

# Talents for Future: Report of the Second National Medical Science Olympiad in Islamic Republic of Iran

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## Abstract

This report describes a unique experience of Second National Medical Science Olympiad that was held in August 2010 in Shiraz, Islamic Republic of Iran. The history of medical science Olympiad in Iran and the development, process and domains in the Olympiad and the way for future will be discussed.

**Keywords:** Medical Science Olympiad; Iran; Talents

## Introduction

The rapid and increasing advances in all sciences, particularly medical sciences, and the continuous developments in preventive and rehabilitating measures have necessitated revision in educational goals, especially in the field of medicine. Nobody can deny the mission of universities to identify, educate and orient the students' scientific talents. The traditional methods of education, indeed, offer a mixture of information and concepts, but analysis, priority setting and organization of new knowledge, which are the prerequisites for critical thinking and effective and meaningful learning are ignored.<sup>1</sup>

Gifted adults enter professional careers such as medicine, so at least 3–5% of medical learners will be gifted and talented adults,<sup>2</sup> and they stand out in academic settings. Therefore, it is reasonable to assume that most outstanding medical learners are gifted and talented adults.<sup>3</sup> As mentioned by Roeper (1991) gifted and talented adults are more sophisticated and more global thinkers and interested in engaging in

serious intellectual discussions.<sup>4</sup> These characteristics make them as potential sources for solving the problems in the field of medicine and health.

A doctor is a unique combination of different kinds of abilities. Harden *et al.* in 1999 described a three-circle model for a doctors' duties with the tasks to be performed by the doctor in the inner core (Performance of tasks: Technical intelligences), the approaches to the tasks in the middle area (Approach to tasks: Intellectual, emotional, analytical and creative intelligences), and the growth of the individual and his or her role in the practice of medicine in the outer area (Professionalism: Personal intelligences).<sup>5</sup>

Additional programs beside formal curriculum is required to be offered to gifted medical students to develop their personal growth for building meta-competencies required for their professional life. One of these programs is planning a nationwide competition in which team based problem-solving skills is valued. There have been some studies on the effects of scientific Olympiads on the participants' skills. A study in the Netherlands on the effects of mathematics Olympiads on prospering the students' math talent revealed that Olympiad participants were successful in academic studies and published some books in the field of mathematics. The Olympiad also resulted in higher self-confidence and helped them in their choice

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of future careers.<sup>6</sup> This suggests that participation in scientific competitions can help the individual and professional promotion and based on this view, two scientific Olympiads were held in Islamic republic of Iran.

### **Olympiad Aim**

Although such Olympiads can potentially remove some drawbacks in medical education, the following specific objectives are set:

1. Identifying scientifically talented individuals
2. Motivating and encouraging scientifically talented individuals
3. Orienting extra-circular scientific activities
4. Generating scientific liveliness and morale
5. Interuniversity cultural exchanges
6. Encouraging to creative and critical thinking
7. Reinforcing health system goals and objectives
8. Encouraging team work
9. Encouraging interdisciplinary activities

The Olympiad has been planned for the undergraduates because they constitute the major number of students. In addition, it was thought that the best group for interdisciplinary training was undergraduates and these students had the possibility of change. Participation in the Olympiad could affect their future career and the outer of their professional studies.

### **History of Medical Science Olympiads in Iran**

The original idea of holding such competitions was discussed in Isfahan University of Medical Sciences in year 2000. Around 2006, the first steps to arrange such competitions started and so far some sessions have been held with the attendance of experts, professors and the top students. Based on the concession obtained in 2009, scientific reasoning in basic sciences, clinical reasoning in clinical sciences and management in health system were chosen as three important domains for the Olympiad and the first national medical science Olympiad was performed in individual and team stages in Isfahan University of Medical Sciences in August 2009. One hundred and twenty two students participated in basic sciences field, 127 students in clinical sciences field and 115 students in management field from 45 medical universities in Iran. Since these students were under pressure as they are expected to succeed, they were accompanied by 100 academic staff from their own universities for

psychological support and answering their questions in the free times. Thirty five experts in the three scientific committees also participated. The difference between Olympiad and other routine examinations in the universities, improving creativity, and problem solving and reasoning were important results of the first Olympiad from students' viewpoint; however the students ascertained that they needed to be more educated about this kind of exam. The need to inform all universities about the Olympiad and teaching scientific thinking to students in medical universities were reinforced. The faculties reported this Olympiad was a new method of scientific thinking assessment. This first medical Olympiad experience played as the road map for the second Olympiad.<sup>7</sup>

### **Second National Medical Science Olympiad**

Shiraz University of Medical Sciences was the host of the Second National Medical Students' Olympiad in August 2010. All students in medical sciences (such as medical, dental, nursing, midwifery, management in health system, and pharmacy students) had the opportunity of participate. All students who were interested in the topics and had an average grade point of more than 16/20 had the chance to register. They participated in a compact course about the topic in their own university. After this course, an evaluation was done in each university with questions on the topic with more emphasis on critical thinking and reasoning. Those with highest grade were then allowed to participate in the National Olympiad. Iran has 46 medical universities and each university was allowed to introduce 3 students in each field, however 45 medical universities in basic and clinical domains participated and 44 medical universities participated in management domain, therefore 135 students participated in basic sciences field, 135 students in clinical sciences and 131 students in management field. These students were accompanied by 163 academic staffs from their own universities. As in the first Olympiad, these faculties played an important role in psychological and scientific support of students in their free times. Forty experts in three scientific committees also participated.

### **Development of Exam**

Forty experts from different medical universities in Iran were invited to participate in three scientific

committees in basic sciences, clinical medicine and health system management domains as the board of examiners. A bank of questions was developed by these experts after several meetings. A reference panel answered the questions and identified the tests that were confusing and not related to the objectives of Olympiad; a few minor changes on wording of the questions were made finally. The final questions in each domain were planned to measure scientific and critical thinking and problem solving and reasoning to make this Olympiad as an educational opportunity.

### Individual Exam

This stage was done in the first two days of Olympiad. In basic sciences exam, the students were asked to write a concept map<sup>8</sup> based on three articles in the stem cell field and then their scientific thinking was evaluated by hypothesis testing. In clinical exam, the students were asked to answer clinical reasoning tests such as Key Feature Examination,<sup>9</sup> Clinical Reasoning Problem,<sup>10</sup> Script Concordance Test<sup>11</sup> and Comprehensive Integrative Puzzle<sup>12</sup> in emergency medicine field. In the health management exam, the major emphasis was on critical thinking and reasoning in the field of equity of health.

### Team Exam

The average grade points of each team were calculated and nine best teams in each domain were identified by ranking the sum of the scores of all team members and those with highest scores were invited for the team exam. After one day rest, these teams participated in the team exams in the following two days.

In the team exam, in basic sciences, the students were asked to write a proposal in the stem cell field. In the health system management, examinees were given real data on infant mortality in the country and in one of the provinces of the country. They had access to internet for their own search and they were asked to tackle the cause of infant mortality and to find the disparities in this indicator both between the target province and other provinces and also within the target province. Based on their analysis, they were asked to suggest their own solutions to decrease these disparities.

In the clinical domain, Team Objective Clinical Examination (TOSCE)<sup>13</sup> and answering to clinical

questions by searching the best evidences in internet were used.

### Scoring

The following criteria were considered when reviewing the documents and scoring in exams.

1. Logical ways of solving problems
2. Order and consistency in presenting the materials
3. Sufficient and reliable references in solving the problems
4. Team-work for solving problems stage
5. Honesty and refraining cheating
6. Innovation in solving the problems

### Additional Programs

Scientific workshops were held in this Olympiad such as scientific writing, equity in health system, research methodology, and creativity. Entertainment programs were designed for the students such as visiting Persepolis and Hafez Tomb.

### Evaluation of Second National Medical Olympiad by Participants

95.4 percent of students reported that they were satisfied for participation in this Olympiad. 97.2 percent of the students thought that problem solving abilities should be included in the formal curriculum of universities. 87.4 percent of students believed that this Olympiad promote their scientific thinking and problem solving abilities. 85.2 percent of them ascertained that this Olympiad was useful for motivating them to try more for success in their future professional life. Faculties in the Olympiad reported that this kind of meeting can encourage and motivate students and reported a very friendly and scientific environment in the Olympiad.

### The Way for Future

The needs of gifted and talented medical students should be identified .What tools and approaches would be useful and effective, e.g. Olympiads or other extracurricular activities? And, if so, in what

form? These and other questions need to be addressed. To our knowledge, the National Medical Science Olympiad in Iran in these subjects was a unique experience worldwide. In the third millennium that the scientific branches are developing rapidly, giving direction to the medical students seems to be necessary. The students are faced with broad perspectives of basic and clinical sciences and they should be guided toward the society needs. For each country and according to their needs, the suggestion can be changed. Some universities reported summer interdisciplinary school programs for gifted and talented students while others had no program for outstanding medical students.

Seehusen *et al.* (2006) have described 5 recommendations for outstanding medical students<sup>2</sup> including: i) Teaching beyond the immediate patient, ii) Teaching patient care principles, iii) Inviting the learner to educate others, iv) Encouraging personal development and vi) Providing opportunities to work with other high achievers.

As it appears, the outstanding medical students should be engaged in solving the problems and higher level education and not a simple learning. The present report showed that national medical Olympiad can help gifted and talented medical students to encourage personal development and work with other high achievers. This Olympiad made important headway in identifying the scientifically talented individuals and motivating and encouraging them to engage in extracurricular activities.

A number of lessons have been learned from this Olympiad such as the importance of initial planning, the need for an immense picture, facilitation of student learning, the appropriate assessment system, committee and administrative structure and leadership. This Olympiad revealed that negotiation is important for shared activities, and the identification of needs in this way is a continuous process. In addition, funding and resources are needed to support such programs.

There were some shortcomings such as unfamiliarity of the students with this kind of exam and fears of having this Olympiad as another exam. The Ministry

of Health and Medical Education considered bonuses like Elite National Foundation membership for the first to third rank in individual exams, valuable gifts for the first ten ranks in individual exams and the first sixth ranks in team exams in each domain. Furthermore, a certificate of attendance was given to all of the students participating in the Olympiad. There is a debate whether giving such bonuses is correct or not, should ministry increase the number of bonuses based on a minimal pass level and what are the impacts of these bonuses i.e. whether these kinds of bonuses will motivate talent students to make more efficient effort in their future professional life.

This report will be circulated to interested parties for consideration and action. By raising the profile of these important issues and further mobilizing other universities and medical schools in other countries, the international Olympiads in medical sciences will provide a strengthened foundation for future action.

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