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The Effect of The Research Activities by Dentistry Faculty Members of Tabriz Medical Sciences University on Their Teaching Activities from Their Own Perspectives

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Abstract

Introduction: Research and teaching are the most important duties of the faculty members in the universities. On the other hand, there are still discrepancies regarding the relationship between the teaching activities of the faculty members and their research activities. Therefore, unravelling the exact association between these two is of a great importance. The present study aims at investigating the effect of the research activities by dentistry faculty members of Tabriz Medical Sciences University on their teaching activities from their own perspectives. Materials and Methods:The present study was conducted in two parts. At first, a reliable and valid questionnaire was prepared for assessing the perspectives of the dentistry professors in Medical Sciences University, Tabriz Branch, in such a way that, following the designing of the questionnaire, its face and content validities were quantified using impact factor, ratio and content validity index, respectively. The questionnaire's reliability was examined based on Cronbach's Alpha method as well as the test-retest correlation coefficient subsequent to the completion of the questionnaires by 40 of the dentistry faculty members within a two-week interval.Then, the professors were administered with the valid and reliable questionnaires following the collection of which, the answers were subjected to statistical investigation and analysis. The extracted data were analyzed in SPSS and a P-value below 0.05 was set as the significance level.Findings:The results obtained from the present study indicated that there is a positive correlation between the teaching and research activities of dentistry faculty members of Tabriz Medical Sciences University. It was also figured out that the faculty members' research activities account for 8% of their teaching activities' variations. Conclusion:Although the results of the present study were reflective of the idea that the research activities of the dentistry faculty members from Tabriz Medical Sciences University positively influence their teaching activities, it is not found much of a strong effect. It is evident that the recognition of the existent barriers in this regard enables the enhancement of the research-teaching interrelationships thereby to pave the way for a practically better use of research findings in teaching processes.

Keywords: Faculty Member, Dentistry, Research Activity, Teaching Activity

Introduction:

Universities have huge responsibilities in doing research as well as teaching and educating the university students. Faculty members of the universities are the best science producers (Wei et al., 207). Besides devoting a considerable part of their time to the teaching of the university students, faculty members also work as researchers in the universities and their performance in research area is an important index for the upgradation of their scientific rank and grade. Since the professors are personally inclined towards their own job promotion, their research role competes with their teaching role (Ministry of Healthcare, 2012; Bates & Frohlich, 2000). One of the objectives in doing research in healthcare system is granting quality to the instruction process. The establishment of various research centers in the medical sciences university, the increase in the amount of research loans during the recent years, absorption of human resources for doing numerous researches in various grounds, on the one hand, and the importance of making research-based decisions, on the other hand, have caused a great deal of expectation amongst the physician and dentist professors in respect to the extent to which the research findings are put into use and the research activities of the faculty members have always been the major concern of the educational systems of the universities (Ebadifar et al., 2004).. The amount of the scientific products and research development in every country determines the potentials thereof for remaining as competitive in the international arena in such a manner that having a high ability in science production provides a country with the opportunity of taking advantage of the others' research results (Gravand et al., 2014). There are many studies carried out in foreign countries for finding the relationship between educational and research activities of the faculty members and it occasionally seems that there are various notions in this regard. Some of the professors are of the belief that the instructional programs the teachers of which are

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the very researchers of the same study field enjoy a higher quality than those drawn on the others' research results whereas some others believe that the performing of academic research causes reduction in the quality of the offered instruction (Healey, 2005). The results of the study by Wei et al (2007) showed that the students' evaluation of the teachers' educational skills (SETs[1]) differed depending on their research activities and a mutual relationship was evidenced between the professors' scientific rank and the effectiveness of the researches carried out by them. In this study, a positive correlation was documented between the effectiveness of teaching and effectiveness of research and, in fact, teaching was found benefiting from research (Wei et al., 207). The findings of the study by Jencks et al (1968) signified the influence of research on the professors' enhancement of knowledge and provocation of their mental activities (Jencks & Riesman, 1968). Michalak et al (1981) reported that the professors active in research tended to challenge their students more in scientific terms (Michalak & Friedrich, 1981). On the other hand, there are studies that either imply the negative relationship between teaching and research or have not reported any relationship between the two. For example, the results of the study by Mortimer et al (1996) were suggestive of the idea that research might cause the professors not to spend sufficient time and energy to teaching the way it is deserved and paying extreme attention to research can negatively influence the teaching (Noser et al., 1996). In the majority of the studies, the indicators utilized for the investigation of the relationship between teaching and research activities by the faculty members have been quantitative scales like SETs and the number of articles published by the professors. On the other hand, subjective indices, like the experiences of the faculty members have also been reported in regard of this relationship. The study by Robertson (2001) that included interviews with faculty members, as well, indicated that there is a considerable difference in faculty members' experiences of the relationship between teaching and research (Robertson &, Bond, 2001). The study by Stack (2003) demonstrated that although prominent researchers can non-proportionately have a lower number of students whose SETs might be high, the quality of the effectiveness of their researches was not found necessarily associated with the students' appraisal of their instruction (Stack, 2003).

Considering the existent discrepancies and the fact that there is a scarcity of research in Iran regarding the relationship between the teaching and research activities by dentistry faculty members as well as in regard of the idea that there is not sufficient and comprehensive information at hand in the area of research duties of the dentistry faculty members in Tabriz Medical Sciences University and knowing the important position of Tabriz Medical Sciences University, as one of the mother universities in producing and teaching science, it is necessary to discover the exact relationship between the instructional and research activities of the faculty members. The present study was performed aiming at the discovery of the relationship between the instructional and research activities of dentistry faculty members in Tabriz Medical Sciences University and the effect of their research activities on their teaching activities.

Materials and Methodology:

The present study is a cross-sectional research that investigates the relationship between the research activities by dentistry faculty members of Tabriz Medical Sciences University and their teaching activities as well as the effect of the dentistry faculty members' research activities on their teaching activities in Tabriz Medical Sciences University. To do so, a reliable and valid questionnaire was seminally prepared for the investigation of the effect of dentistry faculty members' research activities in Tabriz Medical Sciences University on their teaching activities from the perspectives of them. To construct a valid and reliable research instrument, an expert panel comprised of dentist faculty members from Tabriz, Ardabil and Zanjan Medical Sciences University was requested to take part in the study. To prepare the questionnaire's items, it was seminally attempted to make use of the items from existing credible questionnaires in the other articles. Then, the vague words and expressions of the questionnaire were corrected and replaced as deemed expedient by the professors. To perform a quantitative evaluation of the face validity and in order to reduce and remove the inappropriate items and determine the importance of each of the items, the quantitative item impact method was employed (Hajizadeh & Asghari, 2010). In this stage, 14 specialized and faculty member dentists scored the impact rate of each item within the format of a questionnaire based on Likert's five-point scale using such choices as "completely important" (score 5), "important" (score 4), "intermediately important" (score 3), "a little important" (score 2) and "not important" (score 1). In the end, the impact scores of each item were calculated based on the following formula in separate:

Importance × frequency (in percentage)-impact score

The items with impact scores above 1.5 were selected appropriate to be subjected to further analysis. To answer to the question as to whether the contents of the instrument's question have the capability of measuring the defined goal or not and whether the items codified in the instrument possess the required adequacy to represent the measured content or not, content validity was assessed based on both qualitative and quantitative methods (McKenzie et al., 1999; Wynd et al., 2003).

To investigate the content validity in a qualitative manner, specialized dentistry faculty members and experts were asked to initially examine the quality of the instrument and then provide feedback in respect to such scales as grammar, wording, item allocation and scaling. After receiving the revising hints from the experts in a written and expanded form, the required corrections were made. To investigate the content validity in a quantitative manner, two coefficients, content validity ratio (CVR) and content validity index (CVI), were applied. To

[1] Students' perspectives regarding the teaher's prfomance in the classroom and teaching quality as well as student's evaluation of the instrruction, i.e. the students' appraisal of the teaching skills of a teacher, including the skills in material presentation and providing assistance during the learning process.

assure that the most important and most correct content has been selected in statistical terms, an expert panel, consisted of ten specialized dentistry faculty members, were asked to evaluate each item based on three-point Likert scale with such choices as "necessary", "useful but unnecessary" and "unnecessary". Then, the calculated content validity ratio was compared for each item to that inserted in Lawshe Table following which the proper decisions were made (Lawshe, 1975). The content credibility of the items the computed CVR of which was above 0.62 was confirmed. Resultantly, the confirmed items with an acceptable statistical significance level of $P<0.05$ were considered as necessary and important (De Von et al., 2007). To insure that the items have been best designed to investigate the effect of faculty members' research activities on their teaching activities, the CVIs of the items and questionnaire were investigated based on three scales, namely simplicity, specificity (relevance) and clarity, based on Likert's four-point scale. CVI score was calculated as follows: the consistent scores of each item that had acquired rank three or four (highest score) were summed and then divided by the total number of the experts and the CVI mean was set as the scale's content validity index. Items with scores above 0.79 were envisaged acceptable (Hajizadeh & Asghari, 2010). To ensure the items' adequacy, the experts were asked to write down the items they think appropriate for the investigation of the effect of faculty members' research activities on their teaching activities in the provided blank spaces in the end of the questionnaire (Rubio et al., 2003). In this study, in order to assure the similarity, precision, predictability and reliability of the results of the prepared instrument under similar conditions, the study instrument reliability was evaluated using Cronbach's alpha test (Rubio et al., 2003).To insure the questionnaire stability, retest based on calculation of the internal consistency correlation (ICC) was employed (Dilorio, 2005). The data were analyzed in SPSS software and Cronbach's alpha coefficient above 0.7 and ICC values equal to and/or higher than 0.4 were considered acceptable. To perform the retest, 40 professors were asked to complete the questionnaires within a two-week interval (the impossibility of using the same professors' ideas in various stages of the research is a constraint of the present study).

After final designing of the questionnaire, the assistant professors, associate professors and professors from all the study fields (orthodontics, pediatrics, mouth and jaw and face surgery, community dentistry, repair and plastic surgery, endodontics, periodontics, teeth prosthesis, mouth and jaw and face radiology, mouth diseases, mouth pathology) of dentistry department of Tabriz Medical Sciences University were included as the study sample volume based on a full-count method. The valid and reliable questionnaire was personally distributed amongst the faculty members who were subsequently provide with the required information regarding the study subject and objectives and the confidentiality of the information and their enjoyment of the right to withdraw from the study at any time and questionnaire completion was considered as their conscious consent for the participation in the project. After the completion, the questionnaires were collected and the results were subjected to statistical analysis in such a way that the rank of each research and teaching activity by the faculty member that has been determined based on Likert's scale was inserted into SPSS. The sum of the ranks related to the teaching and research activities was determined in separate within the format of the score of research and teaching activities. According to the status of the distribution of the data related to the score of the teaching and research activities by faculty members, inter-variable Pearson Correlation and a correlation coefficient suitable for the investigation of the relationship between them was used and the significance level was set at $P<0.05$. The relationship between the scores of the teaching and research activities of the faculty members was separately investigated and analyzed in each of the demographic variables' level. The significance of the regression model and its coefficients was considered as the association of the teaching activity scores obtained by dentistry faculty members in Tabriz Medical Sciences University to their research activities based on simple linear regression analysis so that the variation percentage of the faculty members' teaching activities and their research activities could be determined.

Results:

According to the results given in tables (1) and (2), the items for which no acceptable scores were obtained in terms of face and content validity indices were considered as inappropriate hence discarded from the final questionnaire's structure. This way, a final valid and reliable questionnaire, including 40 and 38 teaching and research items, respectively, was obtained and utilized for the second specific goal of the study. The questionnaire has been attached to the ending part of the present study.

Table 1: the results of content and face validity investigation of the questionnaire in an evaluation of the effect of the teaching activities of dentistry faculty members from Tabriz Medical Sciences University on their research activities from their own perspectives

Row	Items related to faculty members' teaching activities	Mean CVI	CVR	Item 's impact score	Evaluation
1	I coordinate the lesson content with its general and specific objectives in every session.	0.93	0.8	4.7	Suitable
2	I use appropriate resources to teach the university students.	0.93	1	4.6	Suitable
3	I collect the lesson materials from diverse, credible and up-to-date resources.	0.93	0.4	4.1	Unsuitable
4	I use up-to-date and new techniques and methods for teaching.	0.86	0.8	4.5	Suitable
5	I offer an appropriate lesson plan for each teaching session.	0.93	0.8	4.5	Suitable
6	I use a teaching method in proportion to the contents and objectives of each session.	0.96	1	4.5	Suitable
7	In every session, I review a summary of the previous session's lesson and link it to the new materials.	0.93	0.4	4.3	Unsuitable
8	In every session, I firstly propose the lesson goals and then explain it.	1	0.4	4.6	Unsuitable

9	I use clear and understandable expressions when teaching the students.	1	0.8	4.4	Suitable
10	In my classes, I provide the students with unfamiliar scientific and specialized terms.	1	0.6	4.6	Unsuitable
11	I use various objective and practical examples to elicit better understanding of the materials.	0.96	0.8	4.8	Suitable
12	I explain the application of each session's lesson materials and their usability in objective situations for the students.	0.96	0.6	4.8	Unsuitable
13	I use instruction aids for teaching.	1	0.8	4.4	Suitable
14	In my teaching contents, I make a greater emphasis on the primary and key points.	0.96	0.8	4.6	Suitable
15	To offer the materials in each session, I get completely prepared with perfect dominance over the topic of the lesson.	0.86	0.8	4.7	Suitable
16	I organize and offer the lesson materials in each session based on the corresponding curriculum.	0.86	0.6	4.5	Unsuitable
17	In organizing the contents and offering of the lesson materials, I consider the various characteristics of the learners.	0.8	0	4.3	Unsuitable
18	I observe the sequence and coherence of the materials when arranging and organizing the lesson materials.	1	1	4.6	Suitable
19	I share the objectives of each session with the students early during each session.	0.96	0.8	4.7	Suitable
20	In the beginning of each session, I vividly explain the learners' duties.	0.86	0.6	4.5	Unsuitable
21	I announce the students' evaluation method and scoring criteria in the beginning of each semester.	1	1	4.6	Suitable
22	I explain the lesson rules to the students during the first session.	0.96	1	4.5	Suitable
23	In the first session of the class, I use various and appropriate ice-breaking methods to get more familiar with the students and create sincerity.	0.96	0.8	4.6	Suitable
24	Outside the classroom, I give counseling and guidance to the students.	0.8	0.4	4	Unsuitable
25	I evaluate the goal achievement of each teaching session in the end of each session.	0.9	0.4	4.4	Unsuitable
26	I design questions from the entire taught materials.	0.86	0.2	3.9	Unsuitable
27	I design the questions in such a way that I can be able to evaluate the students' understandability and perceptions and their analytical and reasoning power inn lieu of what they have memorized.	0.96	1	4.9	Suitable
28	In evaluating the students, I use appropriate methods in proportion to the various learning areas.	0.96	1	4.7	Suitable
29	I evaluate the students' learning both during the course and in the end thereof in a constant manner and in proportion to the educational objectives.	0.96	0.8	4.7	Suitable
30	In educational designing and planning, I make use of credible scientific evidence.	0.9	1	4.6	Suitable
31	I cooperate in the codification, designing and revising of the educational programs and proposition of the relevant lessons.	1	0.6	4.3	Unsuitable
32	I evaluate my own educational programs and/or the educational department.	0.96	0.8	4.7	Suitable
33	I teach the instructional materials in such a way that the students can understand the offered materials.	0.86	0.2	4.5	Unsuitable
34	I provide the students with counseling and guidance regarding learning process.	0.9	0.8	4.6	Suitable
35	I guide the students about the method of doing the assignments and exercises.	0.96	0.8	4.4	Suitable
36	I specify the students' volume of assignments in proportion to the number of the lesson units.	0.93	0.4	4.2	Unsuitable
37	I specify the lesson assignments to the extent understandable and doable by the students.	0.93	0.8	4.5	Suitable
38	I dedicate appropriate time to classroom questioning and answering of the students so as to encourage the deep study of the lesson materials.	1	-0.4	4.4	Unsuitable
39	I teach team work skills to the students.	0.96	0	4.1	Unsuitable
40	I teach critical thinking skills to the students.	0.96	0.4	4.5	Unsuitable
41	To facilitate students' learning, I prepare a summary of the instructional material and make it available to the students in the form of pamphlets.	0.76	-0.2	4.1	Unsuitable
42	To elevate the students' learning, I design multimedia instructional films and software.	0.93	0.4	4.6	Unsuitable
43	I use audiovisual instruments for better learning of the students.	1	0.8	4.1	Suitable

44	I inform the students of the resources of the books and articles existent about the lesson subjects.	1	1	4.1	Suitable
45	I actively participate in instructional processes of students and specialized dentistry assistants' supplementary courses.	0.96	0.8	4.4	Suitable
46	I regularly supervise the practical skills of the learners in each session.	1	0.8	4.1	Suitable
47	I supervise the students' correct way of using the instruments and devises in the practical parts.	1	1	4.5	Suitable
48	I teach the students the correct way of using the instruments and devices in the practical parts.	1	1	4.7	Suitable
49	In planning, designing and evaluating the instructional programs, I consider the learners' roles and competencies.	0.93	0.6	4.6	Unsuitable
50	I provide the students with constructive feedbacks regarding the assignments they have accomplished.	0.86	0.8	4.1	Suitable
51	I analyze the students' problems in learning the instructional materials.	0.9	1	4.6	Suitable
52	I teach solutions for enhancing self-confidence to the students.	0.93	0.8	4.2	Suitable
53	I use time-management skills in my classes.	0.9	0.6	4.1	Unsuitable
54	I predict the students' contingent questions before attending the class and prepare myself for their possible answers.	0.93	-0.2	4.3	Unsuitable
55	To enhance my answerability to the students' questions, I keep my information about the subject of each lesson session up-to-date.	0.96	0.8	4.1	Suitable
56	I transfer the lesson materials clearly and vividly.	0.96	0.6	4.1	Unsuitable
57	I offer the research plans and novel teaching methods in consideration of the society needs.	0.86	0.8	4.4	Suitable
58	In planning, designing and evaluation of the instructional programs, I consider the society needs, healthcare issues and accountability thereto.	0.83	0.6	4.4	Unsuitable
59	I constantly and actively participate in planning, implementing and evaluating the instructional programs related to dentists' empowerment.	0.9	0.8	4.5	Suitable
60	To achieve the standards of the general and specialized dentistry courses, I use relevant teaching methodologies.	0.9	0.8	4.1	Suitable
61	I actively take part in instructional conferences held by the department.	0.93	0.4	4.1	Unsuitable
62	I place effective listening skill and feedback offering in my work schedule.	0.86	0.8	4.5	Suitable
63	I try to teach with zeal and fervor and make use of jokes, stories and proverbs on the right time and in the right place.	0.83	0.8	4.1	Suitable
64	During teaching, I consider short breaks for the students' resting in order to prevent them from becoming tired.	0.9	0.8	4.6	Suitable
65	I also use body language and appropriate nonverbal messages to establish effective relationships with the students.	0.9	0.8	3.9	Suitable

Table 2: the results of investigating the questionnaire's face and content validities in evaluating the effect of the research activities by dentistry faculty members from Tabriz Medical Sciences University on their teaching activities from their own perspectives

Row	Groups related to faculty members' research activities	Mean CVI	CVR	Item 's impact score	Evaluation
1	I teach in research workshops	1	0.8	4.5	Suitable
2	I take part in the necessary research workshops to enhance my research skills.	1	1	4.1	Suitable
3	I use my research results in my clinical and practical tasks.	1	0.8	4	Suitable
4	I make plans to participate in researches related to my profession.	0.93	1	4.4	Suitable
5	I make plans to make use of the others' study results in my profession.	0.9	0.8	4.2	Suitable
6	I discuss and converse with my colleagues about the solutions to the application of the research results in solving the problems and issues of my profession.	0.93	1	4.7	Suitable
7	I make plans to apply the results of my research in the educational department I am working.	1	1	3.7	Suitable
8	In doing research projects, I consider the research priorities of the university.	0.96	1	4.7	Suitable
9	I actively shoulder the affairs related to the counseling and guidance of the dissertation.	0.93	1	4.5	Suitable
10	I make plans for enhancing my skills in searching the databases.	0.93	1	4.4	Suitable
11	To elevate my competency in using computer software, I make plans depending on the type of the research activity.	0.8	0.8	4.7	Suitable

12	I critically evaluate the research articles of the journals.	1	0.8	4.7	Suitable
13	I teach the students the correct formulation of their research questions.	0.96	1	4.4	Suitable
14	I guide the students in selecting the research plans in proportion to the research hypotheses and questions.	0.9	0.8	4.3	Suitable
15	I guide the students in analyzing their research information and data.	0.8	0.8	4.1	Suitable
16	I teach the students the method of recognizing the research variables and selection of the appropriate measurement methods.	0.96	1	4.5	Suitable
17	In designing my research, I consider the contents of the existent standard guidelines.	0.93	1	4.1	Suitable
18	I share the results of my researches and their concepts with the others via publishing articles in credible domestic or foreign journals.	1	0.8	4.2	Suitable
19	To design and implement my researches, I ask help from the experts and specialists in various research fields.	0.93	0.8	4.7	Suitable
20	I actively take part in the launching of research laboratories and/or clinical areas effective in offering of teaching and research.	1	1	4.3	Suitable
21	I present articles in domestic or foreign seminars and conferences.	0.93	1	4.2	Suitable
22	I work in the area of publishing and promulgating books and articles and/or translation of them.	0.93	1	3.9	Suitable
23	I actively cooperate in the editing of scientific articles and books.	0.86	0.8	4.7	Suitable
24	I make plans for the creation of innovative and inventive thoughts in students' minds.	0.86	0.8	4	Suitable
25	I actively participate in reviewing research articles, plans and dissertations.	1	0.8	4.3	Suitable
26	I suggest the research plans and dissertations in proportion to the students' roles and competencies.	0.9	0.8	4	Suitable
27	I encourage the students for doing research and taking part in research plans.	0.93	1	4.1	Suitable
28	I design my research projects in line with staying accountable to the society's needs.	0.9	0.8	4.5	Suitable
29	In my weekly schedule, I devote a certain time to the performing of research works.	0.96	0.8	4	Suitable
30	I always try to be a proper research model for the students.	0.96	1	4.3	Suitable
31	I search and retrieve the scientific information I need for doing my research works using proper strategies.	0.93	1	4.5	Suitable
32	I observe the ethical principles of performing research works and writing of scientific articles.	1	1	4.1	Suitable
33	I make a practical use of the materials I have learnt in the courses and research workshops related to research software.	0.96	1	4.7	Suitable
34	I make a practical use of the materials I have learnt in the research methodology instruction courses for faculty members.	0.93	1	4.3	Suitable
35	I use novel and latest technologies of the world in doing research.	0.9	1	4.7	Suitable
36	I use the university's libraries and laboratories for doing my research projects.	0.86	0.8	4.3	Suitable
37	I use the available instruments and equipment I need for doing the research works.	0.96	1	4.5	Suitable
38	I perform activities for promoting research culture in the university.	0.86	0.8	4.7	suitable

Values equal to 0.89 and 0.87 were, respectively, obtained for the reliability of the questionnaire that was completed twice by the professors within two weeks. As it can be seen, they are in an optimum and acceptable range. Moreover, the relationship between the two questionnaires (the questionnaire that was completed for the first time and the questionnaire that was completed after two weeks) was strong and significant (internal consistency coefficient=0.97 and Sig=0.000).

In total, 76 faculty members participated in an investigation of the effect of the research activities by dentistry faculty members from Tabriz Medical Sciences University on the teaching activities of them from their own perspective. Table (3) presents the entire demographic information in separate for the various variables.

Table 3: the number and frequency percentage of the faculty members participating in the study in separate for their demographic characteristics (76 faculty members)

Demographic variable name	Variable level	Frequency	Frequency percentage
gender	Male	44	57.9
	Female	32	42.1
Marital status	Single	8	10.5
	Married	62	81.6

	Unknown	6	7.9
Scientific rank	Assistant professor	51	67.1
	Associate professor	16	27.1
	Professor	4	5.3
	Unknown	5	6.6
Employment relationship	Service-committed	33	43.4
	Contracted	16	21.1
	Formal-experimental	5	6.6
	Formal-permanent	18	23.7
	Unknown	4	5.3

The average age of the individuals participating in the study was 39.54±7.78 and the participants were in an age range from 28, at least, to 59, at most. The faculty member participants of the study had an average work experience equal to 9.16±6.38 and their work history ranged from one year, at least, to 29 years, at most. The total mean score of the teaching and research activities of all the 76 faculty members participating in the study was 270.14±25.41 and it ranged from a minimum 229 to maximum 349 (It is worth mentioning that the minimum and maximum acquirable score of the questionnaire were 78 and 390, respectively). Furthermore, the means score of their instructional activities was 151.67±13.12 and it ranged from 120, at least, to 178, at most. In the same way, the mean score of their research activities was 118.47±18.37 and it ranged from 92, at least, to 171, at most.

In determining that whether the mean scores of the faculty members' teaching and research activities enjoy normal distribution or not, the k-s statistic and significance value were respectively found equal to 0.48 and 0.97 for the teaching activities of the faculty members and k-s statistic and significance value equal respectively to 1.15 and 0.13 were also obtained for their research activities. So, the scores' distribution is accordingly confirmed.

No significant relationship (P>0.05) was found in an investigation of the relationship between the total score of the teaching and research activities of the faculty members participating in the study with their demographic variables. The highest and the lowest total scores of the teaching and research activities of the dentistry faculty members in Tabriz Medical Sciences University were found respectively belonging to the faculty members with a work history in a range from 10 to 15 years (288.22±32.11) and the faculty members whose recruitment relationship was unclear (252.25±15.41) (table 4). The relationship between the teaching and research activities by the dentistry faculty members in Tabriz Medical Sciences University based on their demographic variables was positive with their gender and negative with their age, marital status, work history, scientific rank and recruitment relationship as figured out in the related statistical test.

Table 4: investigating the significance of the relationship between the total score of the teaching and research activities of the faculty members participating in the study based on their demographic variables (76 faculty members)

Demographic variable's name	Variable level	Total mean score of teaching and research activities± standard deviation	Statistical test and its two-tail asymptotic domain	Relationship significance
Age	>30	19.53±268.44	Pearson Chi-square= 0.628	Insignificant
	30-40	25.08±26.88		
	<40	28.32±280.21		
Gender	Male	25.11±267.25	Likelihood ratio= 0.006	Significant
	Female	25.68±274.12		
Marital status	Single	29.36±283.62	Likelihood ratio= 0.997	Insignificant
	Married	23.37±267.98		
	Unknown	38.05±274.50		
Work history	Below 5 years	20.59±266.95	Likelihood ratio= 0.492	Insignificant
	5-10 years	23.76±263.84		
	10-15 years	32.11±288.22		
	Over 15 years	27.93±279.71		
Scientific rank	Assistant professor	23.79±266.19	Kendall's tau-b= 0.228	Insignificant
	Associate professor	29.31±285.00		
	Professor	15.36±267.00		
	Unknown	22.77±265.40		
Employment relationship	Service-committed	20.00±264.15	Kendall's tau-b= 0.983	Insignificant
	Contracted	24.79±271.06		
	Formal-experimental	11.81±264.00		
	Formal-permanent	32.52±286.00		

	Unknown	15.41±252.25		

There is a significant and positive relationship between the teaching and research activities of the faculty members and the teaching activities are on average increased by 0.2 units per every unit increase in the faculty members' research activities. Furthermore, a positive correlation was documented between the research activities by dentistry faculty members from Tabriz Medical Sciences University and their teaching activities but it is not much of a strong correlation (R=0.28). According to the fact that R^2 (determination coefficient) has been found equal to 0.08, it can be stated that the research activities by the dentistry faculty members in Tabriz Medical Sciences University account for 8% of their teaching activities' variations. In other words, the solutions for the improvement of the teaching activities of the professors should be sought in issues other than change and enhancement of their research activities for 92% of the cases.

The information table of regression model pertaining to the investigation of the relationship between research activities by dentistry faculty members in Tabriz Medical Sciences University and their teaching activities from their own perspective

Model	R	R^2
1	0.28	0.08

ANOVA					
Model	Sum of squares	DF	Mean square	F	Sig.
Regression	1028.19	1	1028.19	6.39	0.014
Residual	11890.58	74	160.68		
Total	12918.77	75			

Coefficients					
Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(constant)	127.79	9.54		13.38	0.000
Faculty members' research score	0.20	0.08	0.28	2.53	0.014

Discussion:

Universities have a huge responsibility for performing research and teaching and educating the university students. The faculty members of the universities are the best producers of science (Wei et al., 207).. The duties of the faculty members, as stipulated in article 10 of the faculty members' administrative-recruitment procedures of Medical Sciences Universities include teaching, research and cultural activities, individual development, executive and managerial activities, offering of healthcare services, treatment and health promotion as well as the specialized activities outside the institution (Ministry of Healthcare, 2012). Besides spending an important part of their time for teaching the students, faculty members also work as researchers in the university and their performance in research area is an important index for the upgradation of their scientific rank and degree. Since the professors are inclined towards occupationally promoting themselves, their research roles compete with their teaching roles (Bates & Frohlich, 2000). One objective in doing research in healthcare system is granting quality to the teaching process. The establishment of various research centers in Medical Sciences Universities, the increase in the amount of research loans during the recent years and absorption of the human resources for doing numerous researches in various fields, on the one hand, and importance of research-based decision making, on the other hand, have given rise to many expectations regarding the use of research findings amongst the physician and dentist professors (Ebadifar et al., 2004). The evaluation of the extent to which the research findings are put into use and the identification and classification of the problems and barriers and coming up with solutions in this regard are deemed as undeniably necessary subjects. Based thereon, it is necessary to investigate the extent to which the research findings are put into practical use and recognize the existent hindering factors so that proper decisions can be made regarding the provisioning of the facilities required for the application of the findings (Gravand et al., 2014). The results of various studies, as well, support the relationship between research and teaching and they have indicated a positive relationship between the research products and efficiency elevation in teaching. In addition, it has been demonstrated in these studies that the professors who have been good researchers, as compared to others, have a higher teaching efficiency. The results obtained in the current research paper are consistent with what has been found by Wei et al (2007) in a study of Chinese professor that was titled "the investigation of the effect of professors' research activities on their teaching activities' efficiency". It was shown in their study that the students' evaluation of the professors' teaching skills (SETs[2]) differs depending on the professors' amount of research activities and a mutual relationship was figured out between the professors' scientific rank and the effectiveness of the researches performed by them. The correlation between the teaching effectiveness and research effectiveness was also

[2] Students' perspectives regarding the teaher's prfomance in the classroom and teaching quality as well as student's evaluation of the instrruction, i.e. the students' appraisal of the teaching skills of a teacher, including the skills in material presentation and providing assistance during the learning process.

positive in their study and, in fact, teaching was found benefitting from research (Wei et al., 207). The study shows that the higher the scientific rank of the professors, the more their research activities and studies would be more coherent and more applied and the effect of such research activities was evaluated to be more positive on the professors' teaching activities. But, in the present study, no comparison was made between the professors in terms of their scientific ranks and the effect of the research activities could have become possibly more accentuated on the teaching activities amongst the professors with higher scientific ranks if the professors were assigned to separate groups in terms of their scientific ranks. Another study, almost similar to the present research project, has been conducted by Jencks et al (1968) who investigated the effect of research activities on the professors' knowledge and science levels in American universities. The results of this study were also reflective of the effect of research on the increase in professors' knowledge and their mental activities' provocation. They showed that the professors with extensive research activities enjoyed a higher level of knowledge in their own specific and different fields (Jencks & Riesman, 1968). Although the study was carried out long ago hence naturally suffering deficiencies in terms of data analysis, it, like the present study, underlines the usefulness of the research activities. Michalak et al (1981) reported, in a study called "the effect of research products on the efficiency of the teaching activities" in regard of the research activities performed by the university professors, that the professors active in research areas tend to more challenge their students scientifically (Michalak & Friedrich, 1981). This conclusion can be suggestive of the idea that the professors that are active in research naturally possess more up-to-date information hence more capable of challenging the students in the classrooms. Although this study had dealt with a study of the art professors, it, like the present study, pointed to the positive effect of research on teaching. On the other hand, there are studies that imply the negative or nonexistent relationship between teaching and research. For instance, the results of the study by Noser TC et al (1996), under the title of "the effects of research activities on the teaching activities by the economy department professors in England's Universities", indicated that research may cause the professors fall short of devoting sufficient time and energy to teaching the way it deserves and paying extreme attention to research can adversely influence teaching (Noser et al., 1996). Therefore, the results of these studies were against what has been found in the current research paper hence challenging the accuracy of our results. One primary reason for such a conclusion can be related to the examined study field for the fact that the economic issues have been of a far greater importance at the time that the study has been in progress, especially in the western countries, and, due to the same reason, the economy department professors have been more concentrated on the research studies so as to contribute to the corroboration and modification of their country's economy infrastructure via doing fundamental research for which reason they have failed dedicating sufficient time to the teaching of the students. It can be generally stated that, at that time and in developed countries, research activities were considered as more superior. Stack et al (2003) performed a study on the social sciences' professors under the title of "professors' research productions and their evaluation by the students in terms of their teaching" and demonstrated that the effectiveness quality of the professors' researches is not necessarily associated with the students' evaluation of their teaching (Stack, 2003). That is because the outstanding researchers might non-proportionately have lower numbers of students for teaching. Another study that was conducted by Bates et al (2000) under the title of "the relationship between research activities and effectiveness and efficiency of teaching activities" indicated that the elite professors do not differ so much from non-elite professors in terms of the number of articles published in the credible journals (Bates & Frohlich, 2000). The study was carried out on economy professors and, on the other hand, their scales for the selection of the elite professors from the university was the mere teaching activities of them and, as viewed by the authors of the present research paper, comparison of the professors' research activities based on the professors' being elite or not, is not correct in teaching regards. Additionally, the indicators that have been employed in the majority of the studies for the investigation of the relationship between research and teaching activities of the faculty members are quantitative measures like SETs and the number of the articles published by the professors. However, subjective indices like the experiences of faculty members have also been reported in studies in respect to the aforesaid relationship. The study by Robertson (2011), named "an experience in investigating the relationship between teaching and research", deals with the teaching and research issues of the faculty members so as to find out which of the teaching or research activities are more valuable in academic terms. The study that also included interviews with the faculty members showed that there is a considerable difference between the faculty members' experiences in terms of the relationship between teaching and research (Robertson &, Bond, 2001).

Conclusion:

The primary objective of the present study was the investigation of the effect of research activities on the teaching activities by the dentistry faculty members in Tabriz Medical Sciences University from their own perspectives. The final analysis of the study questionnaires was suggestive of the idea that although the research findings can be utilized in the majority of the study fields, they are not used so much for various reasons such as uncertainty of the quality of the performed researches, leaving most of the research projects uncompleted and non-applied nature of the research works. Thus, the research activities of the dentistry faculty members in Tabriz Medical Sciences University do not exert much of a strong influence on their teaching activities. However, the study results were expressive of the idea that the research activities of the dentistry faculty members in Tabriz Medical Sciences University positively influence their teaching activities.

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