Study Habits and Perceived Efficacy of Exam Practice Questions among First-Year Medical Students at a United States Medical School

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Abstract: Medical school curriculum integrates pre-clinical coursework with clinical experiences to impart understanding of pathophysiologic processes and requisite skills for future physicians. Evaluation through examinations measures students' knowledge and skills acquisition, while practice exam questions remain underexplored in studies on student study habits and exam performance. This study addresses the study habits, perceptions, and utilization of practice questions among first-year medical students (M1s). A survey conducted in 2023 revealed that a substantial proportion of students dedicate extensive time to independent study, with a majority expressing a strong preference for utilizing practice questions in their exam preparation. Notably, the survey findings underscored the perceived effectiveness of practice questions in assessing comprehension and identifying crucial content areas. Furthermore, students emphasized the value of practice questions that integrate and synthesize information across different curriculum blocks. The majority of students reported improved perceived performance on content accompanied by practice questions, highlighting the potential benefits of integrating these resources into medical school curricula. By understanding and supporting effective study strategies, educators can potentially mitigate student stress and enhance overall academic performance.

Keywords: medical education, practice exam questions, student study habits, exam performance, curriculum assessment

INTRODUCTION

Through a complex curriculum that includes pre-clinical coursework integrated with hands-on clinical experiences, medical school is designed to give students an understanding of pathophysiologic processes within the human body and the skills necessary to become competent physicians. To measure if students have gained the knowledge and skills they will need, they are evaluated utilizing a variety of assessment formats, including examinations. Examinations allow students to recall and utilize the information taught in the classroom, improving overall comprehension and retrieval of the same material in a future retrieval attempt (Donker et al., 2022). To improve their academic performance, students employ various study strategies, which may include utilizing practice exam questions.

Academic performance carries career implications for medical students, incentivizing programs to provide resources to achieve superior scores. Krupat et al. (2017) showed that...
decreased academic performance in the 1st year of medical school is a risk factor with both predictive utility and predictive validity for worse performance later in medical school. Lerchenfeldt and Nyland (2016) analyzed the preferences of learning techniques utilized by medical school students. In evaluating the efficacy of these techniques, it was found that nearly one-half of pre-exam study time was spent on practice testing and questions. Practice exam questions are integral to the complex system of learning opportunities provided to students to improve their scores and overall performance. These questions promote retrieval practice and critical thinking in a spaced learning pattern that could be helpful for knowledge retention and performance on the test. Yet, few studies investigate student study habits, or their perceptions and utilization of practice questions in medical school. Therefore, the main goal of our study is to understand medical students' study habits, perceptions, and usage of practice questions when preparing for exams. Specifically, we will use a descriptive survey, where students can share details about their study habits and their perceptions of utilizing practice questions to prepare for exams.

METHODS

Students in the respiratory and circulatory blocks were chosen for this study based on mean exam average and standard deviations. Cohorts of first-year medical school students in these blocks are instructed over standardized topics by the same educators from year to year. Students in their first year of medical school (M1s) in 2023 were surveyed about their study habits and perceptions of exam practice questions. The survey (see Appendix) was sent via email with biweekly reminders. The survey responses were analyzed using descriptive statistics. This study was deemed IRB exempt (IRB #0077-23-EX).

RESULTS

The survey was emailed to 2023 M1s (n=132), which received over a 46% response rate (n=61). Of the students that responded, 48% (n=29) stated that they studied 5-6 hours per day outside of class time, with 20% (n=12) stating that they spent over 6 hours studying per day outside of class. Notably, 69% (n=42) of respondents preferred studying alone, compared to studying with others (5%, n=3), or having equal preferences for studying alone and with others. Additionally, 75% (n=46) of students always utilize practice questions when available, and 0 students reported never using available practice questions. According to the survey, 42 students (69%) utilized practice exam questions just before the exam only, compared to weekly (n=16), and daily (n=1). Before starting medical school, 89% of students utilized practice exam questions. Importantly, 50 students (82%) report that they perform better on content accompanied by practice questions, with 57% (n=35) stating that instructor-developed practice exam questions aid in gauging their knowledge of the information to be tested.

At the survey's end, there was an open text box for students to provide more information about their perceptions of practice exam questions and performance. Notably, 40 students opted in to provide their opinions on the subject. This feedback showed that students value the inclusion of practice questions before exams, as they assess their understanding, helping to gauge their knowledge before exams. It was stated that having practice questions offers a sense of whether students can apply the material learned and highlights the importance of certain content. Additionally, students appreciate practice questions that synthesize and connect information.
across different blocks, particularly when explanations accompany the answers. Many students even expressed disappointment in not having more practice questions to utilize.

**DISCUSSION**

The findings from this initial survey provide valuable insights into overall study methods and the perceived impact of practice exam questions on test preparation and performance. With almost 68% of students reporting that they spend at least 5 hours studying every day throughout the first year of medical school, it is a topic that should be investigated so that faculty can understand how to best support students. Since 89% of our students indicated they utilized practice exam questions prior to starting medical school, and the 57% of students recognized that these questions aid in gauging their own knowledge, this underscores the early adoption and perceived efficacy of these resources.

Gathering feedback from students and faculty by curriculum directors can promote critical thinking, problem-solving skills, and, in this case, effective study strategies to allow students to confidently approach exams and achieve better outcomes. First-year medical students need help navigating the intricacies of effective study techniques and refining their approaches to optimize learning outcomes within the rigorous demands of post-graduate studies. It has been shown that implementing study strategies significantly improves student confidence and academic performance (Sisa et al., 2023). Also, according to previous studies, medical courses and curricula play a part in the disillusionment and demoralization of students by decreasing their initial enthusiasm for medicine and failing to prepare them adequately for the diversity of problems with which they will be presented as professionals (Friedman, 2009). By providing adequate resources to students, it can be theorized that students can learn more efficiently and effectively, ultimately decreasing the stress burden often perceived.

Inadequate time management among medical students can significantly impede efficient study habits, hindering the mastery of essential content (Bin Abdulrahman et al., 2021). By providing guidance on pertinent exam material, faculty can enhance students' productivity, potentially elevating academic performance. Upon analysis of the open-text responses provided by survey participants, it became evident that a significant perception among students is that practice exam questions aid them in pinpointing crucial information from lectures. This finding underscores the valuable role that these questions play, enhancing students' ability to discern pertinent content from their academic lessons.

Interestingly, many students reported that they prefer solitary studying, relying predominantly on lecture slides and personalized notes. This shows similarity to the findings by Bin Abdulrahman et al. (2021). While this method is common, an exclusive focus on these materials may limit the depth of understanding, particularly if students neglect broader references instead of more minute details. When integrated into study routines, practice exam questions are invaluable tools for comprehensive learning. They not only help students gauge their comprehension but also encourage the application of knowledge in various contexts, promoting critical thinking and problem-solving skills, which are essential for a more profound understanding of the subject matter.

Limitations of this study encompass several factors that may influence its findings. Our study was conducted at a single institution, which means our findings may not be generalizable to other institutions or students. Moreover, the quality of practice questions students have previously utilized may be highly variable, which would impact student perceptions of their effectiveness.
Differences in individual learning preferences and study habits may affect the extent to which students engage with these resources. As we continue to develop and improve the medical school curriculum, we must gather evidence regarding what is effective for learners. Well-trained and educated medical students are more likely to perform at the highest level as residents, fellows, and attendings. This may benefit society, as these medical professionals will be a part of the healthcare workforce. Through improved methods, medical students may be better prepared to provide and support positive health outcomes for patients, regardless of specialty. It is important that the impact of changes in medical school curriculum are continuously examined based on measurable outcomes to ensure that the quality of training in medical school remains high (McKeown et al., 2003).

**FUTURE DIRECTIONS OF RESEARCH**

The survey portion of this project is just the initial step in the overall goal of assessing the efficacy of practice exam questions in relation to exam performance and student perceptions of the utility of these questions. Our survey highlighted the importance of practice questions to students. Therefore, we will continue our work by studying the initial class (2023 M1 class) and their grades on exams within the circulatory and respiratory blocks, which will serve as a control group, ultimately being compared to the 2024 M1 class. Throughout this academic year, curriculum directors and faculty will work to develop high-quality practice questions provided to the 2024 M1 class with the same learning objectives and blocks as the 2023 M1 class. A deidentified compilation of exam grades in both classes will be analyzed to determine the significance, if any, of the provided practice questions on exam performance. Limitations of this future study include class variability, quality of practice questions provided, and the overall utilization of practice questions provided. Going forward, we want to conduct the same research at multiple institutions and in various blocks to better understand the generalizability of our findings.

**REFERENCES**


**APPENDIX**

This survey was given to 2023 1st year medical students (M1s) as a control, who were not provided practice questions for the respiratory or circulatory blocks. The survey will also be given to 2024 M1s, as a treatment group, who will be given practice questions for the respiratory and circulatory blocks.

Consent verbiage: We are interested in understanding your study habits and perceptions of having instructor-provided practice questions prior to exams. This survey will be distributed to UNMC Medical Students in their first year of training (M1s). The survey should take you no more than 10 minutes to complete. Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. By submitting the survey, you acknowledge that your participation in the study is voluntary, you are at least 19 years of age or older, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

1. During this semester, on average, how many hours per day have you spent studying outside of class? (choose one)
   - Less than 1 hour
   - 1-2 hours
   - 3-4 hours
   - 5-6 hours
   - >6 hours

2. What is your preferred setting for studying? (choose one)
   - Studying alone
   - Studying with others
   - Equal preference for studying alone or with others

3. How often do you utilize practice questions of any type in studying for block content? (choose one)
   - Always
   - Sometimes
   - Rarely
   - Never
   - (if always, sometimes, or rarely are selected, proceed to question 4; if never is selected, proceed to question 6)
4. When do you utilize practice exam questions in your studying?
   - Daily
   - Weekly
   - Right before the exam only
   - Other

5. At what point in your academic career did you first utilize practice questions as a study tool? (choose one)
   - Prior to Medical School
   - Starting at the beginning of Medical School
   - At some point during the 1st year of Medical School
   - Unknown

6. What is (are) the source(s) of your practice exam questions? (choose as many as appropriate)
   - Given by the Faculty/Lecturer of the content
   - UWorld
   - Amboss
   - AnKing
   - Other Resource (fill in)

7. In your experience, how effective or ineffective are practice exam questions in gauging your knowledge of the information on which you will be tested?
   - Very effective
   - Somewhat effective
   - Neither effective nor ineffective
   - Somewhat ineffective
   - Very ineffective

8. In your opinion, how beneficial or detrimental are practice questions when it comes to improving overall performance on exams?
   - Very beneficial
   - Somewhat beneficial
   - Neither beneficial nor detrimental
   - Somewhat detrimental
   - Very detrimental

9. Prior to taking the exams for the Respiratory Block, how confident or uncertain were you of your knowledge of the material?
   - Very confident
   - Somewhat confident
   - Neither confident nor uncertain
   - Somewhat uncertain
   - Very uncertain

10. Prior to taking the exams for the Respiratory Block, how confident or uncertain were you of your ability to perform well on the exam?
11. Prior to taking the exams for the Circulatory Block how confident or uncertain were you of your knowledge of the material?
- Very confident
- Somewhat confident
- Neither confident nor uncertain
- Somewhat uncertain
- Very uncertain

12. Prior to taking the exams for the Circulatory Blocks, how confident or uncertain were you of your ability to perform well on the exam?
- Very confident
- Somewhat confident
- Neither confident nor uncertain
- Somewhat uncertain
- Very uncertain

13. In your opinion, how does your performance on exams correlate with having access to practice exam questions on the given content?
- I perform better on content without practice exam questions.
- I perform better on content with practice questions.
- There is no difference in my performance with or without practice exam questions.

14. Please use this space to provide any additional information regarding your perceptions of practice exam questions and exam performance.
- Open text response.