Impact of a case-based activity on student pharmacists' confidence in contraceptive prescribing at a school of pharmacy in the United States

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Abstract

Objective: To evaluate the impact of a case-based activity on student confidence in selecting an appropriate contraceptive product while considering state-specific rules and regulations regarding pharmacist-prescribed contraception in the United States. **Methods:** A pre- and post-activity survey was utilised to evaluate change in confidence. **Results:** Of 119 third-year students, 104 completed the pre- and post-survey (87.3% response rate). Among the respondents, 93%-96% reported they were fairly confident or very confident with post-activity survey items regarding confidence in interpreting and utilising state-specific guidance and prescribing algorithms to apply to a given a patient case scenario, as compared to 18-38% in the pre-activity survey (p<0.001 for all items). Additionally, mean scores to Likert scale items increased close to two steps on the scale toward higher levels of confidence after this activity. **Conclusion:** A case-based activity was effective in improving students' self-reported confidence in fundamental skills necessary for competence in pharmacist-prescribed contraception.

Introduction

Unintended pregnancies continue to pose a major public health burden in the United States (US). Despite a recent decline in rates and the availability of effective contraceptive agents, the latest data suggest that nearly 43% of pregnancies in the US among women 15-44 years of age were unintended (Healthy People 2030 – FP-01, n.d.). Additionally, the National Survey of Family Growth (NSFG) reported that between 2015-2017, despite the reported use of an effective contraception method, a little over half of women ages 15-19 years and 20-44 years were at risk of unintended pregnancy (56.3% and 60.3%, respectively) (Healthy People 2030–FP-10, n.d.). Women and children impacted by unintended pregnancy are more prone to negative health outcomes, such as mental and physical health disorders, which are detrimental to societal health. As such, Healthy People 2030 family planning goals have continued their focus on initiatives to improve access to and effective use of contraception to reduce the number of unintended pregnancies in the US.

Pharmacists are among the most accessible healthcare providers in the US, with approximately 90% of Americans living within five miles of a pharmacy (Centers for Disease Control and Prevention–CDC, 2022). Pharmacist-prescribed contraception is a growing service across the US and allows for expanded access for patients, with 21 US jurisdictions allowing for this expanded scope of practice without the need for a collaborative practice agreement (National Alliance of State Pharmacy Associations, 2022). As such, US schools of pharmacy are repsonsible for ensuring students are practice-ready to fulfil the role of expanded scopes of practice (Accreditation Council for Pharmacy Education, 2015). A recent review of curricula coverage across US schools of pharmacy revealed that, on average, hormonal contraception is taught 2.9 ± 2.0 hours in didactic curricula, with case studies being implemented most commonly as the

learning strategy to supplement traditional lecture delivery of didactic content (Rim *et al.,* 2020).

In fall of 2021, to remain contemporary and in response to impending rules being implemented for Alabama's collaborative practice law (H.B. 35), a low-fidelity case-based activity was implemented to augment therapeutic coverage of hormonal contraception within the didactic curriculum. This manuscript reports the results on an evaluation of the impact of this case-based activity on student confidence in selecting an appropriate contraceptive product for a patient, while considering applicable state-specific rules and regulations regarding the scope of pharmacist-prescribed contraception. There are few published studies evaluating teaching modalities for content on hormonal contraception within pharmacy education; thus, this manuscript fills a gap in the literature (Stone *et al.,* 2022).

Methods

Activity description

Participants in the case-based activity were third-year Doctor of Pharmacy students (P3) enrolled in the first of a two-semester, required clinical skills lab course. The course utilises a variety of active learning strategies to include low- and high-fidelity simulations (with or without standardised patients) to integrate curricular course content across professional years. The course provides opportunities for P3 students to apply basic science, therapeutics, patient assessment, and pharmacy law-related knowledge and skills to patient scenarios to promote readiness for Advanced Pharmacy Practice Experiences (APPEs) and practice readiness. The School of Pharmacy's curriculum is aligned such that the course content may cover material being taught concurrently in the didactic curriculum (e.g., Pharmacology, Pharmacotherapy, Self-Care, or Law course sequences), or the course may have activities designed to reinforce content taught in previous semesters. Participants of the lab case-based activity had previously received, during their second professional year (P2), lectures on the pharmacology of hormonal contraception in their Pharmaceutical Sciences course, along with lectures on pharmacotherapy and the current scope of state-specific statutes and regulations, which allow for pharmacist prescribing of contraception in the School's Pharmacotherapy course. The School's didactic law course does not occur until the second semester of the P3 year; therefore, the students had not received additional training on the interpretation and application of pharmacy law prior to the case-based activity on pharmacist-prescribed contraception.

The case-based activity was designed as a two-part experience: pre-class and in-class. The pre-class activity was a reading assignment of a document reviewing the scope of pharmacist-prescribed contraception across the US and a publication that provided a primer on key elements and functionality of pharmacist collaborative practice agreements (Centers for Disease Control and Prevention–CDC, 2013; Chim & Sharma, 2021). The pre-work was released for completion via the Learning Management System three weeks before the in-class activity, and it is estimated that the pre-class activity took no more than one hour to complete. The in-class activity began with a debrief of pre-class reading material and a pre-brief of the case-based activity, including a demonstration of how to utilise the CDC's US Medical Eligibility Criteria for Contraceptive Use (US MEC), how to access and interpret state-specific rules and regulations on pharmacist-prescribed contraception, and how to utilise US state-specific prescribing algorithms for contraceptive prescribing (Curtis et al., 2016). Following the pre-brief, students were divided into pairs and assigned two patient scenarios, each representing a patient seeking pharmacist-prescribed contraception in a different state. For each scenario, the students received a mock state-specific checklist/screening form for contraceptive prescribing that was completed to simulate the one required for completion for pharmacist-prescribed contraceptive encounters in the US, along with a written summary of the patient's history of presenting illness, past medical history, list of active medications, social history, and details of the patient's preference for the route of contraception administration. Students were then tasked to review the complete checklist/screening form and written summary while consulting the US MEC recommendations to determine the most appropriate contraceptive for the patient. Subsequently, students would need to access and interpret the assigned state's rules/regulations regarding pharmacist-prescribed contraception and the prescribing algorithm to determine the appropriateness of pharmacist-prescribing or the need for referral.

For the first patient scenario, the students were assigned a state where pharmacists are allowed to prescribe both "self-administered" contraceptives and prescribe and administer parenteral depot medroxyprogesterone acetate. The patient in this scenario presented with a contraindication to combined hormonal contraceptives, which was revealed when students assessed the completed patient screening form and written summary in the context of the US MEC recommendations. In the second scenario, the students were assigned a state with a narrower scope of agents permitted for pharmacist-prescribed contraception (limited to oral agents). The patient in this scenario presented with a

contraindication to oral, combined, and progestin-only contraceptives; therefore, the student would need to make the decision to refer the patient. Following the two case scenarios, the lab activity was concluded with a debrief discussion on key elements of the various state-specific protocols utilised in the activity and a review of therapeutic pearls on selecting an appropriate contraceptive based on patient-specific factors.

Survey instrument and data analysis

A pre- and post-activity survey was distributed to lab course participants; it evaluated changes in students' confidence in selecting an appropriate contraceptive product for a patient in the context of state-specific rules/regulations and the associated prescribing algorithm. The University's Institutional Review Board designated this survey research as exempt. The survey instrument was developed by the School of Pharmacy's faculty, who taught hormonal contraception in the Therapeutics curriculum, and it was peer-reviewed by the School's lab course Instructor of Record. Additionally, before dissemination, the survey underwent a review for clarity by a fourth-year professional student. The 11-item survey instrument consisted of five questions on demographics and previous work experience in a state with legislation on pharmacist-prescribed contraception and six questions rated on a five-point Likert scale (1=not confident to 5=very confident) assessing students' level of confidence in selecting appropriate hormonal contraception based upon patient-specific factors and state-specific laws/rules on pharmacist-prescribed contraception. The pre- and post-survey were the same instrument.

On the date of the case-based activity, a QR code with an electronic link to the pre-activity survey (Qualtrics, LLC, Provo, UT) was displayed during the first 10 minutes of class for students to complete from their laptop or cell phone. The link was inoperable after the initial 10 minutes. Immediately following the case-based activity, a QR code with an embedded link to the post-survey was displayed and remained operable for 24 hours. Completing pre- and post-activity survey instruments was voluntary and had no grade implications. A unique identifier was collected on the surveys and was used to identify pre- and post-activity surveys completed by the same respondent. Survey results from respondents who completed both the pre- and post-activity instruments were included in this analysis.

SPSS, version 28.0. (Armonk, NY: IBM Corp) statistical software was utilised for data analysis. Differences in mean scores on Likert items were compared with paired t-tests, and pre- and post-survey responses were compared with the Wilcoxon signed-rank test. Cronbach alpha was utilised to assess the internal consistency of the self-confidence assessment across the pre- and post-activity timepoints.

Results

Of the 119 third-year students enrolled in the lab course, 104 completed both the pre- and post-survey (87.3 % response rate). Respondents were mainly female and reported currently working in a pharmacy setting (67.3% and 79.1%, respectively). Additionally, the majority (74.7%) of respondents who reported working in a pharmacy setting characterised their work setting as retail/community pharmacy. No respondents reported current or prior pharmacy work experience within a state with specific laws/regulations regarding pharmacist-prescribed contraception.

Mean scores to 5-point Likert scale items on confidence in interpreting and applying state-specific guidance and prescribing algorithms in the context of a patient case scenario increased close to two steps on the confidence scale, toward higher confidence levels, from pre- to post-activity on all items, with a Cronbach's alpha of $\alpha=.828$ suggesting high internal consistency (Table I). Mean Likert scores of pre-survey responses ranged from 2.3 to 2.8 and were indicative of slight confidence vs post-survey mean Likert scores ranging from 4.4 to 4.5, suggestive of fairly confident participants. Of all respondents, 93-96% reported that they were fairly confident or very confident with each of the statements in the post-activity survey compared to 18-38% in the pre-activity survey; a significant shift toward higher levels of confidence was noted from pre- to post-activity survey responses on all Likert items (Table II).

Table I: Mean scores on Likert items regarding confidence (N=104)

Rate your level of confidence in completing the following tasks involved in interpreting state-specific protocols/ standing orders for pharmacist-prescribed contraception:*	Pre-Activity Score, Mean (SD)	Post-Activity Score, Mean (SD)	*p* value[†]
Determining the formulary of agents that can be prescribed	2.3 (1.10)	4.4 (0.75)	0.921
Determining the education requirements of pharmacists practicing under the protocol/order	2.6 (1.25)	4.4 (0.68)	0.095

Rate your level of confidence in completing the following tasks involved in interpreting state-specific protocols/ standing orders for pharmacist-prescribed contraception:*	Pre-Activity Score, Mean (SD)	Post-Activity Score, Mean (SD)	*p* value†
Determining general requirements for prescribing.	2.3 (1.15)	4.5 (0.67)	0.848
Determining whether a patient is eligible for pharmacist-prescribed contraception.	2.4 (1.16)	4.4 (0.67)	0.221
Utilizing the CDC's US Medical Eligibility Criteria and patient's past medical history to select the most appropriate contraceptive agent.	2.5 (1.16)	4.5 (0.67)	0.940
Using patient information (e.g., preferences, adherence potential, medication allergies, concomitant medications) to select the most appropriate contraceptive agent.	2.8 (1.12)	4.5 (0.67)	0.135

*Based on 1 to 5 scale: 1=not confident to 5=very confident; †paired-samples t-test

Table II: Student pharmacists' confidence regarding pharmacist-prescribed contraception (N=104)

Rate your level of confidence in completing the following tasks involved in interpreting state-specific protocols/ standing orders for pharmacist-prescribed contraception:	Pre activity responses, number					Post activity responses, number					*p* value*
	NC	SC	SwC	FC	VC	NC	SC	SwC	FC	VC	
Determining the formulary of agents that can be prescribed	29	38	18	17	2	0	5	2	45	52	<0.001
Determining the education requirements of pharmacists practicing under the protocol/order	22	33	15	28	6	0	3	1	45	54	<0.001
Determining general requirements for prescribing.	27	41	13	20	3	0	3	1	41	59	<0.001
Determining whether a patient is eligible for pharmacist-prescribed contraception.	24	42	11	24	3	0	3	1	47	53	<0.001
Utilizing the CDC's US Medical Eligibility Criteria and patient's past medical history to select the most appropriate contraceptive agent.	23	40	16	21	4	0	3	1	43	57	<0.001
Using patient information (e.g., preferences, adherence potential, medication allergies, concomitant medications) to select the most appropriate contraceptive agent.	10	40	15	35	4	0	3	1	42	58	<0.001

* Wilcoxon signed-rank test; **NC**: Not confident; **SC**: Slightly confident; **SwC**: Somewhat confident; **FC**: Fairly confident; **VC:** Very confident

Discussion

Analysis of pre- and post-survey results following a case-based activity demonstrate an increase in student confidence in utilising the US MEC and state-specific prescribing algorithms to select an appropriate contraceptive product allowable within state-specific rules and regulations regarding pharmacist-prescribed contraception. The vast majority of students in the current study reported that they were fairly confident or very confident with each of the statements in the post-activity survey regarding interpreting and utilising state-specific guidance and prescribing algorithms to apply to a given patient case scenario, as compared to less than half of students in the pre-activity survey.

A study of pharmacy students in a women's health elective course investigated self-perceived confidence in prescribing hormonal contraception after a simulation activity based on the Oregon protocol for pharmacist-prescribed contraception (Lynch, Griffin & Vest, 2018).

In the post-activity survey, 67% and 90% of students agreed/strongly agreed that the activity made them more comfortable prescribing hormonal contraception and that they could confidently prescribe these products, respectively. All the students agreed/strongly agreed that they were comfortable knowing when to refer a patient to a physician for contraception, reflecting confidence similar to that of the current study in selecting the most appropriate contraceptive agent and determining whether a patient is eligible for pharmacist-prescribed contraception.

Another study explored pharmacy student confidence in pharmacists' patient care process abilities since it pertains to pharmacist-provided contraception (Lynch *et al.,* 2020). The simulation was also based on the Oregon protocol and used a pre-/post-activity survey. In the post-activity survey, students were asked to rate their confidence in different aspects of this activity: 88% responded that they were confident in their ability to recognise when a patient should be referred, 80% were

confident in their ability to recommend a specific product, and 87% were confident in their ability to provide product counselling. There was a significant change in confidence that students reported in the post-activity survey compared to the pre-activity survey. These post-survey numbers are lower than those in the current study and show that student confidence was high in these tasks.

A confidence survey using the California protocol was administered to pharmacy students at the end of a simulated case-based activity on pharmacist-prescribed contraception (Harris, Melody, & Charneski, 2020). All the results were presented in a bar graph format without specific numbers of percentages. Review of bar graphs indicated that students agreed/strongly agreed more with statements about their confidence in using patient information to determine whether a patient is eligible for hormonal contraception and select a product compared to statements about their confidence in educating a patient on a missed dose or prescribe a product based on patient-specific factors. Again, these numbers appear lower than those in the current study and show that student confidence was fairly high in these tasks.

Limitations

Limitations of this study include that it did not evaluate persistence in student confidence in this expanded practice role; rather, it explored it at just one point. As such, it cannot be concluded that this post-activity shift in confidence would translate into practice-readiness. Additionally, the results are reported from one professional year of students at one educational institution, which might limit generalisability.

Conclusion

This study demonstrated that a case-based activity following didactic coverage of hormonal contraception was effective in increasing student confidence in selecting an appropriate contraceptive product within the context of patient-specific factors and following state laws/rules. As more states adopt pharmacist-prescribed contraception, Schools of Pharmacy could incorporate similar activities to prepare students to be ready to implement this expanded scope into their practices.

Conflict of interest

The authors declare no conflict of interest.

Source of funding

References

Accreditation Council for Pharmacy Education. (Feb 2015). Accreditation standards and key elements for the professional program in Pharmacy Leading to the Doctor of Pharmacy Degree ("Standards 2016"). acpe-accredit.org Available from: https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf

Centers for Disease Control and Prevention. (Oct 2013). Collaborative Practice Agreements and Pharmacists' Patient Care Services: A Resource for Pharmacists. cdc.gov. Available from: https://www.cdc.gov/dhdsp/pubs/docs/Translational_Tools_Pharmacists.pdf

Centers for Disease Control and Prevention. (2022). Get to Know Your Pharmacist. cdc.gov. Available from: https://www.cdc.gov/heartdisease/pharmacist.htm

Chim, C., & Sharma, P. (2021). Pharmacists prescribing hormonal contraceptives: A status update. *US Pharmacist, 46*(9), 45-49. Available from: https://www.uspharmacist.com/article/pharmacists-prescribing-hormonal-contraceptives-a-status-update

Curtis, K. M., Tepper, N. K., Jatlaoui, T. C., Berry-Bibee, E., Horton, L. G., Zapata, L. B., Simmons, K. B., Pagano, H. P., Jamieson, D. J., & Whiteman, M. K. (2016). U.S. Medical Eligibility Criteria for Contraceptive Use, 2016. *MMWR Recommendations and reports*, *65*(3), 1–103. https://doi.org/10.15585/mmwr.rr6503a1

Harris, E., Melody, K., Charneski, L. (2020). Student knowledge and confidence with prescribing hormonal contraception. *Currents in Pharmacy Teaching and Learning, 12*(6), 751-762. https://doi.org/10.1016/j.cptl.2020.01.031

Healthy People 2030 (n.d.). Reduce the proportion of unintended pregnancies — FP 01 (online). Health.gov. Available from: https://health.gov/healthypeople/objectives-and-data/browse-objectives/family-planning/reduce-proportion-unintended-pregnancies-fp-01

Healthy People 2030 (n.d.). Increase the proportion of women at risk for unintended pregnancy who use effective birth control — FP 10. Health.gov. Available from: https://health.gov/healthypeople/objectives-and-data/browse-objectives/family-planning/increase-proportion-women-risk-unintended-pregnancy-who-use-effective-birth-control-fp-10

Lynch, S.E., Griffin, B.L., & Vest, K.M. (2018). Assessment of a simulated contraceptive prescribing activity for pharmacy students. *Currents in Pharmacy Teaching and Learning, 10*(2), 178-184. https://doi.org/10.1016/j.cptl.2017.10.013

Lynch, S. E., Griffin, B., Stewart-Lynch, A., & Vest, K. M. (2020). Effect of a Simulated Activity on Student Ability, Preparedness, and Confidence in Applying the Pharmacists' Patient Care Process to Contraceptive Prescribing. *Pharmacy*

(Basel, Switzerland), **8**(3), 146.
https://doi.org/10.3390/pharmacy8030146

National Alliance of State Pharmacy Associations. (Sept 2022). Pharmacist Prescribing: Hormonal Contraceptives. Naspa.us. Available from:
https://naspa.us/resource/contraceptives/

Rim, C., El-Ibiary, S.Y., Rafie, S., & Borgelt, L.M. (2020). Assessment of contraceptive curricula in US pharmacy programs. *Currents in Pharmacy Teaching and Learning,* **12**(4):395-399. https://doi.org/10.1016/j.cptl.2019.12.025

Stone, R. H., Cieri-Hutcherson, N. E., Vernon, V., Arellano, R., Mospan, C., Harris, J. B., Barnes, K. N., Griffin, B. L., Lodise, N. M., Patel, J., Rafie, S., & Vest, K. (2022). Curricular Considerations for Preparing Student Pharmacists to Prescribe Hormonal Contraception. *American journal of pharmaceutical education,* **86**(4), 8667.
https://doi.org/10.5688/ajpe8667