Evaluation of writing principles in medical alumni theses of a medical sciences university

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Abstract
Aims: One of the main research references in universities is thesis. Conducting the research in different majors of medicine promote the medical sciences and better conducting of student thesises according to the given standards is of considerable importance. The aim of the study was to assess students’ theses and medical assistance in terms of the observing the writing principles.

Methods: Through a cross-sectional analytical study from 2000 to 2006, 318 theses were selected and examined using census method. At first a data collection containing required variables for scoring (0-100) was prepared. Different parts of all theses including the title, introduction, material and method, result, conclusion, discussion, index, writing principles, Persian & English abstract and references, were analyzed and scored. All checklists were filled by researcher qualitatively.

Results: The highest score was for the section of result with the mean of 97.4 and the lowest score was for English abstracts with the mean of 74.1. 106 theses had published articles. The highest rate of conversion of thesis to an article was related to neurosurgery department (66.7%). The difference of the conversion of thesis to article was significant in both basic science and clinical group (p=0.03). The theses which had higher mean scores were more resulted in published articles (p=0.02). Gynecology-Obstetric department with the mean of 96.2±2.9 had the highest score and the microbiology department had the lowest score 81±5.3.

Conclusion: The major problem of theses is the abstract and methodology sections. It seems necessary to check the theses constantly and to hold regular research and article workshops; also the regular evaluation of theses and improvement of thesis preparing process are essential.

Keywords: Thesis, Writing Principles, Medical Student

Introduction
One of the main factors in the scientific and technology prosperity of any society is paying attention to study and research [1]. In addition, the status of science in a country can be assessed by the studies conducted in that country. A brief look at developed countries will show the fact that knowledge and technique are not obtained only through education but what makes the modern civilization is research and study [2]. Accordingly, conducting research in various fields of medical sciences promotes the medical science and this important task is among the activities of medical universities and related sciences [3]. Most of university activities should be allocated to research in a way that students, instructors and professors of different fields follow the educational and health affairs with an investigating mind [4]. According to the poll by Curisefen et al., most medical students and instructors have considered the basic or clinical research useful in preparing students for medical practice [5]. Therefore, six credits have been assigned for the thesis course during general medical education, so that the students become somehow familiarized with the research methods and the way of its conducting during their studies. It seems that one way of training researchers is to encourage students to conduct research theses. Universities employ different styles of writing in Iran and generally, thesis is not of enough importance and unfortunately this important has not been considered in the universities of medical sciences and quantitative developing and increasing of the clinical skills of students have been more emphasized [3].

The study of the rate of following scientific writing principles in theses of Gilan University students shows that only 15.4% of theses have been written excellently and the rest had varying degrees of weaknesses and deficiencies and most errors are observed in references and discussion sections and the least is seen in the results section [6]. Results of
another study in Gilan University indicate that only 26.6% of theses had observed the correct pattern in writing the references [6].

In the study conducted by Mirsamadi et al. on the theses of medical students of Iran University of Medical Sciences in the first half of 2009, 73.7% of theses had the desirable quality and 26.3% of them had some weaknesses in different aspects [3].

The study of Kolahi et al. on the theses of 14 universities in Iran in the academic year of 1991-1992 and 1998-1999, revealed that the score of theses has changed in terms of structure and content in the two given educational periods. In 1991-1992, 82% of the theses' volume consisted of literature review which is from the most useless parts of the thesis, because the translation of old books or the summary of MEDLINE databases is used without having any relationship with the subject or without any scientific use. In this study, researchers concluded that although the observing of theses' structure is necessary, its content is also important. The median score of the theses increased from 105, during 1991-1992, to 288 in 1998-1999 [7].

To evaluate this issue and explain the problems in theses' structure, a cross-sectional analytical study was conducted to investigate the effectiveness of such programs. This study was conducted to investigate the structure of theses in the medical faculty during the year 2000-6, to determine the qualitative changes and the strengths and weaknesses of theses and following up of the trend of theses' changes to reinforce the strength points and dispel the weak points for further improvement of the theses.

**Methods**

During a cross-sectional analytical study, 318 medical theses from one of the Tehran medical sciences universities were studied from 2000 to 2006. All theses of this time period were studied using the census sampling method. First, by searching in the data banks, the related foreign and local articles were extracted, then after studying and summarizing, the data collection form containing the required variables for scoring (zero to 100) was prepared.

In the data collection form, some general questions were included about the number of authors, advisors, research groups, and the year of presentation and the translation of the project into Persian or English article. Moreover, some specific questions were included about the title (explicitness and clarity, lack of unfamiliar words, clarity of time and place of study in epidemiological studies), introduction (academic development of the topic, literature review, statement of the objectives and hypotheses and the necessity of conducting the study), methods (description of materials and location of implementing the study, methodology, inclusion and exclusion criteria for samples, sampling method and sample size, mentioning the variables, stating the type of study, problems and limitations and ethical considerations for intervention studies), the results (responding to main and secondary research questions and the existence of tables and graphs), discussion (interpretation of results, comparison with other studies and recommendations), index (observing of numbering and mentioning the page numbers in the table of contents), observing the principles of writing (the presence of all mentioned parts in this section in the thesis), the Persian abstract or summary (observance of the article structure including introduction and objectives, methods, results, discussion and keywords), English abstract (observance of the abstract's structure and sources (the author's name, the publication year, article's title, name of journal, journal's number, page number)). Instrument validity was determined using content validity and the reliability of data collection form was obtained using the test/retest approach and came out to be 0.88.

Data was inserted into SPSS 13 software and was statistically analyzed using Chi square test, independent t-test and Pearson correlation coefficient.

**Results**

The highest mean scores were respectively related to the table of contents (97.7±7.3), results (97.4±6.9), introduction (93±7.4), title (91.5±8.6), references (89.4±9.1), discussion (87.6±9.1), methodology (76.4±9.3), Persian abstract (75.6±9.5) and English abstract (74.1±10.4).

From among 21 departments of clinical and basic sciences, 106 theses had published articles and 212 titles lacked it. No information was found for about 8 theses. 39 theses were related to the groups of basic sciences and 287 theses were related to clinical groups, that from the clinical group 99 articles and from the basic sciences' groups 7 articles had been published and presented that the difference between the two groups was significant (p=0.035). The mean scores in the clinical group was 88.9 and in the basic group was 83.1, that this difference was significant (p=0.001).

Most theses were related to internal medicine (61 titles) and the least ones were related to the health
department (one title). The highest rate of theses conversion to article was related to neurosurgery department (66.7%) and then general surgery department (15.7%) and internal medicine (7.5%). Twenty four theses were about military topics and respectively related to internal department with eight titles, dermatology department with four titles, psychiatry department with three titles, pathology department with three titles, ophthalmology department with three titles, ENT department with one title, psychology department with one title and physical medicine department with one title. The group of theses that had higher mean score were converted to paper more than other theses (p=0.021). The total mean of the score given to theses by referee group was 18.86±2.1 and the total mean of the score given to theses was 88.19±8.8. In the study of the relationship between the mean scores given to theses and the score given by referee group, no significant relationship was observed (p=0.074; r=−0.2).

Most studies were of cross-sectional design (122 titles) and the least ones were of cohort group design (99 titles). The highest percentage of articles were in the cohort group and then in case-control studies. The lowest percentage of articles had been presented in descriptive cross-sectional studies. In the cohort group studies, the mean of scores was the highest; then, analytical cross-sectional studies and the lowest score was related to empirical or experimental studies. In total, there were 234 titles of observational studies and 84 titles of experimental studies. The highest percentage of cross-sectional descriptive studies was observed in the internal medicine group (30.4%), the highest percentage of analytical cross-sectional studies was in the surgery group (22.6%), the highest percentage of case-control studies was in the pathology group (40%), the highest percentage of clinical trial studies were in the physiology group (21.6%) and anesthesia (20.5%) and the most cohort studies were in the internal medicine group (66.7%).

There was a weak and inverse relationship between the theses' page numbers and the final score (p=0.47; r=0.2). Two theses had no table of contents, 4 theses didn’t have Persian abstract, 9 theses didn’t have English abstract, two theses didn’t have the list of references and three theses were with no discussion section. All theses had title, introduction, materials & methods and results.

**Discussion**

Specialty and general medical students' theses according to UNESCO classification are put in the count of research statistic of the country and their authors are also considered in the researchers’ statistics of each country [6]. In this study, a total of 318 theses in two groups of clinical sciences and basic sciences were analyzed that the rate was 136 theses in the study of Khalili et al [9], 21 theses in Asefzadeh study [10], 266 theses in Davami's study [1], 267 theses in Sobhani's research [6], 25 theses in Zahedpasha's study [11] and 180 theses in Mansour Ghenati's study [4]. In this study, out of the total theses, 20.5% were related to the internal medicine group; in the study of Iran University of Medical Sciences the rate related to this group was 53% [3] and that of Gilan University of Medical Sciences was 44.4% [4], showing the different tendencies of students in choosing different groups for theses.

In this study, the mean score of observing writing principles was 98.9%, that in the previous studies, the desirable quality percentage has been obtained, so that it has been 77.7% in the study of Rezayian in Rafsanjan [12], 73.7% in Mirsamdy's study in Iran [3], 35.1% in Asefzadeh's research in Qazvin [10] and 15.4% in Sobhani's study in Gilan [6].

Of total theses, 26% had no table of contents, 1.42% had no Persian abstract, 2.98% didn’t have English abstract and 0.26 didn’t have the list of references and 0.39% was without discussion section. All theses had title, introduction, materials & methods and results. In the Asefzadeh's study in Qazvin [10], 1.4% of theses had no abstract, 5.6% had no literature review, 3.7% had no Introduction, 9.1% lacked a theoretical framework and 7.4% had no purpose section, but in the study of Mirsamady in Iran, all parts are presented [3]. In quantitative examination of different parts of the theses, the highest average scores were respectively related to the table of contents with 97.7±7.3, results with 97.4±6.9, introduction with 93±8.4, title with 91.5±8.6, references with 89.4±9.1, discussion with 87.6±9.1, methods with 76.4±9.3, Persian abstract with 75.6±9.5 and English abstract with 74.1±10.4. In Mirsamady's study in Iran [3], the highest average of scores were respectively related to the title with 14.9 (out of 15), abstract 10.6 (out of 15), introduction with11.6 (out of 15), Method with 75.8 (out of 100), Results with 19.3 (out of 25), discussion with 13.1 (out of 20), references with 7.8 (out of 15) and proposing suggestions and new ideas with 24.5 (out of 45). Moreover in the Asefzadeh's study in Qazvin [10], different parts of the theses have been graded as weak, medium and good and the good results include title (40.7%), table of contents, Persian and English
abstract (10.2%), introduction (13.6%), materials & methods (23.7%), results (32.2%), discussion (3.4%) and references (13.6%). In Mirsamadi’s study in Iran, the percentage of full observance of writing principles for introduction section was 78%, for methods was 75.8%, for results 77.2%, for discussion 65% and for the references list was 52% [3]. The mean obtained by the referee group is 18.9±2.1 that is consistent with the study of Mirsamadi in Iran [3] with the mean of 18.8 and is not consistent with that of Khalili in Qazvin [9] with 19.1. In this study, the discussion section has allocated the mean score of 87.6±9.1, which is one of the weakest parts after the methodology section and is consistent with the results of Mirsamadi in Iran [3] and Sobhani in Gilan [6]. In the accurate survey of the theses it was cleared that the discussion section contained the repeated issues in the results section which were presented in other words. In addition, since there is no correct literature review in most theses, no correct comparisons have been made in the discussion section. Few number of theses have been done in the basic sciences group (12.5%), indicating the gap between basic and clinical departments and that conducting of the theses has been postponed to internship. This can be studied by some other research. Also, to encourage students to do research in these fields, a course of actions should be also done. Considering the comparison of the mean scores in the clinical groups with that of basic sciences, it can be concluded that the basic sciences group pay less attention to the thesis related issues and observing the writing principles than the clinical group. In this study, the theses that had higher scores have significantly resulted in more articles; this emphasizes that when the theses conducted with more scientific principles and more defined methods, will have a greater possibility of publishing. The least frequent type of study is cohort, while the highest percentage of theses conversion to the paper has been observed in this group. Wholly, among the total of theses whose type of study have been determined, it turned out that most studies are observational studies (234 theses) and empirical studies (84 theses) have allocated the least percentage. While the ratio of the conversion of theses to papers is more in empirical studies (38.1% versus 31.6%) and this augments the necessity of more attention and emphasis and creating the necessary conditions for conducting experimental studies. In order to promote the quality of thesis, it is suggested that a similar writing format be developed and apprized to all universities and research workshops and thesis writing courses be held for students. Also, it is better to give special privilege to the theses that their credible articles are published in journals. Comparison between the theses’ page number and the final score reveals the weak relationship between these two variables, but they are inversely related to each other, i.e., by increasing of the theses page number, its total score will decrease, which is not statistically significant. This shows the necessity of students’ more attention to the content and quality of thesis than its quantity.

Conclusion

Overall, the average score of theses writing in the studied university is at the desirable level, but their accurate comparison is not possible due to the presence of different evaluating criteria in the previous articles.

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