Impact of the "Journal Club" activity among medical students' knowledge of scientific methodology

Ana Carolina Coelho Baracat, Élen Maria Guimarães Zeni, Eduarda Feitosa Lourenço, Heitor Augusto Gomes, Juliano Mota Volinger

ABSTRACT

Introduction: The Journal Club is an environment for exchanging information within the medical context concerning updated literature and evidence-based medicine. Considering the importance of constantly updating the acquired knowledge and scenarios of social isolation imposed by the COVID-19 pandemic, the Journal Club event was held virtually, aiming to expand the understanding of the scientific methodology among medical students by understanding the differences among each type of evidence pyramid study by reading and discussing scientific articles. **Methodology:** An analytical, prospective, and cross-sectional study was conducted in October 2021. The Journal Club event took place in nine classes where each type of evidence pyramid study was addressed. The sample included 20 medical students. A questionnaire was used at the beginning and end of the event to assess the participants' knowledge from the classes taught and was divided into two parts: participant identification data and 19 questions regarding the types of studies present on the pyramid of evidence. **Results**: It was found that after the pre- and post-event analysis of the questionnaire among the 19 questions, correct answers increased in 17, among which 3 obtained a statistically significant value: questions 1 (p = 0.031), 15 (p = 0.039), and 18 (p = 0.016)**. Discussion**: An increase in the number of correct answers was noted between pre- and post-classes, which may indicate an improved understanding of the subject among students. Furthermore, the study demonstrated that the students had little involvement in scientific research (only 25% had ever been involved in a project). **Conclusion:** Based on the analysis of the participants' performance in the pre- and post-event questionnaires, it can be concluded that the medical students were able to expand their knowledge of scientific methodology.

Keywords: Evidence-based medicine, Education medical undergraduate, Information dissemination

INTRODUCTION

Introduced to North America by Osler in 1875, the Journal Club became an important venue for exchanging information (Linzer 1987) [...]. The purpose of these formative journal clubs was to help clinicians stay up-to-date with emerging world literature (5).

SARS-CoV-2 is a respiratory virus with a widely accepted mode of transmission and occurs among people due to close contact, mainly via the droplets expelled through various respiratory activities, such as coughing, sneezing, singing, and talking (7). Considering the pandemic caused by the spread of this virus, face-to-face meetings became unfeasible; however, the relevance of the Journal Club remained, particularly in times of pandemic and misinformation.

In this sense, the virtual environment has become a good alternative, considering that advances in information technology, which made the personal computer a generalized influence in everyday life, also changed the practice of medical education at all levels. A recent review in The Lancet stated that "in less than two generations of students, information and communication technology has been repositioned as an integral component of the medical school environment" (6).

Therefore, considering that the need for physicians to continually update their knowledge has gradually been recognized, it became clear the need for medical students to complete graduation with critical skills and access to information for self-directed learning to maintain self-taught study throughout life (5). Thus, knowledge

Universidade Positivo, Curitiba, (PR), Brasil.

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about study designs in the health area becomes essential. Furthermore, it should be noted that scientific articles and their abstracts presented at congresses will be the main reliable sources for updating medical knowledge for most health professionals.

Therefore, being able to read scientific articles and understand them provides unrestricted and first-hand access to data newly obtained in the best and most reliable laboratories and hospitals in the world (4). Parallelly, it is necessary to build a solid foundation about the types of study, given the first step in carrying out a critical reading is to gain knowledge of the principles of the article in question. That is, we must remember that before health professionals change their practice in light of a published research article, they must decide whether the methods used are valid (8).

In this way, they will be able to practice evidence-based medicine, defined as the explicit, conscious, and judicious use of the best evidence currently available in the medical literature from systematic clinical observations (clinical studies) to make decisions relevant to the patients' care (4).

With this in mind, the Journal Club event was held in a virtual environment, aiming to expand the knowledge of scientific methodology among medical students by understanding the differences between each type of evidence pyramid study by reading and discussing the articles.

METHODOLOGY

This study has an analytical and prospective cross-sectional design. The sample consisted of 20 medical students who had access to the Internet synchronously with the classes and were chosen for convenience.

The "Journal Club" event was conceived by the local Scientific Committee of IFMSA Brazil—an institution of medical students that aims to increase students' knowledge of subjects that are not normally addressed at the university—and disseminated through virtual platforms such as WhatsApp, Instagram, and Telegram in September–October 2021. Only students who accepted the terms that include the Free and Informed Consent Form had access to the questionnaire prepared by the researchers and made available through Google Forms. The questionnaire was applied on the first and last days of the event.

This instrument was developed by the authors, exclusively for this research, aiming to determine whether there was an expansion of knowledge about scientific methodology among the project participants from the classes taught.

The questionnaire was divided into two parts: participant identification data and questions about each type of study. In the identification part, the initials of the participant's name, gender, age, semester of college, if the participant has already studied methodology, epidemiology, or statistics during graduation, and if he has already participated in any scientific research were asked.

The second part of the questionnaire consisted of 19 questions: 2 on animal and *in vitro* studies, 3 on case reports and series, 2 on cross-sectional studies, 3 on case–control studies, 3 on cohort studies, 3 on randomized clinical trials, and 3 on systematic reviews. Thus, it was determined whether the participants were able to understand the main characteristics of each type of evidence pyramid study.

The research was submitted and approved by the research ethics committee of Universidade Positivo (CONEP Protocol 48490721.0.0000.0093, date 08/14/2021). The data were collected using Excel spreadsheets. Statistical analyses were conducted using GraphPad Prism 5.0 and SPSS 17.0. Categorical variables were expressed in percentages and comparisons between moments before and after classes were performed using the McNemar test. Fisher's exact test was employed for comparisons between independent samples. *P* values less than 0.05 were considered statistically significant.

RESULTS

The event took place in nine classes taught virtually (via Zoom) in October 2021. In the first class, issues related to scientific methodology were addressed and divided into three parts with three addressing professors: database

search of data, characteristics of the evidence pyramid studies, and how to critically analyze a scientific article.

Between the 2nd and 8th meetings, each type of evidence pyramid study was addressed: research in animals and *in vitro*, case report and series, cross-sectional study, case–control study, cohort study, and randomized clinical trials and systematic review. These six classes were organized as follows: first, the event organizers recalled the characteristics of the type of study of the day and then a guest professor read and discussed with the participants a base article to better exemplify that type of study. Finally, the 9th class had evidence-based medicine as its theme. Each meeting lasted an average of 1 h.

The number of students in classes varied, with an average of approximately 40 participants per day; in the first meeting, 47 people answered the initial questionnaire. However, the number of students who answered the first and second questionnaires was 20. The reasons for this low adherence are probably the format of the questionnaire (long and with many questions) and the remote administration of the classes.

In this sample of 20 people, 75% (n = 15) of the participants were females and 50% (n = 10) were between 20 and 22 years old, with more than half (n = 13) in the basic cycle of the medical course. Furthermore, 60% (n = 12), 20% (n = 4), and 60% (n = 12) already studied scientific methodology, epidemiology, and statistics during graduation, respectively. Those who did not attend any of the previously mentioned disciplines accounted for 40% (n = 8) of the students. As regards participation in some scientific research, only 25% (n = 5) of the students already had this experience in their academic curriculum.

When analyzing the comparison between the pre- and post-event questionnaires, it was possible that of the 19 questions asked, there was an increase in the number of correct answers in 17, among which 3 had a statistically significant value: question 1 (p = 0.031) had laboratory and animal studies as its theme, 15 (p = 0.039) involved randomized clinical trials, and 18 (p = 0.016) addressed systematic reviews. There was no decrease in correct answers for any of the questions.

Table 1
Sample identification

Characteristics (N=20)	n	%
Gender		
Feminine	15	(75,0)
Male	5	(25,0)
Age		
17-19	4	(20,0)
20-22	10	(50,0)
23+	6	(30,0)
Cycle		
Basic	13	(65,0)
Clinical	7	(35,0)
Scientific Methodology		
No	8	(40,0)
Yes	12	(60,0)
Epidemiology		
No	16	(80,0)
Yes	4	(20,0)
Statistic		
No	8	(40,0)
Yes	12	(60,0)
No discipline		
No	12	(60,0)
Yes	8	(40,0)
Already participated in research		
No	15	(75,0)
Yes	5	(25,0)

DISCUSSION

An important challenge for physicians and medical students lies in learning how to access quality information that can support clinical decision-making based on evidence (1). Thus, this study aimed to consolidate the participants' knowledge about the types of studies described in the pyramid of evidence, considering scientific articles represent one of the main sources of reference in today's world. Although the answers to the questionnaires did not exhibit much significance, there was a general improvement in the pre- and post-class evaluation of the Journal Club, as observed by the increase in the correct answers to the questions.

Another point is that although the interest of medical students in conducting scientific research is high, they conduct very little research in practice. Several factors are responsible for

Table 2

Analysis of the effect of educational intervention (N=20)

Questions**		Before		After		p*
		N	%	N	%	
Question 1	right	13	(65,0)	19	(95,0)	**0,031**
Question 2	right	5	(25,0)	10	(50,0)	0,230
Question 3	right	8	(40,0)	14	(70,0)	0,070
Question 4	right	7	(35,0)	13	(65,0)	0,070
Question 5	right	9	(45,0)	14	(70,0)	0,125
Question 6	right	9	(45,0)	14	(70,0)	0,180
Question 7#	wrong	20	(100,0)	20	(100,0)	n.a
Question 8	right	1	(5,0)	6	(30,0)	0,063
Question 9	right	2	(10,0)	6	(30,0)	0,125
Question 10	right	0	(,0)	2	(10,0)	n.a
Questão 11	right	6	(30,0)	8	(40,0)	0,754
Question 12	right	3	(15,0)	9	(45,0)	0,070
Question 13	right	5	(25,0)	9	(45,0)	0,219
Question 14	right	7	(35,0)	7	(35,0)	1.000
Question 15	right	4	(20,0)	11	(55,0)	**0,039**
Question 16	right	7	(35,0)	12	(60,0)	0,125
Question 17	right	7	(35,0)	13	(65,0)	0,070
Question 18	right	9	(45,0)	16	(80,0)	**0,016**
Question 19	right	0	(,0)	1	(5,0)	n.a

* McNeman test, **Proportion of correct answers

n.a = not applicable, due to the absence of data for one of the variables

#Question 7 got only wrong answers

this low performance of academics in scientific research, among which the lack of advisors and incentive programs for scientific development are the main factors (2). Our study data corroborating this shortage in scientific production by students is that a small percentage (25%) of Journal Club participants has already been involved in some scientific research; this could be seen as a bias, considering that the majority of the sample (65%) consisted of students in the basic cycle who have not started their scientific life yet. However, it was noted that of the 18 people who answered yes to this question in the first questionnaire, which obtained 47 responses, 10 were studying the basic cycle. When observing the responses of individuals who participated in the pre- and post-questionnaires, there were five positive responses to this question, 2 (40%) of which were from individuals who were studying the basic cycle. Therefore, respondents belonging to the basic cycle do not justify the low percentage (25%) of students who have already been involved in some scientific research.

Possibly, the low significant value was due to the small sample size of the research. Although the number of students in classes was 40 on average, only half of them answered both survey forms. This low adherence in completing the survey forms was possibly due to the number of questions asked (19)—which may have discouraged a portion of the participants from completing the questionnaire–and its application through Google Forms, a digital platform; the answers depended on viewing the messages calling for participation in the research and on the individuals' motivation to answer the questions with diligence and dedication. However, the use of the digital method to explain classes, in addition to being a great option in the face of the COVID-19 pandemic, is also in line with the emerging use of electronic resources by medical students to access information. This stems from the fact that traditional teaching

methods have significant flaws in delivering information at the speed current medicine demands, with the digital medium being a facilitating vehicle to fill this information gap, as it can be immediately disseminated and consumed virtually (3). In this sense, we believe that journal clubs, such as the Journal Club, in which new literature updates are discussed and carried out online, play a crucial role in continuing medical education.

CONCLUSION

With the application of the questionnaire among the participants before and after the event, it was observed that of the 19 questions asked, there was an increase in correct answers in 17, among which 3 obtained a statistically significant value. Furthermore, there was no decrease in correct answers for any of the questions. Thus, it is concluded that after the Journal Club event, medical students were able to expand their knowledge of scientific methodology. It is noteworthy that the small sample size influenced the low number of questions with statistically significant value and that the long questionnaire made available virtually may have had an impact on adherence to its completion. Additionally, the relevance of holding new events like this is highlighted, with the increase in the number of participants and with the elaboration of a more objective questionnaire to perpetuate the practice of meetings based on evidence-based medicine.

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Corresponding Author:
Ana Carolina Coelho Baracat
anacarolinacoelhob@gmail.com

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