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*Original Article***Evaluation of the curriculum for undergraduate course of operating room in international level and suggesting an appropriate curriculum for Iran**

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**Abstract**

**BACKGROUND:** The objectives of an educational system in a society are based on society's requirements. Since personnel knowledge and skill are not qualified with the advantages of science and invention of new tools, new needs are arisen. Comparing the curriculum of undergraduate course of operating room of our country with international societies, it seems that this curriculum is not a good one to educate experts for taking care of the patients before, while and after operation. This research is done in an international level to determine a curriculum for operating room course and suggest a suitable educational program.

**METHODS:** Executive method contained 3 stages. In first stage after searching the web and finding the curriculum of operating room course in the world, the current curriculum was compared to the findings in second stage and in third stage a questionnaire has sent to 17 experienced members of faculty scientific board and after performing their opinions and modifications, the curriculum for undergraduate course of operating room was suggested.

**RESULTS:** This research's findings contain two sets of data obtained from searching the internet and polling research samples which result to the suggestion of curriculum for undergraduate course of operating room.

**CONCLUSION:** Surveying the suggestion of research units showed that more than 50 percent of courses have utility more than 90 percent and the minimum utility is belonged to hygiene and internal medicine and digestion and tumors operation courses (about 76%). By modifying these courses ambiguities are cleared and finally the suitable curriculum suggested.

**KEY WORDS:** Curriculum, operation technologist, operation, Delphi method, operating room nurse.

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Educational system is a subset of social system which has taken its objectives from environment and society and also will take back its outputs to the environment and society.<sup>1</sup> Besides, since having objective as a key role in programming, the main basis to select educational objective which is related to society requirements is to educate students to do a job.<sup>2</sup> Medical education is a part of higher education which is dealing with human life, so the role of medical sciences universities in

growing professional role of graduates considering quality, is very important.<sup>3,4</sup>

Nowadays, educated operation personnel role in health care system is more than ever and in fact it can be talked about the quality when the student is qualified according to the determined objective in education program. In other word, education and education programs should be able to educate people who are equipped with sufficient knowledge, experience and skill.<sup>5</sup>

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Operating room nurses are a group of medical science students who are working in hospital operation sections, emergencies, clinics and doctor offices in a close relation with nominated patients for operation, patients' family and other members of health care team.<sup>6</sup>

Since the operation environment is a complex environment, individual and team performance of members, knowing special operation procedures and group policies is very essential to remove disorder in patient and operation process and perform an effective and safe care while operation.<sup>7,8</sup> In our country students start studying from technician level and if they want they can attend entrance exam for BS and start working as operating room nurse. But by reviewing the non-continuous nursing curriculum it seems that in this program professional courses of operating room don't contain. On the other hand, with comparing the task list of operating room nurses and technician we see no difference. This is while an elite performance in caring jobs needs an extended knowledge and skill and the base of development of each job, is its education and so operating room nurses like other members of health-care system require standardized education. American Society of Operation Technologist (AST) which is based by American College of Surgeons (ACS), American Hospital Association (AHA) and Association of Operating Room Nurses (AORN) has suggested that at least it is essential for operation technologists to have technician degree, and for surgeons' first assistants to have BS degree.

With comparing curriculum of technician course of operating room in our country and scientific societies of the world it seems that current curriculum is not suitable for educating experts for taking care of patients before, while and after operation, because the surgery techniques are advancing day to day and surgeons are stepping forward with it but taking care of the patients is stayed still.

Since, the education group of each faculty should continuously revise the curricula and provide authority with the modified curriculum,<sup>9</sup> so this research has been aiming to com-

pare the current curriculum of operating room technicians in Iran and international curriculum and suggesting a curriculum for Iranian operating room experts in year 2007.

## Methods

This research is a descriptive study which using Delphi method to suggest curriculum for BS course of operating room. The resources to gather data in this project were the passage of Cultural Revolution Council about the courses of operating room technician, websites and verified journals. After that the suggested curriculum has put under polling. First we studied the operating room technician course for Iran and found the international curricula and in the next step a comparison has been done by experts between Iranian curriculum and international one. Then the provided topics by surgery technologist society and suggested courses by operating room group of nursing faculty of Isfahan University of Medical Sciences have been determined after sufficient investigating. Finally a questionnaire about the number of courses and their container was designed in tabular form and in the third step the members and non-members of scientific group of operating room (9 people) and some of the experts including the members of scientific group of nursing faculty of Isfahan University of Medical Sciences (8 people) have been polled to say their opinion about the suggested curriculum in the 3 levels of desirable, undesirable and partly desirable and if necessary write their opinion. Finally after polling and utilizing Delphi method and achieving 70 percent of consensus the curriculum has been suggested.

It is needed to say that the sampling method was of the type objective based so that 17 people has been studied and to analyze quantitative data descriptive statistics has been used and the related frequency of each level (desirable, undesirable and partly desirable) for each course has been provided.

Also the reliability of data collection tools in this research has been calculated based on exterior reliability. To investigate and verify this type of reliability experts' opinion has been uti-

lized. On the other hand referring the questionnaires for premiership determine the total agreement and provide some time to investigate internal reliability<sup>10</sup> which is done using Delphi method.

## Results

Opinions and suggestions of 17 faculty experts including the faculty head, and educational secreter and some the group managers and scientific group members has been collected. The findings of the analysis of this stage were descriptive and the related frequency of each course about the number of units and its con-

tainers in 3 levels of desirable, undesirable and partly desirable has been provided which is displayed in table 1.

After investigating the opinions and the answers of research units, some cases have been modified and checked by the person who has suggested the modification. After performing the suggested modifications, research team suggested a curriculum for B.A course on operating room. In this curriculum in addition to previous cases (course name, number of units and total curriculum) the suggested syllabus also has been provided.

**Table 1.** The Suggested Syllabus for the Curriculum of Undergraduate Degree in Operating Rooms

Code	Course Name	No. Unit	Desirable (Percent)	Partly Desirable (Percent)	Undesirable (Percent)
1	Anatomy 1 and 2	6	88.23	11.77	0
2	Physiology	4	82.35	17.65	0
3	Microbiology and Leechology	3	100	0	0
4	Inorganic Chemistry and Biochemistry	2	100	0	0
5	PC Skills	2	100	0	0
6	Medical Physics, Electricity and Robotic and Their Application in Operating Rooms	2	88.23	11.77	0
7	General Psychology	2	100	0	0
8	Mental Health in Operating Rooms	2	94.11	17.65	0
9	Vital Statistics	1	88.23	5.88	5.88
10	Research Methodology	1	94.11	5.89	0
11	Health	1	70.58	23.52	5.88
12	Pharmacology	3	88.23	5.88	5.88
13	Immunology	1	88.23	11.77	0
14	Introduction to Pathology and Wound Remedy	1	82.35	17.65	0
15	Internal Medicine and Digestion and Gland Surgery	5	76.47	11.76	5.88
16	Internal Medicine and Cardiac Surgery and Blood and Respiration	4	88.23	5.88	5.88
17	Internal Medicine and Nerve and Orthopedic Surgery	4	94.11	0	5.88
18	Internal Medicine and Gynecology and Urology Surgery	3	82.32	17.67	0
19	Internal Medicine and ENT and Jaw, Eye and Face Surgery	3	94.12	5.88	0
20	Internal Medicine and Pediatric Surgery	2	100	0	0
21	Internal Medicine and Dermatology, Burning and Skin Transplant Surgery	2	94.12	5.88	0
22	Cardiopulmonary Resuscitation and CCU Fundamentals	2	88.24	11.76	5.88
23	Anesthesia	2	100	0	0
24	Recovery Care Basis	1	88.24	5.88	5.88
25	Emergencies	2	88.24	5.88	5.88
26	Medical Expressions	1	100	0	0
27	Technical English	4	100	0	0

Code	Course Name	No. Unit	Desirable (Percent)	Partly Desirable (Percent)	Undesirable (Percent)
28	An Introduction to Operating Technology	2	100	0	0
29	Sterilization Basis	1	88.24	11.76	0
30	Introduction to Operating Room Tools	2	94.12	5.88	0
31	Basics and Operation of Circular	3	76.48	23.52	0
32	Basics and Operation of Scrub	2	88.24	11.76	0
33	Management in Operating Room	2	100	0	0
34	Workshop of Operating Room Management	1	100	0	0
35	Workshop of Central Sterilization	1	88.24	11.76	0
36	Principles of Recovery Care (Practicum)	1	76.48	23.52	0
37	Cardiopulmonary Resuscitation and CCU (Practicum)	2	94.12	5.88	0
38	Workshop of Principles of Surgery Technician as Circular and Observer	1	94.12	5.88	0
39	Introductory Workshop to Principles and Performance of Surgery Technician as Scrub and Circular in Pediatric and General Surgery	2	94.12	5.88	0
40	Workshop of Principles and Performance of Surgery Technician as Scrub and Circular in Pediatric and General Surgery	3	100	0	0
41	Workshop of Orthopedic Surgery	2.5	94.12	0	5.88
42	Workshop of Neurosurgery	2.5	94.12	0	5.88
43	Workshop of ENT Surgery	1.5	94.12	0	5.88
44	Workshop of Orthognathic Surgery	1.5	94.12	0	5.88
45	Workshop of Optical Surgery	1	94.12	0	5.88
46	Workshop of Burning Surgery	1.5	94.12	0	5.88
47	Workshop of Gynecology	1	88.24	5.88	5.88
48	Workshop of Cardiovascular Field	1.5	94.12	0	5.88
49	Workshop of Thoracic Surgery	1.5	94.12	0	5.88
50	Workshop of Urology Surgery	1.5	94.12	0	5.88
51	Workshop on a Chosen Surgery	2	100	0	0

**Table 2.** The suggestions and edits of the curriculum for undergraduate degree in operation rooms

Course Title	Suggested Curriculum (Second Phase) (Number of Units)	Corrections (Final Edition of Curriculum) (Number of Units)
Anatomy 1 and 2	4	4 (Theory and Practicum)
Physiology 1 and 2	3	3 (Theory and Practicum)
Vital Statistics	2	1
Health	2	2
Pharmacology	4	3
Surgical technology in gastrointestinal and gland surgery	3.5	3 Surgical technology in gastrointestinal and gland surgery
Surgical technology in cardio-Torasic and vessels surgery	2	2 Surgical technology in cardio-Torasic and vessels surgery
Surgical technology in orthopedic and neurosurgery	3	3 Surgical technology in orthopedic and neurosurgery
Surgical technology in gynecology and urology surgery	2	2 Surgical technology in gynecology and urology surgery
Surgical technology in eye, ENT & faciomanibular surgery	3	2 Surgical technology in eye, ENT & faciomanibular surgery
Surgical technology in pediatric surgery	1	1 Surgical technology in pediatric surgery
Surgical technology in Burns and skin transplant surgery	2	1 Surgical technology in Burns and skin transplant surgery

\*One unit is omitted from diseases course and added to the workshop.

At first we wanted to replace the courses which were 70% favorable or less with suggested topics, but there was no course with less than 70% vote. Therefore, all the courses with favorability between 90% and 100% are presented in table 2, except cases that needed some edits. The courses with favorability between 70% and 90% were edited applying the suggestions of participants and research team professors. In cases the suggested changes were not possible, the reasons are mentioned.

## Discussion

Reviewing the data presented in the tables and the percentage of frequencies in acceptable (favorable) and unacceptable, we can say that more than half of the courses (31% to 51%) were 90 to 100 percent favorable. And none of the courses were less than 70% favorable.

The less favorable courses and their modifications are as follow:

*Code 6:* medical physics, electricity, robotics and their appliance in operating rooms is the title suggested for the curriculum of undergraduate degree in medical physics and its application in operating rooms and we added the electricity and robotics to the title. This course had favorability of 88.23% and the main criticism about it was that the robotic and electricity discussions are too difficult for this course. Regarding that this course was taken from Association of Surgical Technologist for an undergraduate degree, we can certainly say that it is a good course for the students. Also, difficulty of a course is related to the total content and its objectives, as a course on anatomy can be designed easy or difficult. Considering the increasing use of technology and robotic in operating rooms, it seems that students should be ready for facing these fast technological changes. Therefore, in this study, we kept the course without any changes.

*Codes 1 and 2:* anatomy and physiology are courses from Association of Surgical Technologist with 8 units for undergraduate degree. The research team decided to include it in the curriculum with 10 units. However, in the survey, 88.23% agreed with 6 units for anatomy and

82.35% agreed with 4 units for physiology. The reason for disagreement of the unit numbers with the parallel major in nursing is that there are 5 units for anatomy and physiology in nursing. Therefore, it was requested to reduce it from 10 units to 7 units, 3 units for physiology and 4 units for theory and practicum anatomy and the request was accepted. Moreover, for the code 9 (vital statistics), it was suggested to increase the units from 1 to 2, because it was not possible to include all the content in 1 unit.

*Code 11:* health was the least favorable compared to other theoretical and workshop courses (70.58%). This course had just one unit because other courses include this topic in some ways. However, most of those who were not completely agree with this course believed that it should be 2 units since it is for a degree in a health related major and it was changed to 2 units.

*Code 12:* pharmacology was suggested to be 3 units based on the curriculum of Association of Surgical Technologist. After the survey, it was decided to change it to 4 units in general and special course (anesthetic medicine). But separating general and special course seems to be unnecessary, since it is not aimed to train an expert in anesthesiology. Therefore, it was just agreed to increase the units from 3 to 4.

*Code 13 (immunology):* there was just one person opposing 1 unit for this course, and considering the suggested courses by Association of Surgical Technologist and the number of units in nursing, we kept it the same.

*Code 14 (an introduction to pathology and wound remedy):* the survey showed that there was just one person opposing 1 unit for this course and considering the suggested courses by Association of Surgical Technologist and the number of units in nursing, we kept it the same.

*Code 15:* internal medicine and digestion and gland surgery was the least favorable after health (76.47%). It seems that the units looked illogical to the evaluators because in this course (courses 16 to 21), internal medicine is not separated from professional surgery. It should be mentioned that based on the AST curriculum, page 84, the course on internal medicine and

surgery is one, but it is referred to in pathophysiology course. Considering the previous experiences in courses of internal medicine and professional surgery for undergraduate degree, and also in order to simplify the course and referring to the consensus in decision making, the course of internal medicine and professional surgery and the course on patho-physiology were offered separately. To explain the reason, we should say that the main content of this course is surgery and not internal medicine; and this is opposite of what happens in the course of internal medicine and surgery for nursing degree. Because training personnel for operating rooms is aimed to make them familiar with operating techniques and there is less emphasis on internal medicine. Therefore, to solve the problem, instead of changing the unit for this course we changed the list of courses as it was explained in chapter 4 and it means that two separated courses on internal medicine (3.5 units) and professional surgery (5.18 units) were offered in different systems.

*Codes 22 and 25:* two participants believed that cardiopulmonary resuscitation and CCU and emergencies courses should be joined or for each of them 5% of content must be practicum. Emergencies course is in the AST curriculum, page 182 and aims to enable students to do the primary activities in the emergencies, understand the priorities and be ready to admit patients in the emergencies' operating rooms. Therefore, this course seems to be totally separated from cardiopulmonary resuscitation and CCU, because students in this course learn the primary and advanced methods of cardiopulmonary resuscitation as well as the role of operating team in the case of cardiac arrest or respiratory arrest. They also learn the basics of mechanical respiration, natural and unnatural rhythms of heart and hemodynamic monitoring, respiratory monitoring, oxygen-therapy, etc for the cases of severe damages in nerve, brain, muscles, trauma, etc in the course of CCU basics. Therefore, it doesn't seem right to join these two courses as the contents of the two courses are separately determined in the lesson plans and it shows that it is not necessary to join these

two courses. One of the evaluators suggested that the techniques of cardiopulmonary resuscitation need to be practicum. The answer to this suggestion is that based on the AST curriculum, there is no workshop for this course and it should be both theory and practicum. In addition, as it is mentioned in the questionnaire, there are 2 units of workshop for this course. However, following this suggestion and the ideas of the research team, these 2 units of workshop was changed to 1.5 units and the remained 0.5 unit was added to the theory course to be offered in the clinical laboratory.

*Code 24 (recovery care basics):* according to AST curriculum, page 186, there is no such course for college degree of operating rooms, and the content is included in the course of principles and performance of surgery technician as circular. And according to the law approved by the High Council of Cultural Revolution, this course is joined with the course of working in operating rooms. The faculty of nursing and midwifery in Isfahan asked for this course with a separated number in past few semesters and it was offered as working in operating rooms<sup>3</sup> and showed good results. Therefore, it was suggested in the course list in this research.

Some evaluators suggested increasing the units of this course from 1 to 2. But it was rejected because one unit workshop for this course is already considered.

*Code 29:* sterilization basics was also in AST curriculum as part of the course on principles and performance of surgery technician as circular. And due to its importance and to specialize it, this course was included as a separate course in the suggested course list. One of the evaluators suggested increasing the units of this course to more than 1. This suggestion was rejected by the team because there is one unit of workshop considered for this course already.

*Code 31:* principles and performance as circular, is based on AST curriculum, page 156, which is included here with a few changes offering some topics as a separated unit.

Four of the evaluators (23.5%) said that 3 units are too much for this course and sug-

gested to reduce it to 2 units. It should be mentioned that this course include various topics and the content requires 3 units. The content of this course includes most of fundamental procedures and therefore, it was kept the same.

*Code 32:* principles and performance as scrub, is also based on AST curriculum. One of the evaluators believed that 2 units are too much for this course and it should be reduced to 1 unit. This suggestion was not accepted for two reasons: first, this course is both theory and practicum and in practicum, some hours are specified for the students; second, the content load is too much for 1 unit and therefore, it was not changed.

*Code 35 and 36:* workshop of central sterilization and workshop of principles of recovery room care are generally taken from workshop courses in AST curriculum. However, other workshops are designed based on the researchers' experiences in practicing with students of college degree in operating rooms. Four of the evaluators believed that 1 unit is not enough for

these courses and should be increased to 2 units. Considering the lesson plans for these two courses and the content as well as the working experiences and supervision in these two sections, one unit seems to be enough and there is no need to increase it.

*Code 47 (workshop of obstetrics):* one of the evaluators disagreed with all of the workshops including this one and the reason was his mistake about the place of workshop. He believed that the workshop will be in wards and not in the operating rooms. Therefore, this course was not changed. Another evaluator suggested adding a workshop in ward for the students. Therefore, a unit of workshop in principles and techniques was added to workshops. Finally, considering the suggestions and ideas of the participants, the list of courses was edited and the final version was prepared.

The authors declare that have no conflict of interest in this study and they have surveyed under the research ethics.

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