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Effective Holding of Scientific Olympiads for Medical Sciences Students: A Qualitative Study

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Abstract

Introduction: Due to the importance of holding effective scientific Olympiads for medical sciences students, this study aimed to evaluate experts' viewpoints in regard to their necessity, costs, achievements, barriers and solutions.

Methods: In this qualitative study, required data were collected using open-ended questions through self-development questionnaires, which were filled out by experts. Data were analyzed through content-analysis methods. To select participants, a purpose-based sampling method was applied up to the point of information saturation. Thus, this study was performed with 20 individuals.

Results: The main necessity and philosophy of holding Olympiads expressed by the experts were: promoting health sector performance, extension of interrelationships between universities, development of scientific competition and incensement of students' creativity. The majority of participants believed that the achievements of holding these Olympiads are negligible versus their costs. The most important barriers were: absence of appropriate relationships between universities, lack of proper support for holding these Olympiads, the low motivation of professors, non-interested students and the shortage of resources and facilities. Furthermore, the most important solutions included: performance evaluation of previous Olympiads, increasing incentives and motivations as well as suitable planning.

Conclusion: According to experts' viewpoints, although holding scientific Olympiads is necessary for medical students, during past years, the achievements of such Olympiads versus theirs costs seem negligible and there are lots of barriers in the path of achieving their goals and philosophy.

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Introduction

Universities of medical sciences mainly aim to train people to maintain and promote health. Nowadays, universities utilize a novel approach for providing a scientific, competitive and healthy atmosphere and detect talented students. One of these approaches is holding scientific student Olympiads.[1] The purpose of holding these Olympiads in health systems is promoting health system performance, teaching the skills of reasoning and problem solving, considering creative and critical thinking, paying attention to health system goals, encouraging teamwork and encouraging interdisciplinary activities.[2,3] According to results of previous studies, holding these Olympiads makes students more self-confident, assists students in choosing their future career,[4] guides and trains their

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scientific capacities[5] and promotes creativity, innovation and problem-solving skills among students.[6] In Iran's health system, the primary idea of holding a medical sciences student scientific Olympiad was presented in Isfahan University of Medical Sciences in 2000 and the first Olympiad was held in Isfahan University of Medical Sciences for bachelor and Professional Medical Doctorate (MD) students in 2009. Later Olympiads were held in Shiraz, Tehran, Tabriz and Kerman, respectively.[7-9] Previous studies in this area do not give attention to necessity, costs, achievements, barriers and solutions related to effectively holding such Olympiads. Due to the subject importance and the extent of holding such costly Olympiads, performing a study on the necessity of holding these Olympiads seemed imperative. The present study aimed to assess experts' viewpoints about necessity, costs, achievements, barriers and solutions in regard to holding Olympiads.

Materials and Methods

This was a qualitative study performed at Tabriz University of Medical Sciences in 2014 using the phenomenology method. The participants included experts from the Ministry of Health and all universities of medical sciences who played a key role in holding prior Olympiads. The reason for selecting these individuals was their experience, knowledge and extensive information about holding student scientific Olympiads. The inclusion criteria included involvement in activities or responsibilities in regard to holding student scientific Olympiads at the level of the ministry or university, as well as the tendency and ability to participate in the study. To select individuals, a purposive sampling method was applied. In this study, sampling was continued up to information saturation; in other words to the point at which not only would no new information be gained, but also the previous information was repeated. Information saturation in this study occurred within the first 14 participants; however, the researchers continued sampling up to 20 individuals for more confidence. All participants returned the questionnaire.

To collect data, a researcher-made questionnaire with open questions was applied, which included:

- What is the necessity and philosophy of holding student scientific Olympiads in the field of medical sciences in your opinion?
- What are the barriers and solutions to holding current student scientific Olympiads in each item which follows:
    - Within university exams
    - Holding preparation classes for scientific Olympiads
    - Designing questions
    - The structure and quality of national final exam
- What is your opinion about accessing the goals of holding medical students' scientific Olympiad in Iran with the current circumstances?

The questionnaire was designed using the literature review and the opinions of experts in this field, and reliability was tested using a pilot study with 5 participants. The questionnaires were delivered to the person by hand if direct access was possible, if not the questionnaires were posted or emailed to individuals.

To analyze qualitative data, the content analysis method was used manually. To perform data analysis, the notes were organized, completed and their relationships were discovered and demonstrated. Furthermore, all collected information was revised frequently. Then the information were categorized (for example, all codes that had a unit concept were included in one category) and coding was done by two researchers using the following process: Data immersion (getting familiar with context of data), identifying and extracting primary codes, identifying themes (putting extracted primary codes in related themes), reviewing and completing identified themes, naming and defining themes and assuring the reliability of extracted codes and themes (agreement between two encoders by discussion and removing disputed cases). In this research, participants used natural codes, i.e., words or sentences, and finally all data were put together and the comments of different subgroups were compared.

For data rigor, we used peer checking and data immersion. For ethical considerations, the participants filled informed consent forms and were notified that participation in this study was voluntary. In addition,, the purpose of this study was explained to participants.

Results

Demographic characteristics of participants are shown in Table 1.

The results of participants' viewpoints on the necessity and philosophy of holding student Olympiads in the field of medical sciences are shown in Table 2.

As it is presented in Table 2, ideas about the necessity and philosophy of student Olympiads in the field of medical sciences is divided into two groups: individual and university.

The results of participants' viewpoints about barriers and solutions to hold current student scientific Olympiad in the field of medical sciences are shown in Table 3.

The results from combining barriers and solutions provided by experts on holding student scientific Olympiads in the field of medical sciences are shown in Table 4.

About achievements associated with holding students scientific Olympiads in Iran, responders mentioned the following: increasing students' knowledge and skill, practicing teamwork, increasing students' creativity and innovation, spreading relationships between universities and students as well as improvement of health system performance. One of responders expressed that "the result of such Olympiads is knowledge or skill increase among selected students…" another responder said "these Olympiads encourage teamwork, creativity, interrelationships between students and universities ..."

Comparing the spent cost with achieving Olympiad goals, most responders believed that holding such Olympiads

not only had huge costs, but also failed to achieve their goals appropriately. One of the responders declared in this case that, "in my point of view, these Olympiads are not cost-effective since its final outcome must change the education system and consequently modify the health system, whereas this is not possible with the current circumstances…" Another responder stated, "but in the case of achievements it was expected that during 5 years… the students' knowledge and skills will be utilized in science transfer, and their creativity will be promoted, but this prediction has not happened, Olympiad is confined to grant several acknowledgements and prizes… so considering Olympiad achievements, it can be said that Olympiads are not cost-effective…" Some responders also believed that achievements are vague and small. One responder in this case said, "I think it had not a clear achievement and the cost-effectiveness of spent costs was less than 40% (in the most optimistic view)…"

Discussion

During the past years, five Olympiads were held in different universities. Considering the sensitivity and importance of holding these Olympiads, assessment of philosophy, necessity, barriers and solutions seemed essential. In the current study these issues have been discussed from experts' viewpoints.

According to the results of the current study, the main reasons for holding such Olympiads are health system promotion, scientific competition, creativity and innovation among students. Furthermore, the participants expressed their opinion about the current manner of holding Olympiads. Most of participants believed that the Olympiad gains are negligible compared with its costs. The main barriers declared by experts were lack of a proper relationship between universities and insufficient resources or facilities. The main presented solutions include: performance evaluation of previous Olympiads, boosting incentives and appropriate planning.

In previous studies on holding student Olympiads, health promotion and maintenance, improving rationalization and problem-solving skills, considering creative and critical thinking, health system targets, encouraging teamwork and interdisciplinary activities,[2,3] enhancing students' self confidence, aiding students to choose their future career[4] and the guidance of students' scientific talents[5] were understood as the necessities of holding the mentioned Olympiads. The current study implied some of these necessities as well as increasing scientific spirit and vivacity, interuniversity cooperation, detection and implementation of new educational methods and planning for capable students. In line with the results of the current study, according to the scientific Olympiad report of the Ministry of Science, holding these Olympiads, aimed to detect gifted and talented students of Iran and encourage them to study and research during their schooling and make appropriate opportunities for their scientific promotion.[10] Thus, identifying the necessity of holding student scientific

Table 1. demographic characteristics of participants

NO.	Sex/ age	Job	Education	NO.	Sex/ age	Job	Education
1	M 51	Academic member	PH.D	11	F.58	MOHME expert	MSc
2	M. 46	MOHME expert	MSc	12	F.35	Academic member	PH.D
3	F 33	Academic member	PH.D	13	F.46	Academic member	PH.D
4	F.48	Academic member	PH.D	14	M.42	MOHME expert	PH.D
5	F.43	Academic member	PH.D	15	F.55	Academic member	PH.D
6	F.37	MOHME expert	MSc	16	M.39	Academic member	MSc
7	M.32	MOHME expert	MSc	17	M.43	MOHME expert	PH.D
8	F.41	Academic member	PH.D	18	M.49	Academic member	PH.D
9	F.46	MOHME expert	MSc	19	F.51	MOHME expert	PH.D
10	F.53	Academic member	PH.D	20	M.61	Academic member	MSc

M=Male F=Female MOHME= Ministry Of Health and Medical Education

Table 2. Experts' view point on necessity and philosophy of holding student Olympiads in the field of medical sciences.

Individual advantages	Advantages for university
1. Scientific competition 2. Creativity and innovation growth 3. Familiarity with new scientific concepts 4. students' skill improvement 5. Rehearsing team and group work 6. Creating motivation 7. Bringing scientific sprit and happiness	1. Problem solving and promoting health system performance 2. Cooperation and interrelationship between universities 3. Detecting and applying new educational methods 4. Training and planning talented students

Table 3. The manner of holding current student scientific Olympiad in the field of medical sciences in the view point of trustees, experts and authorities

Field	Problems/ solutions	Themes
Within university exam	problems	1. Question designers' unfamiliarity with the national exam 2. Lack of incentive among professors and students 3. Insufficient advertisement and information 4. Interference with routine university programs and classes 5. Inconsistency among universities 6. Negative attitudes among professors and students
	solutions	1. Holding multilevel exam within university 2. Making Olympiad simulated to national exam 3. Assessing and reviewing students' background 4. Holding Olympiads simultaneously at the national level 5. Planning face to face interviews with students
Holding Preparation classes for scientific Olympiads	problems	1. Pure theoretical classes 2. Few number of participants 3. Interference with routine university plans 4. Lack of incentive for teaching these classes 5. Inconsistency between classes and their content with the national exam 6. Weak planning in holding such classes
	solutions	1. Using experienced and skilled professors 2. Holding classes with more coordination and in appropriate time 3. Holding group and practical classes 4. Using electronic education methods
Designing questions	problems	1. Loss of critical thinking and creativity 2. Question designers' unfamiliarity with the nature of Olympiad 3. Lack of incentive and time to be devoted to design questions by professors 4. Neglecting the experiences and skills of medical sciences graduates
	solutions	1. Using professors who are familiar with Olympiad exam 2. Designing question bank 3. Using new scientific methods in designing questions 4. Designing questions with analytical and rational approach
The structure and quality of national final exam	problems	1. The possibility of cheating and abuse 2. A fix combination of professors 3. Lack of clear and specific instructions
	solutions	1. Different designers and questions 2. Correcting and clarifying grade categories 3. Reducing the exam content 4. Earlier design and send of questions by professors

Table 4. Presentation of barriers and solutions provided by experts on holding student scientific Olympiad in the field of medical sciences

Barriers	Solutions
1. Failure to establish communication networks among students 2. Lack of specific and regular planning 3. Choosinginappropriate subjects 4. Loss of positive attitude and belief among students and professors about Olympiad results 5. Insufficient equipments or facilities for students 6. Inessential costs 7. Ambiguity of goals and plans 8. Lack of scientific passion and healthy competition among students 9. Differences between structure and content of this exam with other ones 10. Shortage in budget and allocated resources	1. Evaluating the prior held Olympiads 2. Holding expert seminar meetings 3. Granting rewards and incentives to winners 4. Holding Olympiad by an external organization outside the Ministry ofHealth 5. Holding a regional stage individually to reduce the load of national content 6. Reducing the probability of cheating and abuse 7. Holding individual stage in a decentralized manner 8. Evaluating potential capacity of volunteer universities 9. Clarifying and improving the process of question design as well as paper correction

Olympiads attempts to make such Olympiads more effective and efficient.

The main barriers reported by participants of the current study included: lack of appropriate interrelationship between universities, professors' unwillingness to cooperate due to low motivation, insufficient resources and facilities, unfamiliarity with the manner of holding such Olympiads, limited incentives, deficiency in designing and correcting questions as well as problems with executive planning. Some of these barriers are reported in previous studies.[11,12] Therefore, considering these barriers, conducting further research to detect other barriers and proper planning will assist in resolving the barriers and promoting achievements in the future Olympiads.

The solutions presented by Olympiad authorities in the current study, can be used in resolving these barriers. Some of these solutions include: assessment and detection of strengths and weaknesses from past Olympiads, holding shared consultation meetings between universities to resolve the problems, incentive promotion, making Olympiads effective for students and professors and volume reduction of Olympiad materials, among the other solutions provided in the results section. Some of experts consider Olympiads as the best way to detect gifted, talented and elite students.[13] However, this assumption may be true if Olympiad costs are rational, otherwise its effectiveness in detecting talented students and reaching Olympiad goals will be questioned. In the current study, due to the high costs of medical students' Olympiads, the experts' comments and opinions about effectiveness and achievements of these Olympiads in comparison with their costs were obtained.

According to the results of the current study, most participants believed that such Olympiads are not cost-effective, and considering their costs, they have not met their assigned goals. Thus, corrective actions need to be taken. Holding non-centralized Olympiads, volume reduction of Olympiad programs, utilization of econometric studies, recognizing unnecessary costs and making efforts to use low-cost methods may be applicable to make these Olympiads more cost-effective.

One of the main limitations of the current study was its method for data gathering. In the current study, a questionnaire with open questions was used that could be filled out with insufficient concentration or in little time due to participants' lack of time. However, we attempted to increase sample size to enrich data up to saturation. Another weakness of this study was its inability to access the authorities at some medical universities.

Conclusion

According to positive attitude of participants toward the philosophy and necessity of holding student scientific Olympiads, they argued that the spent costs were enormous compared with the achievements of Olympiads. Holding such Olympiads is important in detecting talented students and utilizing their abilities to promote health systems and consequently service quality, thus, in order to improve the performance of these Olympiads, authorities' willingness to take action seems necessary.

Competing interests

The authors declare that there is no conflict of interests and source of funding for this study.

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