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An evaluation of study habits of third-year medical students in a surgical clerkship

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Abstract

Background: This study was developed to assess study habits of medical students in a third-year surgical clerkship and to determine the relationship of these study habits to performance outcomes.
Methods: A questionnaire designed to assess medical student study habits was administered at the end of five consecutive 10-week multidisciplinary surgical clerkships. The results of questionnaires from 81 students were analyzed in respect to results on the National Board of Medical Education (NBME) surgical subtest and the multiple stations clinical examination (MSCE) given at the end of each clerkship.
Results: Although only 18 of the total 81 students reported studying in formal but self-directed groups, students who reported studying in a group on average scored 4 points higher on the MSCE than those who did not study in a group ($P = 0.001$). However, no significant differences or correlations were discovered between any of the study habits and the individual results on the NBME.
Conclusion: Students may benefit from collaborative studying when it comes to clinical experience as demonstrated by improved performance on the MSCE.

Keywords: Medical students; Surgery education; Study habits; Medical education; Collaborative learning; Group study

Frequently much time is devoted to developing the content of the curriculum and the type of assessments that will be completed with little attention given to how the students best learn or if they will be enhancing their lifelong learning habits [1]. A student's approach to learning, which includes study habits, has been shown to predict the student's success [2]. Students approach learning in different ways that in part are influenced by their preferred learning style and partly by the context of the environment in which their learning takes place. Different disciplines have distinctly different learning environments, which results in students varying their approach to learning [3].

The study habits of students in a surgical clerkship have been shown to reflect how students perceive faculty expectations and the structure of the assessments [1,4]. As a result, it was believed to be of value to include the methods of student study while in the process of curriculum development. The purpose of this study was to assess the study habits of third-year medical students in a surgical clerkship in relationship to performance outcomes. The intent was to use the results of this study to direct the development of curriculum activities. Active discussion with colleagues has been related to academic and intellectual growth [5]. The current healthcare environment demands that practitioners become self-directed, critical thinkers, and team players [6].

Our hypothesis is that students utilizing collaborative study methods perform better on examinations. Thus, including opportunities for collaborative activities will enhance the student's performance.

Methods

A questionnaire was designed to assess medical student study habits in a multidisciplinary surgical clerkship. These questionnaires elicited responses regarding reading habits, utilization of lectures, group study, distribution of study

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time throughout the clerkship, and resources utilized during study.

A pilot study was completed at the end of one surgical clerkship by administering the questionnaire to all 20 of its students. The questionnaire was then revised to increase its clarity. The data from this pilot were not included in the final analysis.

The final questionnaire was then administered at the end of five consecutive 10-week multidisciplinary surgical clerkships. The results of questionnaires from 81 students were analyzed in respect to results on the National Board of Medical Education (NBME) surgical subtest and the multiple stations clinical examination (MSCE) given at the end of each clerkship. The MSCE is a 19-station examination that includes use of standardized patients and interpretation of clinical data all within the framework of patient case scenarios that emphasizes clinical problem solving.

To compare those students who studied in groups, independent *t* tests were used to examine NBME and MSCE performance. Categorical variables were assessed using chi-square tests of independence or Fisher's exact tests, as appropriate. Ordinal variables were analyzed with the Mann-Whitney test. In addition to studying in groups, other study habits were examined to determine if there were differences on NBME and MSCE performance. Correlation coefficients were used to examine the relationships amongst the continuous and the ordinal variables. Results were considered statistically significant for $P < 0.05$.

Results

Of the 81 students who participated in this study, 47 (58%) were male and 34 (42%) were female. Of the 18 students who reported studying in formal but self-directed groups, 10 (56%) were male and 8 (44%) were female. There was no significant relationship between gender and participation in groups or performance on examinations.

Students from the first- and second-year problem-based learning (PBL) curriculum represented 33.3% of the population. There was no significant correlation between whether students had participated in the PBL curriculum and if they chose to study in groups. Students from the PBL curriculum did report a slightly significant increased use of the Internet ($P = 0.045$), otherwise, there was very little correlation between study habits and whether students were in the PBL or traditional curriculum. Tables 1, 2, 3, and 4 further illustrate the descriptive results of the questionnaire.

Most study groups consisted of 2 to 3 students and the majority (55.5%) met 2 to 5 times a month, while 27.8% met 11 to 30 times a month, and 16.7% met 6 to 10 times a month. Of the students who studied in groups, 58.8% reported having preassigned learning issues prior to meeting.

In regard to their reading habits 43.8% of students formulate questions prior to reading, 44.8% only highlight important points, and 55.2% write down important points in their own words. The students were asked to rank their methods of studying, and 58.2% chose reading to prepare for rounds, lectures, or surgery cases as their most frequent method of studying. This was of special interest as students reported spending more time preparing for activities than they did studying for examinations. Aside from textbooks, other methods commonly utilized include question books (84.0%), journal articles (69.1%), Internet (60.5%), and computer programs (23.5%).

Although only 18 of the total 81 students reported studying in formal but self-directed groups, students who reported studying in a group on average scored 4 points higher on the MSCE than those who did not study in a group ($P = 0.001$). Students who wrote down important points in their own words when reading performed significantly better on the MSCE than students who simply highlighted important points ($P = 0.009$). The utilization of cue cards or index cards did not result in improved scores; in fact, students who utilized this method scored 5 points lower on the NBME than students who do not use cue cards ($P = 0.027$). No other significant results were discovered between any of the other study habits and results on the NBME or MSCE.

Table 1
Group demographics

	Group study	No group study
Number of students	18	63
Male	10 (56%)	47 (58%)
Female	8 (44%)	34 (42%)
Problem-based learning	8 (30%)	19 (70%)
Traditional	10 (19%)	44 (81%)
MSCE mean score	73.0	69.3
MSCE standard deviation	5.94	3.40
NBME mean score	73.1	71.7
NBME standard deviation	6.52	9.36

MSCE = multiple stations clinical examination; NBME = National Board of Medical Education.

Table 2
Reading habits

	Group	No group	Overall
Formulate questions prior to reading	29.4%	47.6%	43.8%
Read the material without any particular question in mind	70.6%	52.4%	56.3%
Read every word of a chapter or section	46.7%	72.7%	67.1%
Scan a chapter or section for only interesting information	53.3%	27.3%	32.9%
Highlight important points only	43.7%	45.0%	44.8%
Write down important points in their own words	56.3%	54.9%	55.2%
Use one textbook for each subject	27.8%	13.0%	16.3%
Use a number of textbooks for each subject	72.2%	87.0%	83.8%

Table 3
Lecture material

	Group	No group	Overall
Attend lectures to listen only	61.1%	42.8%	46.9%
Tape record lecture	5.5%	0.00%	1.2%
Designate a note taker	22.2%	6.3%	9.9%
Utilize prewritten notes when available	66.7%	44.4%	49.4%
Review and amend notes soon after lecture	13.3%	19.6%	18.2%
Review notes just prior to examination	86.7%	80.4%	81.8%

Table 4
Other methods of study

	Group	No group	Overall
Question blocks	94.4%	81.0%	84.0%
Journal articles	72.2%	68.3%	69.1%
Internet	66.7%	58.7%	60.5%
Computer programs	27.8%	22.2%	23.5%
Cue cards or index cards	27.8%	19.0%	21.0%
People as a resource (eg, residents, nurses)	16.6%	9.5%	11.1%
Video instruction	5.6%	9.5%	8.6%
Audiotapes	5.6%	6.3%	6.2%

Comments

A significant percentage of medical students utilized active study methods during the study. Most frequently utilized methods include group study, formulating questions prior to reading, written summaries of material read, and use of question books. The advantages of active over passive learning are researched-based and persuasive. Simply stated this research has suggested students utilizing active learning are more likely to internalize, understand, and remember concepts and learned experiences [7–9]. The Harvard assessment seminars compared the performance outcomes of students who studied alone with those who studied in small groups. The students who studied in groups performed significantly better than their colleagues who studied alone. In addition, the students who studied in groups spoke more often, asked more questions, and were generally more engaged during learning activities [10].

Differences in study habits between students from different curricula have been previously reported. However, in this study, with the exception of the increased use of the Internet by PBL students, there were very few significant differences discovered in the study methods utilized when comparing students from PBL versus a traditional curriculum. This is in contrast to the findings in a review of the literature by Albanese et al [11] and a study conducted by Rankin [12]. Both indicated that there were differences in the study methods utilized by students in a PBL curriculum. It was concluded that PBL students made greater use of the library, demonstrated an increased use of textbooks, journals and online sources, and less use of lecture notes [11, 12]. The disparity found in this study could be related to the fact that the students currently in the clerkship are no longer in a true PBL curriculum and that this change in their learning environment restructures their study habits [1].

The NBME generally assesses a student's fund of knowledge while the MSCE measures clinical reasoning. Students may benefit from collaborative studying when it comes to clinical experience as demonstrated by improved performance on the MSCE. This was accomplished without sacrificing performance on the NBME as there was no significant difference seen in these students' NBME scores.

Our results provide additional evidence that collaborative studying among medical students enhances the scope of their clinical reasoning. Current literature supports the fact that small group learning allows students to share their own ideas and respond to others' reactions, which increases their involvement in learning and deepens understanding [13]. Studies have shown working in a collaborative environment allows for the students to gain multiple perspectives, which enhances their ability to solve complex problems even in the absence of the group [14]. In addition the group skills that are acquired can be transferable to the teamwork that will be required of them in their future as a healthcare professional [15].

Our curriculum was recently designed to include protected study time on two evenings a week, which provides the opportunity for those who wish to study collaboratively. We have also developed group mentoring sessions. These sessions are designed with the purpose of students sharing clinical experiences from all of the surgical divisions. The results of this study support the belief that providing such opportunities will lead to enhanced clinical performance.

Conclusion

Future research needs to be directed at how the learning environment affects students' learning behavior and the type of curriculum activities that would enhance the students' educational development in the desired direction [16]. There were two other questions that arose from this study: is it the act of studying in a group that relates to better outcomes when performing on clinical performance examinations, or do students who choose to participate in group study already have existing learning styles that have given them advantages on clinical performance assessments?

Curriculum content influences learning in numerous ways with the structure of assessments possibly being one of the most influential [3]. Students vary their approach to learning depending on their perception of the demands of the course and how this knowledge will be assessed [1]. It is clear that curriculum planning groups need to focus their efforts in creating an environment that provides opportunities that encourage the development of highly motivated, self-directed, lifelong learners.

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