

An innovative approach to teaching depression and anxiety medication management: Virtual choose your own adventure, psychiatry edition

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Abstract

Introduction: Rates of depression and anxiety continue to increase in the United States. It's important for pharmacy students to graduate knowledgeable and confident in treating these disorders. The purpose of this study was to evaluate whether a virtual active-learning exercise (choose your own adventure) is helpful in teaching students how to manage medications for depression and anxiety.

Methods: Third-year pharmacy students responded to preactivity questions and then worked on a single patient case in which the presenting problem is worsening depression and anxiety. Students worked in virtual groups of 4 to 5 to select 1 treatment among 5 multiple-choice options and documented the rationale for their choice. Each multiple-choice option led to a different follow-up case. After writing their assessment and plan, the instructor debriefed on therapeutic concepts from each follow-up case. Students then answered postactivity questions and participated in a voluntary survey consisting of 10 retrospective questions.

Results: Of 106 participants, 85 completed the survey (80.2% response rate). Most agreed that their understanding of treatment of depression and anxiety disorders increased following participation (92.9% *strongly/somewhat agreed*). This was supported by an increase in the percentage of correct responses on the knowledge questions (preactivity: 67.2%, n=91; postactivity: 83.5%, n=97; $P=.01$). Additionally, students reported their confidence in their understanding of depression and anxiety management increased following activity participation (93.0% *strongly/somewhat agreed*).

Discussion: The virtual active-learning exercise improved student knowledge and confidence in managing depression and anxiety treatments. Educators teaching depression and anxiety pharmacotherapy may consider implementing such activity into their lecture(s).

Keywords: depression, anxiety, medication, virtual, psychiatry, teaching

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Introduction

Regardless of the practice setting, pharmacists frequently encounter patients who use psychotropic medications and require counseling.¹ In 2020, 20.3% of adults received mental health treatment in the previous 12 months, and 16.5% took prescription medication for their mental health.² Depression and anxiety disorders are among the most common mental illnesses,³ and data from the Centers for Disease Control and Prevention demonstrate an increasing linear trend in antidepressant use among adults between

2009 and 2018.⁴ Additionally, the American College of Clinical Pharmacy categorizes depressive and anxiety disorders as high-priority content for which pharmacy students are expected to provide patient care based on frequency of encounters and potential socioeconomic impact and pharmacist involvement in these encounters.^{5,6}

Although antidepressants are commonly prescribed, there are substantial gaps in pharmacists' level of engagement when counseling patients receiving antidepressants.^{1,7} For example, studies indicate a difference in the frequency of counseling provided regarding antidepressant onset, treatment duration, and adverse effect information. This may be due to mental health stigma,^{8,9} inadequate training leading to low confidence levels,¹⁰ and/or suboptimal communication skills.¹¹ Additionally, there are several first-line options for treating depression and anxiety disorders with multiple factors affecting treatment selection.¹² Recalling key differences among the many commonly prescribed antidepressants can be challenging for pharmacist trainees, and patients voice concerns regarding stigma and suboptimal counseling when engaging with community pharmacists on antidepressant use.^{9,11,13}

As the need for mental health care continue to rise,¹⁴⁻¹⁸ the demand for pharmacists who are knowledgeable and confident in managing psychotropic medications will undoubtedly increase.^{19,20} Therefore, it is important to investigate which teaching strategies improve student pharmacists' knowledge and confidence in the use of medications to manage depression and anxiety. The choose-your-own-adventure (CYOA) case-based learning format is cited as an effective teaching strategy for improving student performance and engagement in other disciplines²¹⁻³⁰ but has yet to be evaluated in psychiatric pharmacotherapy education. The purpose of this study was to evaluate whether the CYOA virtual activity is effective at improving students' knowledge and confidence in treating depression and anxiety.

Methods

This survey study was approved by the University of Arizona Human Subjects Protection Program. The active-learning exercise was delivered to third-year pharmacy students at 1 public college of pharmacy that has main and satellite campuses located in different cities. One hundred thirty-two students participated in this activity via Zoom videoconference software in spring 2021. The course objectives are to prepare student pharmacists for critical thinking; clinical problem solving; effective communication; and designing evidence-based, patient-centered pharmacotherapy. The course focuses on commonly occurring acute and chronic conditions with 1 class session dedicated to the management of depression and anxiety. The 2-hour

depression and anxiety active-learning exercise was delivered virtually.

Prior to the virtual session, a 5-question baseline knowledge assessment was administered via the game-based learning platform Kahoot! to assess individual student knowledge about previously taught antidepressant concepts in a pharmacotherapeutics course from the year before. The instructor (N.V.), who is a board-certified psychiatric pharmacist, then delivered a 30-minute refresher lecture that focused on key therapeutic concepts in depression and anxiety. The refresher lecture included diagnostic criteria, how to select depression and anxiety treatment, monitoring parameters, and medication class clinical pearls. This lecture was provided because it had been more than a year since the students learned psychiatric pharmacotherapy in fall 2019, when 3 hours were dedicated to teaching depression and anxiety disorders via a lecture-based format. Following the refresher lecture, students were introduced to the CYOA activity. There were 2 parts to this small group activity. Part 1 required students to review a patient case with a primary problem of worsening depression and anxiety. Upon reviewing the case, students were asked to select a treatment for the patient among 5 multiple-choice options, each listed as a potential first-line treatment for depression or anxiety per the World Federation of Biological Psychiatry guidelines (Figure).^{12,31,32} Students were given 10 minutes to review the case and answer the multiple-choice question. Part 2 required student groups to review a follow-up patient case specific to their previously selected option (eg, "If you selected bupropion, please turn to page 3 for your follow-up encounter"). The follow-up case included the patient's history of present illness, mental status exam, Patient Health Questionnaire-9 score, and vitals. After reviewing the follow-up case with their group, students individually wrote a progress note to document their assessment/plan and submitted this portion of the activity for grading. The submitted note was graded by the course coordinator, not the principal investigator.

For activity parts 1 and 2, students were randomly assigned via Zoom to the same breakout room of 4 to 5 students so they could deliberate their treatment choice and rationale. A Zoom poll was conducted for students to report which treatment option they selected, and these results were shared prior to the final portion of class in which a 20-minute debrief lecture on key clinical pearls from each follow-up case was provided. During the debrief, students were encouraged to share their treatment rationale either verbally or via Zoom chat. Afterward, a knowledge posttest via Kahoot! (containing the same questions as the pretest) was administered for students to complete individually. This allowed for changes in knowledge retention to be assessed after session participation. The change in Kahoot! scores was the primary outcome of the study.

TABLE 1: Quantitative survey responses (N = 85)

Question Asked	Strongly Agree, n (%)	Somewhat Agree, n (%)	Neither Agree nor Disagree, n (%)	Somewhat Disagree, n (%)	Strongly Disagree, n (%)
“I would prefer to have classes on psychiatric treatment include this type of activity over one that does not include this type of activity.”	50 (58.8)	23 (27.1)	8 (9.4)	2 (2.3)	2 (2.3)
“After participating in today’s activity, my understanding on treatment of depression and anxiety disorders increased.”	51 (60.0)	28 (32.9)	4 (4.7)	2 (2.3)	0 (0)
“After participating in today’s activity, I am confident in my understanding of the material presented on treatment of depression and anxiety disorders.”	36 (42.4)	43 (50.6)	5 (5.9)	1 (1.18)	0 (0)
“After participating in today’s activity, my interest in treatment of depression and anxiety disorders increased.”	31 (36.5)	33 (38.8)	18 (21.2)	3 (3.5)	0 (0)
“I had fun during today’s activity on treatment of depression and anxiety disorders.”	51 (60.7)	24 (28.6)	9 (10.6)	1 (1.2)	0 (0)
“The instructor seemed prepared for today’s activity on treatment of depression and anxiety disorders.”	81 (95.3)	4 (4.7)	0 (0)	0 (0)	0 (0)
“Group discussion contributed to my understanding of the course material presented today.”	25 (29.4)	29 (34.1)	14 (16.5)	11 (12.9)	6 (7.1)

The last component of the class was the retrospective survey to determine secondary outcomes regarding student perception of the impact of the interactive session on their understanding and confidence in managing depression and anxiety. Students were informed that they had the option to complete a voluntary, anonymous online survey to provide feedback on the CYOA activity. A consent statement was screen-shared via Zoom to inform students that, by completing the survey, they were giving consent for their feedback to be used for research purposes. A QR code and hyperlink was provided via Zoom by the second author (J.L.) after the primary investigator left the session. Specifically, the survey comprised 7 Likert-style questions, 2 case reflection questions, and an additional qualitative question soliciting constructive comments. Student participation in the survey did not impact their grade in the course and took less than 5 minutes to complete. Only surveys with complete responses and no missing data were included in analysis. A Shapiro-Wilk test was used to determine parametric assumptions, and a chi-square test was used to determine whether changes in the 5-question preknowledge and postknowledge tests were statistically significant. A priori alpha of 0.05 was used.

Results

A total of 106 students attended the depression and anxiety virtual class session (80% attendance). As shown in Table 1, a total of 85 students completed the postactivity survey (response rate: 80.2%). Those who participated had a higher percentage of correct responses on the posttest questions compared with the pretest after participating in the CYOA exercise (83.5%, $n = 97$ and 67.2%, $n = 91$, respectively; $P = .01$). Additionally, the postactivity survey indicated that most students (92.9%) either *strongly* or *somewhat agreed*

that their understanding of treatment of depression and anxiety disorders increased following activity participation. Similarly, most students reported feeling confident in their understanding of the material after participating in the activity (93.0% *strongly/somewhat agreed*). Responses to the other survey questions are described in Table 1.

Additionally, students provided insights regarding what they thought worked well and what may have negatively impacted their ability to fully engage in the virtual activity (Table 2). For example, students voiced that they enjoyed the interactive nature of the activity, but some reported being less engaged because of an upcoming exam after class. Differences in group participation also seemed to impact the perceived quality of activity delivery because some students reported having group members who did not wish to discuss the case and kept their Zoom cameras and microphones off (Table 2). Others voiced enjoying the activity less due to Zoom fatigue and burnout. The majority of constructive comments recommended against using virtual breakout rooms but believed the activity itself was informative and engaging. Of note, one student noted that other nonpsychiatric classes could benefit from implementing this style of activity. A complete list of qualitative comments is provided in Table 2.

Discussion

Overall, students provided positive feedback regarding their experience engaging in the virtual CYOA learning activity on depression and anxiety management. The participation led to improvements in student knowledge about key therapeutic concepts and confidence in understanding the covered materials on treatment of depression and anxiety.

TABLE 2: Qualitative survey responses (N = 35)

Theme	Examples of Student Quotes ^a
Positive responses related to activity engagement and learning	<p>“Very fun. Cool way to look at outcomes of therapy. 100% would recommend. These engaging activities I am a huge fan of. I hate to say it. This is the only way I learn stuff, through engaging activities.”</p> <p>“More classes need to implement this type of activity especially with more difficult topics such as cancer. It makes it more engaging rather than just listening to a person lecture for the whole class time.”</p> <p>“I really enjoyed this lecture format. Helped keep myself engaged throughout the class.”</p> <p>“I liked the Kahoot questions as well with the pre and post test to reaffirm the information learned.”</p> <p>“I enjoyed this format of lecture, I don’t think it would work well as an initial presentation of information but was a great refresher.”</p> <p>“Please advocate to your peers on active-learning styles such as this.”</p> <p>“Great presentation and engagement.”</p> <p>“The instructor is always interactive and fun, she has great energy and teaching style.”</p>
Constructive feedback regarding activity structure and timing	<p>“I love this type of interactive class! Only downside was it was right before an exam we have at 1 pm so I didn’t feel as engaged in class as normal because I am also trying to simultaneously study during class.”</p> <p>“My breakout room participants did not want to discuss the case. They kept their cameras and mic off. Would have been beneficial if they were willing to participate.”</p> <p>“Hello. I thought this went pretty well. Partially, I did not enjoy it as much because I have Zoom fatigue and burnout.”</p> <p>“In depth class activities should be saved for classes not directly leading up to an exam in another course.”</p> <p>“My group did not participate in discussion, which I found disappointing.”</p> <p>“I thought the group discussion was a complete waste of time”</p> <p>“I felt the breakout rooms were unnecessary, but once the instructor led the group discussion, it was very informative and engaging.”</p> <p>“I think it would have been beneficial to have more time in the breakout rooms to discuss the case.”</p> <p>“Unfortunately was bad timing, with White Coat Ceremony on Friday and another exam after this. Had circumstances been different, probably would have participated more.</p> <p>“My group didn’t talk at all, but I do think it’s still helpful to have the option to talk to a group to enhance learning.”</p>

^aSelect responses with specific/actionable feedback presented and presented in original format.

In addition to helping with knowledge retention, this virtual activity aimed to emphasize the importance of feeling confident about navigating the unpredictable nature of patient response to depression and anxiety treatments. To our knowledge, this is the first study to assess the CYOA virtual activity for depression and anxiety management in pharmacy education.

For the patient case, the instructor intentionally designed for students to select from a list of multiple-choice treatment options, in which all options consisted of a viable first-line therapy for depression and anxiety. The decision tree (Figure) for each treatment option leading to a follow-up case was created beforehand to spur further critical thinking and decision making by student groups. The benefit of this approach was that participating students got a taste of the unpredictability commonly encountered during a follow-up depression and anxiety medication management visit. At the

same time, this interactive strategy permitted multiple therapeutic concepts to be reviewed for a variety of unique cases. This activity design also allowed the instructor to create the postactivity debrief lecture in advance. Furthermore, delivering the debrief session over Zoom facilitated robust discussion verbally and by using the chat feature. Students appeared eager to share their perspectives after seeing via Zoom poll how many of their peers had selected different treatment options, each of which may have been correct with relevant rationale (Figure). Whereas traditional CYOA activities usually incorporate multiple decision points, due to course time constraints, we chose to limit the activity to 1 decision for the initial patient encounter followed by 5 different follow-up case outcomes that were each debriefed on following activity completion. Depending on time and resource allotment, instructors who choose to utilize the CYOA activity may consider modifying the format presented in this study by incorporating multiple

decision points instead. Additionally, educators implementing this type of activity could consider modifying patient demographics to incorporate discussion points related to addressing gender and racial health disparities in mental health care.

The intention behind a case in which the patient had multiple distressing symptoms (eg, trouble sleeping, low energy, poor concentration) was so any first-line pharmacologic treatment option would be a fair choice (Figure). Each follow-up case was tied to a unique takeaway point with the overarching lesson being that treatment response and tolerability cannot be perfectly predicted ahead of time. For example, when the Zoom poll revealed that most students had chosen fluoxetine as their initial treatment choice (n=49), other students voiced concerns that they had chosen wrong. However, those who chose fluoxetine went on to discover that their patient had developed hypomania necessitating a mood stabilizer. Likewise, other treatment options posed unpredictable patient consequences or tolerability issues during the follow-up case. The only treatment choice that was technically incorrect was psychotherapy because the patient had severe symptoms of depression requiring pharmacotherapy. Only 2 out of 96 respondents indicated that they selected this option following the review lecture delivered at the beginning of the class.

Strengths of this study include a high response rate, a mix of quantitative and qualitative survey results, and the use of preactivity and postactivity knowledge assessments. Because this activity was designed for and delivered to third-year students at 1 college of pharmacy in Arizona, these findings may not be generalizable to students in other years or other institutions with curricular differences. There may be various confounders that affected study findings, such as class timing that may affect student attention to the activity and differences in group engagement during the virtual breakout sessions. Additionally, it was difficult to know how much each component of the activity contributed to improvements in student knowledge (eg, refresher lecture vs case review vs debrief). Regardless, our findings suggest it is important to reinforce clinical concepts pertaining to psychiatric pharmacotherapy throughout pharmacy curricula because students in this study had not been taught pharmacotherapy of depression and anxiety disorders in more than a year. This may also explain the lower correct response rate in the administered pretest. Participating student demographics were not collected to maximize confidentiality and cannot be considered in interpreting the study findings. Students were also informed that the authors would not be involved in grading the activity assignment to further minimize the potential for survey bias. Lastly, it is unknown to what extent outcomes may have been affected if this activity had been delivered in person. Future research might explore the effects of this type of

active-learning exercise delivered within an in-person classroom setting.

Conclusion

The CYOA Psychiatry Edition virtual activity improved third-year pharmacy students' knowledge of key therapeutic concepts, and students perceived that it helped improve their understanding and confidence in managing depression and anxiety. Educators teaching depression and anxiety pharmacotherapy may benefit from implementing this type of activity into their lecture.

References

1. Bostwick JR, Diez HL. Optimizing care for patients with depression in the community pharmacy setting. *US Pharm*. 2008;33(11):24-8.
2. Terlizzi EP, Norris T. Mental health treatment among adults: United States, 2020. Atlanta: Centers for Disease Control and Prevention [cited 2022 May 4]. Available from: <https://www.cdc.gov/nchs/data/databriefs/db419.pdf>
3. National Alliance on Mental Illness. Mental health by the numbers [cited 2021 Jun 16]. Available from: <https://www.nami.org/mhstats>
4. Brody DJ, Gu Q. Antidepressant use among adults: United States, 2015–2018. NCHS Data Brief, no 377. Hyattsville (MD): National Center for Health Statistics; 2020.
5. Dopheide JA, Bostwick JR, Goldstone LW, Thomas K, Nemire R, Gable KN, et al. Curriculum in psychiatry and neurology for pharmacy programs. *Am J Pharm Educ*. 2017;81(7):5925. DOI: [10.5688/ajpe8175925](https://doi.org/10.5688/ajpe8175925). PubMed PMID: [29109559](https://pubmed.ncbi.nlm.nih.gov/29109559/); PubMed Central PMCID: [PMC5663650](https://pubmed.ncbi.nlm.nih.gov/PMC5663650/).
6. American College of Clinical Pharmacy. The 2016 ACCP pharmacotherapy didactic curriculum toolkit [cited 2021 Jun 16]. Available from: http://www.accp.com/docs/positions/misc/Toolkit_final.pdf
7. Svarstad BL, Bultman DC, Mount JK. Patient counseling provided in community pharmacies: effects of state regulation, pharmacist age, and busyness. *J Am Pharm Assoc* (2003). 2004;44(1):22-9. DOI: [10.1331/154434504322713192](https://doi.org/10.1331/154434504322713192). PubMed PMID: [14965149](https://pubmed.ncbi.nlm.nih.gov/14965149/).
8. Murphy A, Szumilas M, Rowe D, Landry K, Martin-Misener R, Kutcher S, et al. Pharmacy students' experiences in provision of community pharmacy mental health services. *Can Pharm J (Ott)*. 2014;147(1):55-65. DOI: [10.1177/1715163513514170](https://doi.org/10.1177/1715163513514170). PubMed PMID: [24494016](https://pubmed.ncbi.nlm.nih.gov/24494016/).
9. Black E, Murphy AL, Gardner DM. Community pharmacist services for people with mental illnesses: preferences, satisfaction, and stigma. *Psychiatr Serv*. 2009;60(8):1123-7. DOI: [10.1176/ps.2009.60.8.1123](https://doi.org/10.1176/ps.2009.60.8.1123). PubMed PMID: [19648202](https://pubmed.ncbi.nlm.nih.gov/19648202/).
10. Phokeo V, Sproule B, Raman-Wilms L. Community pharmacists' attitudes toward and professional interactions with users of psychiatric medication. *Psychiatr Serv*. 2004;55(12):1434-6. DOI: [10.1176/appi.ps.55.12.1434](https://doi.org/10.1176/appi.ps.55.12.1434). PubMed PMID: [15572574](https://pubmed.ncbi.nlm.nih.gov/15572574/).
11. Gardner DM, Murphy AL, Woodman AK, Connelly S. Community pharmacy services for antidepressant users. *Int J Pharm Pract*. 2011;9(4):217-24. DOI: [10.1111/j.2042-7174.2001.tb01052.x](https://doi.org/10.1111/j.2042-7174.2001.tb01052.x).
12. Department of Veterans Affairs Department of Defense. VA/DoD clinical practice guideline for the management of major depressive disorder [cited 2021 Jun 16]. Available from: https://www.healthquality.va.gov/guidelines/MH/mdd/VADoDMDDCPG_FINAL82916.pdf
13. Guillaumie L, Ndayizigiye A, Beaucage C, Moisan J, Grégoire J-P, Villeneuve D, et al. Patient perspectives on the role of community

- pharmacists for antidepressant treatment: a qualitative study. *Can Pharm J*. 2018;151(2):142-8. DOI: [10.1177/1715163518755814](https://doi.org/10.1177/1715163518755814). PubMed PMID: [29531632](https://pubmed.ncbi.nlm.nih.gov/29531632/); PubMed Central PMCID: [PMC5843116](https://pubmed.ncbi.nlm.nih.gov/PMC5843116/).
14. Satiani A, Niedermier J, Satiani B, Svendsen DP. Projected workforce of psychiatrists in the United States: A population analysis. *Psychiatr Serv*. 2018;69(6):710-3. DOI: [10.1176/appi.ps.201700344](https://doi.org/10.1176/appi.ps.201700344). PubMed PMID: [29540118](https://pubmed.ncbi.nlm.nih.gov/29540118/).
 15. Hoge MA, Paris M. Taking action on the workforce crisis. *Psychiatr Serv*. 2018;69(6):617. DOI: [10.1176/appi.ps.69602](https://doi.org/10.1176/appi.ps.69602). PubMed PMID: [29852841](https://pubmed.ncbi.nlm.nih.gov/29852841/).
 16. Levin SM. The psychiatric workforce now and in the future. *Psychiatr Serv*. 2018;69(6):714-5. DOI: [10.1176/appi.ps.201800182](https://doi.org/10.1176/appi.ps.201800182). PubMed PMID: [29852843](https://pubmed.ncbi.nlm.nih.gov/29852843/).
 17. Czeisler M, Lane RI, Petrosky E, Wiley JF, Christensen A, Njai R, et al. Mental health, substance use, and suicidal ideation during the COVID-19 pandemic—United States, June 24-30, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(32):1049-57. DOI: [10.15585/mmwr.mm6932a1](https://doi.org/10.15585/mmwr.mm6932a1). PubMed PMID: [32790653](https://pubmed.ncbi.nlm.nih.gov/32790653/); PubMed Central PMCID: [PMC7440121](https://pubmed.ncbi.nlm.nih.gov/PMC7440121/).
 18. Vahratian A, Blumberg SJ, Terlizzi EP, Schiller JS. Symptoms of anxiety or depressive disorder and use of mental health care among adults during the COVID-19 pandemic—United States, August 2020-February 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70(13):490-4. DOI: [10.15585/mmwr.mm7013e2](https://doi.org/10.15585/mmwr.mm7013e2). PubMed PMID: [33793459](https://pubmed.ncbi.nlm.nih.gov/33793459/); PubMed Central PMCID: [PMC8022876](https://pubmed.ncbi.nlm.nih.gov/PMC8022876/).
 19. Wheeler A, Crump K, Lee M, Li L, Patel A, Yang R, et al. Collaborative prescribing: a qualitative exploration of a role for pharmacists in mental health. *Res Social Adm Pharm*. 2012;8(3):179-92. DOI: [10.1016/j.sapharm.2011.04.003](https://doi.org/10.1016/j.sapharm.2011.04.003). PubMed PMID: [21831724](https://pubmed.ncbi.nlm.nih.gov/21831724/).
 20. Goldstone LW, Dipaula BA, Werremeyer A, Botts S, Hepburn B, Liu HY, et al. The role of board-certified psychiatric pharmacists in expanding access to care and improving patient outcomes. *Psychiatr Serv*. 2021;72(7):794-801. DOI: [10.1176/appi.ps.202000066](https://doi.org/10.1176/appi.ps.202000066). PubMed PMID: [33940946](https://pubmed.ncbi.nlm.nih.gov/33940946/).
 21. Beck J, Rooholamini S, Wilson L, Griego E, McDaniel C, Blankenburg R. Choose your own adventure: leading effective case-based learning sessions using evidence-based strategies. *MedEdPORTAL*. 2017;13:10532. DOI: [10.15766/mep_2374-8265.10532](https://doi.org/10.15766/mep_2374-8265.10532). PubMed PMID: [30800734](https://pubmed.ncbi.nlm.nih.gov/30800734/); PubMed Central PMCID: [PMC6342156](https://pubmed.ncbi.nlm.nih.gov/PMC6342156/).
 22. Beckhoff J. Gamification using a choose-your-own-adventure type platform to augment learning and facilitate student engagement in marketing education. *J Adv Mark Educ*. 2019;27(1):13-30.
 23. Redinger K, Gibb T, Caras KS, Donmoyer I. Choose your own adventure: innovations in ethics training. *Med Educ*. 2022;56(5):557-8. DOI: [10.1111/medu.14752](https://doi.org/10.1111/medu.14752). PubMed PMID: [35199853](https://pubmed.ncbi.nlm.nih.gov/35199853/).
 24. Thomas SP, Fathy R, Aepli S, Clancy CB, Lipschik GY, Simpson SA, et al. Comparative evaluation of choose your own adventure and traditional linear case formats in radiology small group teaching. *Acad Radiol*. 2022;29 Suppl 5:S82-8. DOI: [10.1016/j.acra.2021.10.022](https://doi.org/10.1016/j.acra.2021.10.022). PubMed PMID: [34987000](https://pubmed.ncbi.nlm.nih.gov/34987000/).
 25. Donovan CM, Cooper A, Kim S. Ready patient one: how to turn an in-person critical care simulation scenario into an online serious game. *Cureus*. 2021;13(9):e17746. DOI: [10.7759/cureus.17746](https://doi.org/10.7759/cureus.17746). PubMed PMID: [34659959](https://pubmed.ncbi.nlm.nih.gov/34659959/); PubMed Central PMCID: [PMC8494055](https://pubmed.ncbi.nlm.nih.gov/PMC8494055/).
 26. Scott D, Cernasev A, Kiles TM. Reimagining pharmacy education through the lens of a choose your own adventure activity—a qualitative evaluation. *Pharmacy (Basel)*. 2021;9(3):151. DOI: [10.3390/pharmacy9030151](https://doi.org/10.3390/pharmacy9030151). PubMed PMID: [34564558](https://pubmed.ncbi.nlm.nih.gov/34564558/); PubMed Central PMCID: [PMC8482149](https://pubmed.ncbi.nlm.nih.gov/PMC8482149/).
 27. Park J-C, Kwon H-JE, Chung CW. Innovative digital tools for new trends in teaching and assessment methods in medical and dental education. *J Educ Eval Health Prof*. 2021;18:13. DOI: [10.3352/jeehp.2021.18.13](https://doi.org/10.3352/jeehp.2021.18.13). PubMed PMID: [34182619](https://pubmed.ncbi.nlm.nih.gov/34182619/); PubMed Central PMCID: [PMC8376582](https://pubmed.ncbi.nlm.nih.gov/PMC8376582/).
 28. Kiles TM, Hall EA, Scott D, Cernasev A. Enhancing student knowledge of diabetes through virtual choose your own adventure patient case format. *Pharmacy (Basel)*. 2021;9(2):87. DOI: [10.3390/pharmacy9020087](https://doi.org/10.3390/pharmacy9020087). PubMed PMID: [33924071](https://pubmed.ncbi.nlm.nih.gov/33924071/); PubMed Central PMCID: [PMC8167788](https://pubmed.ncbi.nlm.nih.gov/PMC8167788/).
 29. Morningstar-Kywi N, Kim RE. Using interactive fiction to teach clinical decision-making in a PharmD curriculum. *Med Sci Educ*. 2021;31(2):687-95. DOI: [10.1007/s40670-021-01245-7](https://doi.org/10.1007/s40670-021-01245-7). PubMed PMID: [33643685](https://pubmed.ncbi.nlm.nih.gov/33643685/).
 30. Wilson-Stewart K. Choose your own adventure in podiatry. *Med Educ*. 2017;51(5):539. DOI: [10.1111/medu.13311](https://doi.org/10.1111/medu.13311). PubMed PMID: [28394074](https://pubmed.ncbi.nlm.nih.gov/28394074/).
 31. Bauer M, Pfennig A, Severus E, Whybrow PC, Angst J, Möller H-J. World Federation of Societies of Biological Psychiatry (WFSBP) guidelines for biological treatment of unipolar depressive disorders, part 1: update 2013 on the acute and continuation treatment of unipolar depressive disorders. *World J Biol Psychiatry*. 2013;14(5):334-85. DOI: [10.3109/15622975.2013.804195](https://doi.org/10.3109/15622975.2013.804195). PubMed PMID: [23879318](https://pubmed.ncbi.nlm.nih.gov/23879318/).
 32. Bandelow B, Sher L, Bunevicius R, Hollander E, Kasper S, Zohar J, et al. Guidelines for the pharmacological treatment of anxiety disorders, obsessive-compulsive disorder and posttraumatic stress disorder in primary care. *Int J Psych Clin Pract*. 2012;16(2):77-84. DOI: [10.3109/13651501.2012.667114](https://doi.org/10.3109/13651501.2012.667114). PubMed PMID: [22540422](https://pubmed.ncbi.nlm.nih.gov/22540422/).