ORIGINAL ARTICLE

تقييم ميزان التطابق بين المحتوى التعليمي في فرع الطب الشعاعي مع المتطلبات المهنية لهذا الفرع من وجهة نظر الخريجين

المقدمة: يقوم متخصصي الأشعة بإيفاء دور أساسي في البرنامج العلاجي للمرضى في المستشفيات . لذلك فإن وجهة نظر العاملين في هذا الفرع حول البرنامج التعليمي الذي يتلقونه وتنظيمه لمتطلبات عملهم في المستقبل يمكن أن يساعد في معرفة المتطلبات المهنية في هذا الفرع. لذلك فإن الهدف من هذه الدراسة هو تقييم ميزان التطابق والتناسب بين المحتوى التعليمي في فرع الطب الشعاعي مع الإحتياجات المهنية لهذا الفرع من وجهة نظرة المتخرجين في هذا الفرع.

الطريقة: هذه الدراسة هي دراسة توصيفية تحليلية قد نفذت عام ١٣٩٥(٢٠١٦ميلادي) بمشاركة ٥٩ شخص من خريجي فرع الطب الشعاعي في المشافي التابعة لجامعة بيرجيند للعلوم الطبية. تم جمع المعلومات على شكل أسئلة تشمل قسمين هما المعلومات الشخصية وأسئلة حول مدى الفائدة العملية للدروس الأساسية (التمهيدية) والإختصاصية وقد كان جواب الأسئلة على ثلاث علامات (قليلة، متوسطة، جيدة). الأسئلة المطروحة قد تم الموافقة عليها من قبل الخبراء في التعليم الطبي. قد حددت مدى صحت الأسئلة بالإعتماد على طريقة الفاء كرونباخ ٨٣٪. لتحليل وتفسير البيانات تم الإستفادة من برنامج spss١٦ وبيانات توصيفية (تعدد ونسب مئوية) و المستقل.

الحاصل: كانت وجهة نظر خريجي المعاهد بخصوص تطابق المواد الأساسية مع المتطلبات المهنية حسب النتائج التي تم الحصول عليها أن محتوى مادة تشريح الظام والمفاصل ١و٢ كانت متطابقة مع نسبة ٨٧.٥٪ وكان أكثرمعدل تطابق وكان محتوى مادة الفيزياء العمومية متطابق بنسبة ١٧.٧٪ وكان أقل تطابق بين المواد . أما من وجهة نظر المتخصصين كان محتوى مادة التشريح ٣(الجمجمة، المخ، الأعصاب) متطابق بنسبة ٨٩.٢٪ أكثر معدل تطابق ومادة الإحصاء كانت أدنى معدل تطابق بنسبة ١٣.٣٪ .

أما بالنسبة للمواد الإختصاصية وتطابقها مع الإحتياجات المهنية فلان رأى خريجي المعاهد أن مادة طرق التصوير السيني ١و٢ حصلت على أعلى تطابق بنسبة ١٠٠٪ وحصلت مادة التعليم في المشفى(على أدنى تطابق بنسبة ٤.٢٪ أما من وجهة نظر المتخصصين . حازت مادة طرق التصوير السيني ١و٢ على نسبة ٩٧.١ وكان أكبر معدل تطابق ومادة التصوير بالأمواج فوق الصوتية في الطب على ٣٥٪ وهو أدنى معدل تطابق مع الإحتياجات المهنية للعاملين . حسب رأى خريجي المعاهد والمتخصصين فإن معدل التطابق في الدروس الأساسية مع الإحتياجات المهنية لم يكن مختلفاً أما في المواد الإختصاصية فلان هناك اختلاف واضح (p[0>05)

النتيجة: طبق نتائج هذه الدراسة فإن محتوى المواد التعليمية في فرع تكنولوجيا الطب الشعاعي لم تكن متطابقة مع الإحتياجات المهنية في هذا الفرع . لذلك فإن هنالك حاجة ضرورية لإعادة النظر وإصلاح بعض الدروس التعليمية وتهيئة الأرضية المناسبة من أجل الوصول إلى المتطلبات العملية والمهنية .

الكلمات المفتاحية: تطابق المحتوى التعليمي، تكنولوجيا الأشعة، الإحتياجات المهنية، الخريجين

ریڈی ایشن ٹکنالوجی کی تعلیم کے شعبہ کے نصاب اور اس موضوع سے فارغ التحصیل ہونے والے طلباء کی عملی ملازمتی ضرورتوں میں کیا توازن پایا جاتا ہے

بیک گراونڈ: ریڈی ایشن کے ماہرین اسپتالوں میں بیماروں کا ریڈی ایشن سے علاج کرنے میں اہم کردار کے حامل ہیں۔ اسی وجہ سے یہ ماہرین اس موضوع کے طلباء کی تعلیمی ضرورتوں کو بہتر سمجھتے ہیں۔اس تحقیق کا ھدف ریڈی ایشن کے موجودہ نصاب اور فارغ التحصیل ہونے والے طلبا کی تعلیمی ضرورتوں کا جائزہ لینا ہے۔ اس میں فارغ التحیصل طلباء کی نظر سے اس امر کا جائزہ لیا گیا۔

روش: اس توصیفی تحقیق میں انسٹھ افراد شامل تھے اور یہ تحقیق دوہزار سولہ میں بیرجند کی میڈیکل یونیورسٹی کے زیر انتظام اسپتالوں میں انجام دی گئی۔ تحقیق کے لئے سوالنامے دئے گئے تھے، فردی اور موجودہ نصاب کے کلینیکل سطح پر مفید ہونے کے بارے میں تھے۔ڈیٹا کا تجزیہ ایس پی ایس ایس سولہ سے کیا گیا۔اور ٹی ٹسٹ بھی استعمال کیا گیا۔

نتیجے: اس تحقیق سے حاصل شدہ نتیجوں سے پتہ چلتا ہے کہ ہڈی اور جوڑوں کی تشریح کا نصاب کلینیکل سطح پر مفید واقع ہوا ہے جبکہ کامن فزکس کا نصاب سب سے کم مطابقت رکھتا ہے نیز کھوپڑی،دماغ اور اعصاب کے موضوعات میں اناٹومی کلینیکل پراسس سے بیاسی اعشاریہ نو فیصد تک کا انطباق دیکھا گیا ہے۔

سفارشات: اس تحقیق کے نتائج کے مطابق ریڈی ایشن کا موجودہ نصاب آج کے کلینکل ضرورتوں کے لئے کافی نہیں ہے اور نہ اس سے مطابقت رکھتا ہے لھذا یونیورسٹی اور اسپتالوں کے عھدیداروں کو اس ضمن میں سہولتیں فراہم کرنا چاہیے۔

کلیدی الفاظ: موجودہ نصاب، ریڈی ایشن ، ملازمتی ضرورتیں،فارغ التحصیل۔

Investigating the Rate of Adaptation between the Courses of Radiation Technology and Job Requirements from the Perspective of Graduates

Introduction: the experts of radiology play a crucial role in the treatment programs of the patients in hospitals. Therefore, in order to recognize the needs, the experts' opinion should be obtained about whether the educational program meets the job requirements or not. The purpose of the present study is to investigate the rate of adaptation between the courses of radiation technology and job requirements from the perspective of graduates

Method: This is a descriptive analytical study, conducted on 59 graduates of radiation technology working in the hospitals affiliated with Birjand University of Medical Sciences, 2016.The data were collected via questionnaire that included two parts: demographic information and the questions about the extent to which basic and specific course content is used. The answers were in three scales (low, medium, high). The validity of the questionnaire was confirmed by experts of medical education. The reliability was assessed byCronbach's alpha (82%).The data were analyzed by SPSS 16 and descriptive data (frequency and percentage) and independent-t were utilized.

Findings: in accordance with the results, the perspective of the associate degree graduates about the adaptation of basic courses with job requirements was that the content of the courses of anatomy, bones and joint 1 and 2 was most adapted (87.5%) and the content of general physics course had the last adaptation (17.7%). From the perspective of the experts, the content of the anatomy course (3) (skull, brain, nerves) had the highest level of adaptation (82.9%) and statistics course had the least (13.3%) with the job requirements. Furthermore, associate degree graduates mentioned that among the main courses, the content of radiographic methods course 1 and 2 had the highest adaptation (100%) and the content of Hospital Internship 1 (4.2%) had the least adaptation. From the perspective of the experts the content of radiographic methods course (2 and 3) had the highest adaptation (97.1%) and the content of medical ultrasound course had the least (20%) adaptation to the job requirements.In addition, there was no difference in basic courses from the viewpoints of associate degree graduates and experts, however, there was a significant difference in the specialized courses (p<0. 05).

Conclusion: Regarding the results of the present study, the content of educational courses of radiation technology field is not thoroughly adapted to the job requirements of the students. Therefore, it is recommended to review and modify the curriculum in order to provide the job requirements.

Key words: adaptation of educational material, radiology technology, job requirements, graduates

بررسی میزان تطابق بین محتوای واحدهای آموزشی رشته تکنولوژی پرتوشناسی با نیازهای شغلی این رشته از دیدگاه فارغ التحصیلان

مقدمه: کارشناسان پرتو شناسی ، سهم عمده ای در اجرای برنامه های درمانی بیماران در بیمارستان ها ایفا می نمایند. لذا نظرات شاغلین این رشته در خصوص این که آیا برنامه آموزشی این رشته نیازهای شغلی آینده آنها را پوشش می دهد در شناسایی نیاز ها کمک می کند لذا هدف مطالعه حاضر بررسی میزان تطابق بین محتوای واحدهای آموزشی رشته تکنولوژی پرتوشناسی با نیازهای شغلی این رشته از دیدگاه فارغ التحصیلان بود.

روش کار: این مطالعه توصیفی-تحلیلی در سال ۱۳۹۵ بر روی ۵۹ نفر از فارغ التحصیلان رشته تکنولوژی پرتو شناسی به صورت سرشماری در بیمارستان های تحت پوشش دانشگاه علوم پزشکی بیرجند انجام شد. ابزار جمع آوری اطلاعات پرسشنامه، مشتمل بر دو بخش مشخصات فردی و سوالات مربوط به میزان کاربرد محتوای دروس پایه و اختصاصی بود که با سه مقیاس (کم،متوسط،زیاد) مورد پرسش قرار گرفت. روایی پرسشنامه به تائید صاحبنظران آموزش پزشکی رسید. و پایایی پرسشنامه با استفاده از شیوه الفای کرونباخ ۸۲٪ بدست آمد. برای تحلیل داده ها از نرم افزار SPSS 16 و از آمار توصیفی(فراوانی و درصد) و t مستقل استفاده شد.

یافته ها: براساس نتایج به دست آمده، از دیدگاه کاردانان در خصوص انطباق دروس پایه با نیازهای شغلی آنها، محتوای دروس تشریح و استخوان و مفاصل ۱ و ۲ با ۸۷.۵ ٪ بیشترین انطباق و محتوای درس فیزیک عمومی با ۱۷.۷٪ کمترین انطباق واز دیدگاه کارشناسان محتوای درس آناتومی ۳ (جمجمه – مغز – اعصاب) با ۸۲.۹ ٪ بیشترین انطباق و محتوای درس آمار با ۱۳.۳٪ کمترین انطباق با نیازهای شغلی را داشت. همچنین از دیدگاه کاردانان در خصوص انطباق دروس اصلی با نیازهای شغلی آنها، محتوای درس روش های پرتونگاری ۱ و ۲ با ۱۰۰٪ بیشترین انطباق و محتوای درس کارآموزی بیمارستانی۱ با ۴.۲٪ کمترین انطباق و از دیدگاه کارشناسان محتوای دروس روش های پرتونگاری ۲ و ۳ با ۹۷.۱٪ بیشترین انطباق و محتوای درس تصویربرداری با امواج فرا صوت در پزشکی با ۲۰٪ کمترین انطباق با نیازهای شغلی پرسنل داشت. همچنین بین میانگین تطابق دروس پایه بر اساس دیدگاه کاردانان و کارشناسان تفاوت وجود نداشت اما در دروس اصلی تفاوت معنی دار بود (p<0/05).

نتیجه گیری: طبق نتایج این تحقیق، محتوای واحدهای آموزشی رشته تکنولوژی پرتوشناسی با نیازهای شغلی دانش آموختگان این رشته کاملا منطبق نیست. به همین دلیل لزوم بازنگری و اصلاح سر فصلهای دوره آموزشی و فراهم کردن بستر مناسب به منظور نیل به نیازهای شغلی و حرفه ای این رشته ضروری به نظر می رسد.

کلمات کلیدی: تطابق محتوای آموزشی، تکنولوژی پرتوشناسی، نیازهای شغلی، فارغ التحصیلان

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INTRODUCTION

The higher education system is one of the vast systems in the society that determine the destiny of society in the long term (1). Universities and higher education systems play a crucial role in training experts and the highlight of the status of educational centers (2). Therefore, higher education refers to education in universities and educational institutes in order to obtain a certificate and train the learners. Higher education is a dynamic process and different factors should be considered in order to achieve the goals (3).Higher education system of Iran has encountered different problems and challenges in the recent years, including expand of number of universities and different educational institutes, the number of students, and to some extend the high number of unemployed graduates (4).

These challenges forces the universities to review their structure, purposes and process. Since universities are the most important educational centers, it is expected to review their status and assess it in accordance with desirable situation and take the necessary steps to improve their weaknesses (4). The curriculum and course content are the key elements of the educational system that are the fundamental steps to establish a field of study at university. Thecurriculum is to some extent similar to designing a building (5). The curriculum and the mentioned theories of higher education are influential factors in the realization of educational purposes (6). The curriculum is like a map or plan that supervises the most important educational event which is learning or the reconstruction of experiences (7).

In fact, the curriculum plays a crucial and determining role in the success or failure of the educational centers. Therefore, the curriculum present the rate of improvement and accountability of higher education to the changing needs of the society (8). Being influential, the content of the courses should be in accordance with the purposes and the duties (9). Consequently, the most important step in educational planning is to determine the educational needs and categorize them in accordance with the priorities so that we have a practical curriculum based on reality which is influential in solving the problems (10). Educational needs refers to the needs that can be addressed through education and are categorized into three areas, including knowledge, attitude, and performance (11).

Nowadays, one of the main concerns of the educational system is that the purposes of the educational program are not realized (10). Improving the coherence of educational programs, they should be assessed periodically and make changes if necessary. One of the determining resources in the curriculum is the learners. The content of the curriculum should be in accordance with their needs (12); since there is a cause and effect relationship between the learning quality and future human capital (13).

Radiation technology is one of the medical sciences fields of study that plays crucial role in the diagnosis of diseases. The base of the study is X-ray. Many of the patients require x-ray imaging in or to diagnose their diseases (14). The image of radiography presents anatomy information that should be interpreted by the physician to diagnose the disease and make treatment (15).

On the condition that the radiographic image quality is not ideal, radiation should be repeated and the patient should be exposed to radiation again that might the rate of genetic and carcinogenic abnormalities caused by radiation in the society (16). Therefore, if the experts of this field do not have the required skills in radiation imaging, not only the patients will have excessive exposure but also the diseases might not be diagnosed properly. Shir Jang and his colleagues (17) proved that is a moderate correlation between the curriculum content of public health field of study and job needs of the graduates.

Since the course content have direct impact on the improvement of the students to become skilled workers, and also, no study has been conducted on the radiation technology and its impact on the experts, therefore, a study should be conducted in order to determine the course content adaptation with job requirements of the graduates. So, the present study aimed to investigate the level of adaptation of course content of radiation technology major and job requirements.

Method: this is a descriptive, analytical study, conducted in 2015, in order to determine the level of adaptation, of course content of the radiation technology field of study with job requirements at Birjand University of Medical Sciences. The study population are the graduates of associate degree and bachelor working in Birjand. Therefore, this research was conducted by population census and the study population were 59 people. A questionnaire used in a similar study was used in this study. The reliability of the questionnaire was evaluated based on internal consistency and Cronbach's alpha coefficient, which was more than 0.7 (17).

The questionnaire had two parts; the first part included demographic information of the participants, including gender, age, degree, work experience of radiographers of associate degree and bachelor. The second part included questions about the level of application of the content of the base and specialized courses based on three scales: low, medium, high. Furthermore, there were some descriptive questions about removing or adding some lessons, the strengths and weaknesses of the curriculum. To conduct the study, we coordinated with the radiology wards of the hospitals of Birjand. In addition, it should be noted that the participants consented to participate in the study. The questionnaires were distributed among the radiographers with associate degree and bachelor degree and were collected after completion. The data were analyzed by SPSS 16, using descriptive statistics (frequency, percentage) and independent t-test.

RESULTS

Among the total 59 questionnaires, 35 participants had a bachelor degree (59.3%) and 24 of them had an associate degree (40.7%). The study population frequency distribution based on gender was 33 males (33.9%) and 26 females (44.1%). The average age was 33.21±7.21 and the mean of work experience was 10.21±7.07.in accordance with the type of employment, the frequency distribution was as follows: 9 people hadcontractual contract (15.2%), 14 people

Table 1. frequency distribution from the perspective of graduates of associate degree about the adaptation of basic courses with job requirements

	Basic courses	Application of course content		
		high	medium	low
Associate degree	Anatomy of the bones and joints 1	21(87.5)	2(8.3)	1(4.2)
	Anatomy of the bones and joints 2	24(87.5)	2(8.3)	1(4.2)
	Human physiology	11(45.9)	8(33.3)	5(20.8)
	General Physics	4(16.7)	5(20.8)	15(62.5)
	general Hygiene	10(41.7)	7(29.2)	7(29.2)
	First aid and patient care	14(58.3)	7(29.2)	3(12.5)

had conventional contract, 30 people had a formal contract (50.8%) and six of them had corporate contract (10.3%).

The results of table 1 demonstrated that the content of anatomy, bones and joints courses 1 and 2 had the highest adaptation with job requirements (87.5%) and the general physics course had the least adaptation (17.7%) from the perspective of graduates of associate degree.

The results of table 2 presented that the content of anatomy 3 (skull – brain - nerves) course had the highest adaptation (82.9%) with job requirements and the content of statistics course had the least adaptation (13.3%) from the perspective of graduates of bachelor degree.

The results of table three showed that the content of radiographic methods 1 and 2 had the highest adaptation (100%) and the content of hospital internship 1 had the least (4.2%) from the perspective of graduates of associate degree.

The results of table 4 demonstrated that the content of radiographic method 2 and 3 had the highest adaptation (97.1%) and the content of ultrasound imaging in medicine course had the least adaptation (20%) with the job requirements from the perspective of graduates of bachelor degree.

The results of table 5 presented that there is no significant difference in the mean of basic courses in accordance with the perspective of graduates of bachelor's degree and associate degree. However, there was a significant difference between the perspectives of the groups about the main courses based on job requirements ($P<0.05$).

DISCUSSION

The findings showed that the content of anatomy, bones and joints courses 1 and 2 had the highest adaptation with job requirements (87.5%) and the general physics course had the least adaptation (17.7%) from the perspective of graduates of

Table 2. frequency distribution from the perspective of graduates of bachelor degree about the adaptation of basic courses with job requirements

	Basic Courses	Application of course content		
		high	medium	low
B.S.	Anatomy 1(Upper limb - spine - lower limbs)	27(77.1)	8(22.9)	0
	Anatomy 2 (thoraces - trunk - pelvis)	28(80)	6(17.1)	1(2.9)
	Anatomy 3 (skull – brain - nerves)	29(82.9)	6(17.1)	0
	Physiology	5(14.3)	19(54.3)	11(31.4)
	General Physics	6(17.1)	10(28.6)	19(54.3)
	Cell biology	5(14.3)	9(25.7)	21(60)
	General mathematics	5(14.3)	5(14.3)	25(71.4)
	General Pathology	12(34.3)	15(42.9)	8(22.8)
	Introduction to Modern Information Technology (PC)	12(34.3)	16(43.8)	7(20)
	Computer application in medical imaging	15(42.9)	12(34.3)	8(22.9)
	Caring of patient in the medical imaging ward	19(54.3)	14(40)	2(5.7)
	statistics	5(13.3)	6(17.1)	24(68.6)
	Pathology	18(51.4)	12(34.3)	5(14.3)
	Seminar 1	6(17.7)	12(34.3)	17(48.6)
	Seminar 2	6(17.3)	12(34.3)	17(48.6)
	general Hygiene	6(17.1)	16(45.7)	13(37.1)
	Professional Ethics	13(37.1)	11(31.4)	11(31.4)

Table 3. frequency distribution from the perspective of graduates of associate degree about the adaptation of specialized courses with job requirements

	Specialized courses	Application of course content		
		high	medium	low
Associate degree	Medical terms in radiology	17(70.8)	6(25)	1(4.2)
	Physics Beams	9(37.5)	12(50)	3(12.5)
	Diagnostic radiology physics	13(54.2)	8(33.3)	3(12.5)
	Radio biology and protection against ionizing radiation	18(75)	4(16.7)	2(8.3)
	Radiographic Methods 1	24(100)	0	0
	Radiographic Methods 2	24(100)	0	0
	Radiographic Methods 3	23(95.8)	0	1(4.2)
	Contrastive material in radiography	19(79.2)	5(20.8)	0
	Principles of darkroom	13(54.2)	10(41.7)	1(4.2)
	Principles of preliminary maintenance of radiation devices	7(29.2)	13(54.2)	4(16.7)
	Technical evaluation of radiography films	14(58.3)	8(33.3)	2(8.3)
	Hospital Internship 1	1(4.2)	22(91.7)	1(4.2)
	Hospital Internship 2	23(95.8)	1(4.2)	0
	Internship in the fieldwork	22(91.7)	2(8.3)	0

associate degree. Accordingly, it could be concluded that the general physic is not presented with appropriate materials in radiology major and is mostly the repetition of materials provided during high school. It is suggested to change the content of the course in accordance with radiation physics and CT scan physics, and etc. in order to make it more practical for the radiographers. From the perspective of graduates of bachelor degree,the content of anatomy 3 (skull – brain - nerves) course had the highest adaptation (82.9%) with job requirements and the content of statistics course had the least adaptation (13.3%).

In addition, the results of table three showed that the content of radiographic methods 1 and 2 had the highest adaptation (100%) and the content of hospital internship 1 had the least (4.2%) from the perspective of graduates of associate degree.The results of table 4 demonstrated that the content of radiographic method 2 and 3 had the highest adaptation (97.1%) and the content of ultrasound imaging in medicine course had the least adaptation (20%) with the job requirements from the perspective of graduates of bachelor degree.

These findings were similar to the results of Noor Mohammadi et al. (3). They evaluated the application of laboratory sciences courses in Shahr-e-Kord and presented that the level of curriculum application is not desirable and satisfactory and the courses of basic sciences had the least practicality and should be reviewed and become more practical. Moreover, the findings of the present study were consistent with the researches of Fadaee and his colleagues (4), Ghazanfari (18), Amini (19), and Ovcaa (20), all of which insisted on the average adaptation of courses with job requirements. Therefore, it is essential to conduct needs assessment among graduates of bachelor and associate's degrees of radiology technology in order to review and modify the educational curriculum.

Furthermore, the findings of the present study demonstrated that there is no significance difference between the perspectives of graduates of bachelor and associate's degrees about the basic courses, but there was difference about the main courses in accordance with the job requirements. The results are consistent with the study of Shir Jang and his colleagues (17) that presented there is a difference between the perspectives of graduates of bachelor and associate's degrees about the content of the curriculum and its adaptation with job requirements. Therefore, it is essential to have more accurate planning for the content of the courses in order to upgrade the quality and practicality of the curriculum for the future job. The limitations of the present study was that only the viewpoint of the experts was evaluated about the adaptation of curriculum and job requirements. It is recommended to investigate all resources, including scientific and administrative documents, professionals; opinion, and scientific and technical pundits in order to provide more reliable results to make modifications and changes.

CONCLUSION

The findings of the study presented that the adaptation of the curriculum of radiography technology with job requirements is not satisfactory and desirable. Therefore, further studies are recommended to be held under the supervision of the Ministry of Health and in regard with the opinions of the experts.Moreover, in order to enhance and upgrade the quality of the curriculum and its adaptation with the job requirement, it is suggested to review the curriculum, analyze the duties of the experts and modify the course

Table 4. frequency distribution from the perspective of graduates of bachelor degree about the adaptation of specialized courses with job requirements

	Specialized courses	Application of course content		
		high	medium	low
B.S.	Specialized language	18(51.4)	15(42.9)	2(5.7)
	Medical terms in radiology	28(80)	6(17.1)	1(2.9)
	Record and display the image in medicine	21(60)	12(34.3)	2(5.7)
	Physics Beams	16(45.7)	15(42.9)	4(11.4)
	Diagnostic radiology physics	21(60)	11(31.4)	3(8.6)
	Radiographic Methods 1	33(94.3)	1(2.9)	1(2.9)
	Radiographic Methods 2	34(97.1)	1(2.9)	0
	Radiographic Methods 3	34(97.1)	1(2.9)	0
	Introduction to the structure and properties of contrast media in imaging	22(62.9)	12(34.3)	1(2.9)
	Ultrasound imaging in medicine	7(20)	7(20)	21(60)
	Special radiographic methods	26(74.3)	7(20)	2(5.7)
	Ionized DZI radiation	16(45.7)	14(40)	5(14.3)
	Sectional anatomy	24(68.6)	9(25.7)	2(5.7)
	Physical Principles of CT Scan Systems	17(48.6)	13(37.1)	5(14.3)
	Techniques and clinical aspects of computer tomography	20(57.1)	13(37.1)	2(5.7)
	Radio phobia	13(37.1)	17(48.6)	5(14.3)
	Evaluation of medical images 1	22(62.9)	13(37.1)	0
	Evaluation of medical images 2	23(65.7)	11(31.4)	1(2.9)
	Physical Principles of MRI Imaging Systems	14(40)	15(42.9)	6(17.1)
	Techniques and clinical aspects of MRI imaging	19(54.3)	13(37.1)	3(8.6)
	Preliminary maintenance of radiological devices	11(31.4)	19(54.3)	5(14.3)
	QC imaging method and QA quality control in medical imaging	9(25.7)	17(48.6)	9(25.7)
	Protection against ionizing radiation	24(68.6)	9(25.7)	2(5.7)
	Internship 1	31(88.6)	3(8.6)	1(2.9)
	Internship 2	31(88.6)	3(8.6)	1(2.9)
	Internship 3	31(88.6)	3(8.6)	1(2.9)
	Internship 4	31(88.6)	2(5.7)	2(5.7)
	Internship in CT Scan work field	31(88.6)	3(8.6)	1(2.9)
	Internship in MRI Work field	28(80)	5(14.3)	2(5.7)
	Internship in radiography methods work field	29(82.9)	6(17.1)	0
	Internship in medical sonography	13(37.2)	6(17.1)	16(45.7)

Table 5. comparing the adaption of basic and main courses from the perspective of graduates of associate degree and bachelor degree with job requirements

group	Basic courses		Main courses	
	Mean ± standard deviation	Significance	Mean ± standard deviation	Significance
Associate degree graduates	2.45±0.456	0.080	2.32±0.444	0.035
Bachelor graduates	2.33±0.451		2.89±0.358	

programs and the content of the courses.

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