	Group	5.62	(1, 98)	0.020	0.054
	Within Groups	Time	292.21	(1, 98)	<0.001	0.749
		Group * Time Interaction	3.95	(1, 95)	0.039	0.039
Attitude	Between Groups	Group	0.87	(1, 98)	0.354	0.009
	Within Groups	Time	106.30	(1, 98)	<0.001	0.520
		Group * Time Interaction	11.94	(1, 95)	0.001	0.109
Practice	Between Groups	Group	0.10	(1, 98)	0.752	0.001
	Within Groups	Time	164.01	(1, 98)	<0.001	0.626
		Group * Time Interaction	129.00	(1, 95)	0.721	0.001

For attitude scores, there was a significant improvement over time ($F(1, 98) = 106.296$, $p < 0.001$, $\eta^2 = 0.520$), but the teaching method itself did not significantly affect the scores ($F(1, 98) = 0.867$, $p = 0.354$, $\eta^2 = 0.009$). However, a significant interaction between group and time was found ($F(1, 95) = 11.936$, $p = 0.001$, $\eta^2 = 0.109$), showing that the change in attitude scores varied between the two groups. Both groups showed significant improvements in attitude after the intervention ($p < 0.001$ for both). However, after the intervention, the group teaching group had significantly higher attitude scores than the online teaching group (mean difference = 3.32, $p = 0.012$) (Table 3).

For practice scores, there was a significant improvement over time ($F(1, 98) = 164.007$, $p < 0.001$, $\eta^2 = 0.626$), but no significant effect of the teaching method ($F(1, 98) = 0.100$, $p = 0.752$, $\eta^2 = 0.001$), or interaction between group and time ($F(1, 95) = 129.000$, $p = 0.721$, $\eta^2 = 0.001$). Both groups showed significant improvements in practice scores after the intervention ($p < 0.001$ for both). However, there was no significant difference between the groups before or after the intervention ($p = 1.000$ and $p = 0.599$ respectively). This suggests both teaching methods were equally effective in improving practice scores (Table 3).

DISCUSSION

According to the results of this study, both methods led to significant improvements in all three domains including knowledge, attitude, and practice, the results clearly showed that the group-based method was more effective, particularly in improving knowledge and attitudes.

These findings are consistent with studies emphasizing the superiority of group-based education in fostering interactive learning environments. For instance, Toughyani et al. (2008), examined the effect of group education on the knowledge, attitude, and practice of pregnant mothers, and concluded that education had a very positive impact on the knowledge and performance of mothers. However, the educational program had no effect on the attitudes of mothers (16). In contrast, Adib-Hajbaghery and Faraji (2016), examined the effect of group discussion and an educational booklet on Iranian nursing students' attitude and practice toward patient privacy. They resulted that after the intervention, the mean attitude score significantly increased in the two groups (P=0.001). Moreover, the students' practice score increased in the discussion group while it did not significantly change in the booklet group (P=0.001), highlighting the potential of interactive methods in

fostering attitudinal change (17). Similarly, Bolourchifard et al. (2009) was examined the effect of two educational methods, group-based and individual based, on knowledge, attitude, and self-care skills of individuals with diabetic foot ulcers. It highlighted the effectiveness of group-based education in enhancing attitudes through active engagement and peer discussions (18). These studies are showing that the interactive nature of group-based education creates a more conducive environment for meaningful learning and attitudinal shifts.

While online education has proven beneficial in specific situations, particularly in enhancing knowledge (19-21), its influence on attitudes and practices has shown variability. For instance, the research carried out by Ceylan et al. (2024) investigated the impact of WhatsApp-based training on the genetic knowledge levels of nurses. The findings indicated that education programs utilizing WhatsApp can effectively enhance nurses' understanding and awareness of genetics (19). Also, in another study conducted by Rabiepoor et al. (2016), the effect of Web-based Education and Traditional Education on midwifery students for learning the lesson of fetus health were investigated. It concluded that both methods were effective in the promotion of students' knowledge ($P<0.02$) (21). However, Rojjanasrirat and Rice (2017) found that online education was effective in improving practices but did not significantly affect knowledge or attitudes (22). Similarly, in another research, the effect of training through a workshop and online learning content on the knowledge, attitude and practice of emergency ward nurses were compared. The results show that There was no significant difference between the knowledge and attitude of the two groups before and after the intervention ($P>0.05$), and the performance score in the online training group was significantly higher than that of the other group ($P<0.05$) (23).

Moreover, several studies have demonstrated that online education can improve knowledge, attitudes, and practices (24,25). For instance, Hart et al. (2008) stated in their study that after nurses participated in the computer-based education (CBE) intervention, there was statistically significant differences in perceptions of knowledge, attitude, and skill level as well as beliefs about organizational readiness (24). Gharib et al. (2019), in comparing online methods with workshops, found that both approaches were effective in enhancing all three domains (26). Additionally, in one research on standard precautions among nursing students, the traditional teaching method and integrated online education and game-based virtual reality phone applications were used. After the intervention, the online education group had higher mean scores for standard precautions knowledge and attitude domains than the traditional lecture group ($p=0.001$, $p = 0.002$) (27).

While several studies have examined the impact of online and traditional education on nurses' knowledge, attitudes, and practices (21,27,25), most comparisons focus on traditional lecture-based methods rather than interactive group-based approaches. Furthermore, existing research often evaluates group-based methods independently, without juxtaposing them with modern mobile-based tools like WhatsApp (16). This could be a reason for the differences in the results of the present study compared to those of previous research. Furthermore, it appears that the group-based educational model presented in this study aligns closely with the cultural values of the studied community, as the country's context, cultural factors, and limited openness to non-traditional approaches have all played a significant role in shaping the outcomes of this research. Also, the variations in results across studies can be attributed to differences in training duration, participant interaction levels, and baseline knowledge.

LIMITATIONS

This study has some inherent limitations, including a short follow-up period that may not reflect long-term retention and potential bias from participants' prior knowledge or interest. Additionally, while the findings are culturally relevant, their generalizability may be limited. Future research should examine similar interventions in diverse populations to enhance applicability.

CONCLUSION

This research demonstrated that both group-based and online teaching methods had a positive impact on participants' knowledge, attitudes, and practices. However, the group-based method proved to be more effective, especially in enhancing knowledge and attitudes. Nonetheless, a hybrid approach that merges the advantages of both methods could yield even greater benefits. It is advised that educational planners and healthcare organizations implement a hybrid teaching strategy that combines the interactivity of group-based methods with the flexibility and accessibility of online education. Additionally, future studies should investigate the long-term effects of hybrid models on learners' competencies and patient outcomes.

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Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification,

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