Strides Dev Med Educ. 2019 December; 16(1):e66296. doi: 10.5812/sdme.66296.

Published online 2019 April 8. **Research Article**

Study of the Status of Medical Students and Residents' Thesis in Kerman University of Medical Sciences in Terms of Contribution to Scientific Development

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Received 2018 January 15; **Revised** 2018 June 24; **Accepted** 2018 July 01.

Abstract

Background: Dissertations or theses are valuable sources of information, which play an important role in scientific development because of their specific nature and characteristics.

Objectives: The aim of this study was to investigate the status of medical students and residents' dissertations in terms of contribution to scientific development in Kerman University of Medical Sciences.

Methods: This cross-sectional, analytical study examined the status of medical students and residents' dissertations, submitted to the Medical Faculty of Kerman University of Medical Sciences during 2012 - 2015. First, the research deputy of Kerman University of Medical Sciences provided the dissertation information. Then, the information was analyzed in terms of study design, study type, extraction of Persian and English articles, publication in domestic and international journals, and indexing in reputable scientific databases in two groups of medical students and residents' dissertations. SPSS was used for all statistical analyses.

Results: In total, 643 dissertations were studied, including 342 (53%) residents and 301 (47%) medical students' thesis. Overall, 267 (41.5%) dissertations were published as articles in domestic and international journals. The findings showed that 13.4% of articles were indexed in the Scopus database. The mean scores of medical students and residents' dissertations were 19.22 $\pm$ 0.70 and 19.15 $\pm$ 0.85, respectively.

Conclusions: Despite the large number of medical students and residents' dissertations submitted to Kerman University of Medical Sciences, a limited number of dissertations were published as scientific and research papers, and the number of articles indexed in international journals was insignificant. Thesis writing is generally a unique opportunity for students to learn research skills and methods. In addition, publication of thesis findings in domestic and international databases can lead to scientific development.

Keywords: Dissertation, Residents, Medical Students, Kerman University of Medical Sciences

1. Background

Scientific research is an essential activity, which contributes to the development of human knowledge. Through research, we can find reliable solutions to problems by systematic data collection, analysis, and interpretation (1). Today, a significant part of systematic research is conducted in universities and higher education institutions, the main purpose of which is to develop and expand the current level of knowledge, eliminate the ambiguities of previous findings, and finally apply the developed knowledge for human development.

A large part of scientific research is presented as dissertations or theses. Many scientific papers are also extracted from dissertations. Therefore, it can be claimed that dissertations play an important role in the production of new knowledge (2). Among different educational programs, the great role and importance of higher education cannot be ignored. In fact, higher education programs are an important source of scientific development due to the integration of research in education (3).

Dissertations, which are the focal point of curricula in higher education programs, are associated with scientific development (4). Doctoral dissertations are one of the important components of higher education studies and a primary source of scholarly publications in universities (5). These valuable resources not only allow students to complete their educational activities, but also enables them to improve the existing knowledge of their field (4). They are also proper tools for assessing the academic, personal, and clinical skills of students. In addition, presentation of

high-quality dissertations can initiate a series of comprehensive and fundamental research at universities (6).

Higher education dissertations are expected to address problems in a scientific discipline and promote scientific development (7). Therefore, one of the goals of thesis integration in the curriculum of universities is practical application of findings in an actual environment (2); this goal can be achieved by publishing the results of theses in domestic and international databases. Publication of researchers' findings in indexed journals not only shows the scientific value and credibility of these resources to the scientific community, but also presents valuable results to the readers (5) and promotes the current knowledge and scientific production.

Research in different fields of medical and health sciences leads to the development and improvement of medical sciences. Academic research in medical fields and related disciplines, by examining different parameters and their relationships, can lead to scientific development (8). In fact, if medical research is practically applied to make suitable social, political, and health changes, it can result in the promotion of public health (9, 10). One of the driving forces of research in a certain discipline is the practical application of findings reported by researchers. On the other hand, researchers may be discouraged to continue their studies if they assume that their findings are fruitless or impractical.

Application of research findings not only encourages research activities for further scientific progress, but also promotes future studies. One of the major problems in scientific research is disregard for the practical role of dissertations and theses and the distance between the actual and desired states in the country's scientific community (11). One of the reasons for the inapplicability of thesis findings is non-publication of data (12). Generally, there is a large gap between research and practice, the cause and extent of which are not precisely identified (13).

In Iran, there is a large gap between research and practice. A large number of studies with different designs and formats are conducted annually, the results of which may be archived. Also, the findings of some dissertations can be only found in libraries and remain unpublished. Consequently, other scholars are not introduced to the results of these studies, thereby increasing the possibility of duplication. Due to non-publication, not only new knowledge is not developed, but also considerable time and money are wasted on repetitive research. Also, a large part of governmental funding and a significant amount of faculty members' time and resources are squandered (12).

According to the assessment of dissertations, the gap between research and practice is noticeable. Evaluation of 318 dissertations, submitted by the graduates of a medical sciences university in Iran, showed that only 106 dissertations were published (8). Moreover, among 516 residents' theses in herbal medicine, submitted to pharmaceutical schools, only 38 articles were extracted and published in reputable Persian journals (14). Also, study of theses written by the medical students of French universities showed that only 17% of the articles were published in reputable scientific journals (15). In another study from Spain, the number of articles extracted from doctoral dissertations on anesthesiology was limited in journals with international readership (16).

2. Objectives

With this background in mind, the aim of this study was to investigate the status of medical students and residents' dissertations, submitted by the medical students of Kerman University of Medical Sciences, in terms of contribution to scientific development. In addition to examining the status of dissertations in terms of characteristics, such as type and design, publication percentage and indexing of Persian and English dissertation articles in domestic and international journals were also investigated.

3. Methods

This cross-sectional, analytical study was carried out using content analysis method to determine the status of medical students and residents' dissertations, submitted to Kerman University of Medical Sciences, in terms of contribution to scientific development. For this purpose, all medical students and residents' dissertations, which were submitted by the students to the research deputy of Medical Faculty of Kerman University of Medical Sciences during 2012 - 2015, were reviewed.

The content analysis method is generally used to examine the conveyed messages in a text. In this method, the explicit content and messages are described both systematically and quantitatively (17). It is also a systematic and replicable assessment of communication symbols, which attributes numerical values to the text and then evaluates the relationships between these values, using appropriate statistical methods (18).

At first, the required data (thesis-related) were obtained from the deputy of research of Kerman University of Medical Sciences. Then, the following information related to dissertations was recorded in the data collection form: study design (e.g., basic, applied, and population-based research and basic-applied); study type (e.g., patient assessment, cross-sectional, case-control, cohort, interventional, clinical trial, experimental, and health system man-

agement); publication rate of Persian and English dissertation articles; publication in domestic and international journals; indexing in reputable databases (e.g., PubMed, Scopus, ISC, Embase, Index Copernicus, and ISI); and publication of articles in educational subcategories.

Finally, the data were analyzed in SPSS version 16 (SPSS Inc., Chicago, IL, USA), using descriptive statistics (frequency, relative frequency, mean, and standard deviation) and analytical tests (chi-square and independent *t* test). The results were compared in the medical students and residents groups. Also, the dissertation score and impact factor were compared between the two groups.

The present study was approved by the Ethics Committee of Kerman University of Medical Sciences (IR.KMU.AH.REC.1395.17).

4. Results

In this study, a total of 643 dissertations, submitted to the medical school of Kerman University of Medical Sciences, were reviewed. Overall, 301 (47%) medical students' thesis and 342 (53%) residents' dissertations were included in our analysis. The majority of dissertations (n, 279; 43.7%) involved applied research, and the minority (n, 35; 5.5%) were community-based.

In terms of research method, there was a significant difference between the groups of medical students and residents' dissertations (P = 0.011). Most of the dissertations had a cross-sectional design (n, 290; 45.3%), followed by the interventional design (n, 142; 22.2%). The findings showed that residents did not use the health system management method. There was also no significant difference between the two groups in terms of study type (P = 0.069).

In total, the results of 267 (41.5%) dissertations were reported as articles. Persian articles were extracted from 118 (18.4%) dissertations, including 40 (13.3%) medical students and 78 (22.8%) residents' dissertations; there was a significant difference between the two groups (P = 0.002). The findings showed that 148 (23%) articles were written in English, including 34 (11.3%) medical students and 114 (33.3%) residents' dissertations; there was a significant difference between the two groups (P = 0.001).

Based on the findings, 220 (34.2%) articles were published in domestic journals and 47 (7.3%) articles were published in international journals. There was a significant difference between medical students and residents' dissertations in terms of publication in domestic journals (P = 0.001), whereas there was no significant difference regarding publication in international journals (P = 0.244) (Figure 1).

The highest number of articles (59 articles, 9.2%) was published in the "Journal of Kerman University of Medical Sciences", followed by the "Journal of Addiction and Health" (22 articles, 3.4%). Moreover, the frequency distribution of articles with regard to medical subspecialty indicated that 22.6% of the articles were related to internal medicine, followed by pediatrics (84 articles, 13.1%) and obstetrics (64 articles, 10%). The lowest number of articles was related to urology (8 articles, 1.2%) (P = 0.001).

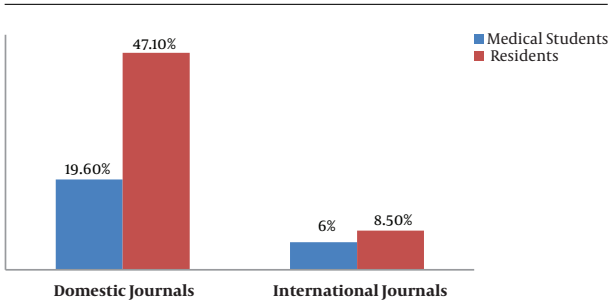

Figure 1. The frequency distribution of dissertations based on publication in domestic and international journals

Most extracted articles (86 articles; 13.4%) were indexed in Scopus, and the lowest number of articles (4 articles, 0.6%) was published in the Index Copernicus. There was a significant difference between medical students and residents' dissertations regarding indexation in Scopus, PubMed, and ISI databases (P = 0.001), while there was no significant difference in terms of indexing in ISC (P = 0.133), Embase (P = 0.228), and Index Copernicus (P = 0.257) (Figure 2).

The mean medical students and residents' dissertation scores of the students were 19.22 $\pm$ 0.70 and 19.15 $\pm$ 0.85, respectively; no significant difference was found between the two groups (P = 0.263). Overall, 53.6% of the articles were published in journals with an impact factor; the mean impact factor was 0.81 $\pm$ 0.65. Also, the mean impact factor of journals publishing medical students and residents' dissertation articles was 1.00 $\pm$ 0.66 and 0.76 $\pm$ 0.06, respectively; however, the difference was not significant (P = 0.346). The mean impact factor was the highest in the neurosurgery group (0.70 $\pm$ 0.12) and the lowest in the internal medicine group (rheumatology) (0).

5. Discussion

One of the most important activities of medical universities is the production of knowledge through research in different branches of medical sciences, which can lead to scientific progress, as diagnostic, therapeutic, and managerial decisions can be made based on research findings. Dissertations comprise the most important part of research activities in medical universities. Publication of

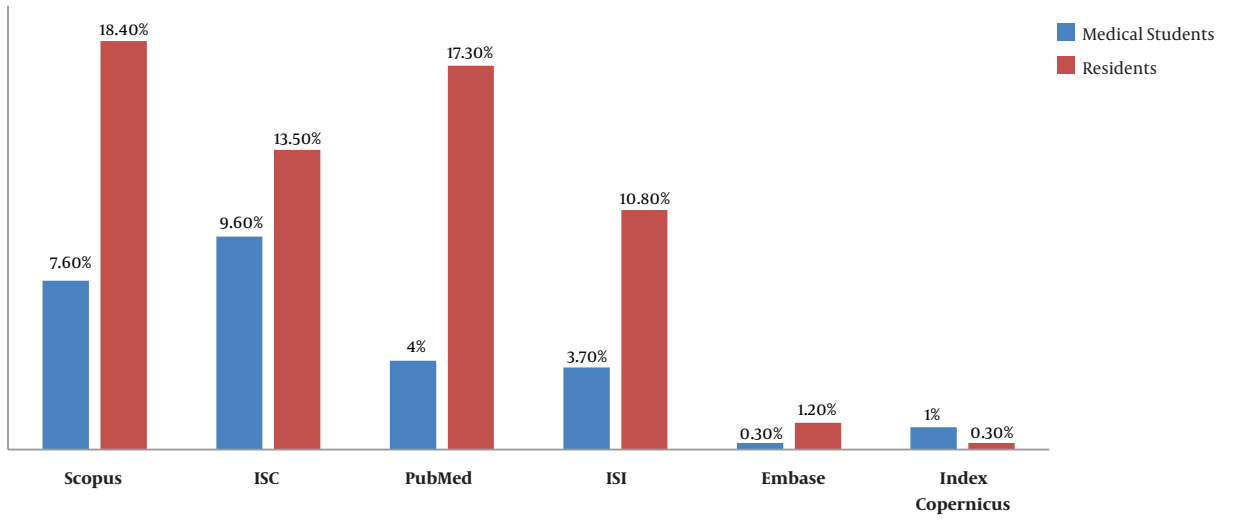

Figure 2. Frequency distribution of dissertations with regard to indexing in scientific databases

the results of these activities can expand the boundaries of knowledge and increase the recognition of scholars.

In the present study, review of 643 dissertations submitted to Kerman University of Medical Sciences showed that 267 (41.5%) dissertations were presented as articles. Analysis of the results of clinical studies indicates the low number of publications from dissertations in the literature (5, 9, 19). In this regard, analysis of residents studies in 39 universities between 2000 and 2010 showed that 47.6% of theses had no important publications (19). According to a study by Dhaliwal et al., the researcher's high workload and educational responsibilities, routine professional tasks, and financial problems are among the barriers to publishing the results of dissertations (20).

While these valuable information sources are used for educational purposes in curriculum development, publication of results as articles can improve the students' research and writing skills (21) and help the research community to identify the strengths and weaknesses of graduate-level research (22). In addition, with the publication of dissertation articles, the results of studies are presented to potential users (physicians or researchers), leading to the development of knowledge in a particular field. These articles can help prevent and control diseases and improve public health by introducing the causes of diseases and their treatment strategies.

Assessment of the status of research projects carried out at Tehran University during 2004 - 2006 showed that the results of most projects (62%) were published in domestic journals (23), which is inconsistent with the present findings. The cause of discrepancy between the results is that researchers usually aim at publishing their findings from the beginning of the project (before research funding), while in case of residents' dissertations, students and professors may only consider them as part of the syllabus (23). On the other hand, lack of time, unfamiliarity with the methods of article writing, lack of funding, low impact of dissertations and articles on career prospects, and participation in residence training, may discourage the students and professors from writing an article.

One of the important factors for scientific communities regarding research activities, including dissertations, is the use of appropriate research methods, which can improve the effective role of dissertations (7). In this study, most dissertations used a cross-sectional design, while in the study by Poursani and Aminpour, the applied method was predominant (24). Overall, in most studies, the highest frequency was attributed to the cross-sectional design (22, 25-27). This design is mostly selected because it is somewhat cost-effective, safe, and simple (21).

As the results of the present study indicated, the interventional design was used in 22.2% of the dissertations. In this regard, according to the content analysis of doctoral dissertations in social services submitted to the University of Florida, 13.49% of theses engaged in interventional research (28). In a similar study from Egypt, interventional research was reported in 5% of theses (21). Generally, this type of research requires more time, experience, and financial resources (21).

Scientific development in every country is indicative of its contribution to the international scientific community. Therefore, the mere increase in scientific de-

velopment and restricted publication in domestic journals cannot improve the country's status in the international scientific community or support sustainable development. Nonetheless, publication of scientific articles in international journals or submission of articles to reputable databases can help achieve this goal (29).

One of the most important indicators of scientific and cultural development in every country is publication of scientific research in international journals (30). Based on the results of the present study, 34.2% of the articles were published in domestic journals and 7.3% in international journals, which is consistent with previous research (21, 31). In this regard, the findings of a previous study showed that 68.9% of theses submitted to Suez Canal University of Egypt were published in domestic journals, while 31.1% were published in regional/international journals (21).

Furthermore, the majority of dissertations (80%), submitted to a Peruvian medical school, were published in Spanish and Peruvian journals, while 17 (20%) dissertations were published in international journals (31). According to a study by Van Teijlingen and Hundley, journals are selected by scholars with respect to factors, such as scientific audience, gap between article submission and subsequent publication, and journal's scientific level, which is often assessed by impact factor (32).

The present study revealed the regional publication pattern of the evaluated dissertations. The highest number of articles (9.2%), extracted from medical school dissertations, was published in the "Journal of Kerman University of Medical Sciences". In a similar study, the "Medical Journal of Peru University" published about one-third of dissertations, submitted to a Peruvian Medical School (31). One of the reasons for this finding might be the familiarity of students with university journals. On the other hand, students may not be familiar with other similar journals to publish their articles. Overall, publication of the results of research activities, research projects, and dissertations in reputable journals plays an important role in documenting human knowledge and recognition of scholars at international levels.

Internal medicine is a medical specialty, which enables the practitioner to prevent, evaluate, diagnose, treat, and follow-up diseases through promoting his/her knowledge, skills, attitudes, and behaviors. In this specialty, the main objective is to train professionals who can provide the highest level of care, diagnosis, and evidence-based treatment for patients and contribute actively to medical education, science production, research, and medical ethics. Based on our findings, most published articles were related to internal medicine in the current study.

Considering the important role of internal medicine experts in the health system, the increasing need of Iran and neighboring countries for these experts, and academic association of this field with other internal medicine subspecialties, it is essential to publish the results of conducted studies for promoting the level of education and research, and consequently, patient treatment and community health. In a study by Alishri et al., the highest number of dissertation articles was reported in the neurosurgery group (66.7%), followed by the general surgery (15.7%) and internal medicine (7.5%) groups (8).

Most dissertation articles (86 articles; 13.4%) were indexed in Scopus, followed by ISC (11.7%) and PubMed (11%); nevertheless, similar studies have reported higher rates (20, 21, 33). The publication rate of articles from dissertations, submitted to Angers Medical School in France, was reported at 16% in PubMed journals (33) and 13.3% in the study by Nour-Eldein et al. (21). Moreover, in the study by Dhaliwal et al., the publication rate of dissertation articles in PubMed journals was estimated at 30% (20).

Publication of articles in PubMed journals can be related to the scope of the journal and quality of submitted articles (21). Medical databases, such as PubMed, can provide access to the latest research findings in areas of treatment and diagnosis in all medical disciplines and related sciences. In fact, publication of articles in these databases can increase the recognition of scholars in scientific communities and expand the knowledge boundaries (20).

The results of the present study showed that the mean scores of medical students and residents' dissertations were 19.22 ± 0.70 and 19.15 ± 0.85, respectively. In another study, the mean total score of dissertations by medical graduates was 18.86 ± 2.10 in one of the medical sciences universities of Iran (8). In another study by Rezakhani Moghadam et al., the mean assessment scores of medical students and residents' dissertations in health education, submitted to Tehran University of Medical Sciences, Tarbiat Modares University, and Iran University of Medical Sciences, were 88.28 and 90.84, respectively (11). These results are inconsistent with the findings of our analysis, and there was no significant difference in the scores.

5.1. Conclusions

Publication of the results of dissertations, as valuable research resources, in reputable domestic and international databases can be effective in promoting the scientific level of the community. According to the review of medical students and residents' dissertations submitted to Kerman medical school, less than half of the dissertations were published as articles. However, the rate of publication in international journals was lower than domestic journals. Indexation of these articles in scientific databases was also insignificant; Therefore, it is suggested

to publish the results of dissertations as articles in reputable journals and consider the presented information in these dissertations. Overall, these valuable sources of information are becoming more and more available to potential readers and promote the country's status in the international scientific community. In addition, one of the main goals of postgraduate studies (Master's and doctoral degrees) is to familiarize students with the principles of scientific research. Through independent research and presentation of dissertations, students can implement these scientific principles in practice. In fact, the skills that students acquire in these programs determine their future research activities.

5.2. Recommendations

Based on our findings, the following activities are recommended: (1) holding training workshops on research methodology and article writing for university professors and students to improve the quality of articles and dissertations; (2) giving special credit to students for publishing articles in domestic and international journals; (3) review of the strengths and weaknesses of dissertations and attempts to resolve them; (4) providing facilities and financial resources for publishing the results of dissertations; and (5) evaluation of the causes of non-publication.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

Acknowledgments

The present study was extracted from a thesis in general medicine, approved by the Faculty of Medicine of Kerman University of Medical Sciences. We would like to thank all the people who cooperated with us in this study.

Footnotes

Conflict of Interests: Authors mention that there is no conflict of interests in this study.

Ethical Approval: IR.KMU.AH.REC.1395.17.

Funding/Support: It is not declared by the authors.

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