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The INVESTIGATION OF THE CORRELATION RATE OF THE KEYWORDS OF PERSIAN ARTICLES IN MEDICAL JOURNALS WITH MEDICAL PERSIAN THESAURUS DURING THE YEARS 2008 AND 2009

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ABSTRACT
The purpose of the present research is to investigate the correlation rate of the keywords in the published articles during the years 2008 and 2009 in Persian medical journals with medical Persian thesaurus. This research is of descriptive and content analysis type and the statistical population includes 1005 keywords from 269 published articles in 58 Persian medical journals with scientific-research degree of 1 & 2 from the commission of the country's medical journals (The Ministry of Health, Treatment, and Medical Education) from the beginning of 2008 until the end of 2009. The data gathering tool is a researcher-made checklist. After the comparison of the keywords of articles of Persian medical journals with the Persian medical Thesaurus, the findings of the research showed that there exist altogether, in two areas of Basic and Clinical sciences, 38.5 percent of total correlation, 41 percent relative correlation, and 20.5 percent the lack of correlation among the key words. There is no significant difference between the two investigated areas regarding the total correlation and the lack of correlation among key words of articles in the Persian medical journals with the Persian Medical thesaurus while there is significant difference between the two areas regarding the relative correlation. Furthermore, the findings of the research demonstrated that the relative correlation of the keywords of articles in Persian medical journals with the Persian medical thesaurus is more than the total correlation.

Keywords: Key Words; Persian Medical Articles; Persian Medical Journals; Persian Medical Thesaurus.

INTRODUCTION
The production of science is emerged in a scientific article at first and its dissemination is started from a scientific journal. The publication of scientific journals is one of the most important indices of the development of science and knowledge in any country of society because information published in the Journals is the basis of the formation of many researches. Scientific journals are one of the important tools in keeping every scientific field up to date and they are also regarded as scientific information retrieval tools.

One of the most important goals of LIS (Libraries & Information Services) is to help the intelligence community to retrieve information they need and regarding the importance of the storage and information retrieval in the present world, the information storage and retrieval tools are very crucial. The keywords used in articles are considered as one of these crucial tools.

In the present era, from one side the increasing growth of scientific information and the development of research areas in different sciences such as medical sciences and from the other side the necessity of saving time and costs for the researchers of medical sciences, with regard to job sensitivity and their great responsibility in solving health and treatment problems of society, necessitate them fast and comprehensive access to special information and this fact confirms the emergency of the existence of thesauruses that are of information storage and retrieval tools (Asadi, 2007). The Persian Medical Thesaurus has an important role in the developed systems of storage and information retrieval, the reduction of the retrieved information recall and increase precision rate of the retrieved information, and the reduction of searching time of the retrieved information.

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Today, due to the increase in medical periodical titles in medical area, matching medical titles and keywords with the information needs in accord to the content of documents is very necessary to let the searchers of the medical information find the most relevant contents in the least time. One of the problems of the information retrieval in electronic information systems is the selection of keywords both by the author of provider in the storage of information and by the users in the information retrieval.

In the time of retrieval, users search the information they need based on the keywords they have in mind. As a result, if there is no congruence and harmony in these two stages, this will lead to a lack of retrieval in most of the stored information. These problems have long been solved to some extent by the utilization of thesauruses. However, due to the peculiar nature of the concept, function, and applications of thesauruses to professionals in the fields and inattention, lack of interest, and lack of spending of proper time by the indexers when writing articles, information storage and retrieval problems still remain in their place (Hosseini and Rahadoost, 2006).

Despite the importance of thesauruses in the advanced information storage and retrieval systems and despite the fact that more than three decades have passed since the formation and growth of thesauruses, there has not been a research particularly dealing with the evaluation of the articles in scientific-research journals of the medical sciences universities of the country regarding the correlation rate of the keywords present in the articles with the Persian medical thesaurus.

In this regard, the main goal of this research is to investigate the correlation rate of the keywords of Persian articles in medical journals with medical Persian thesaurus during the years 2008 and 2009.

Review of the Literature

Frost (1989) dealt in a study to the examination of the overlap between headings chosen from the LCSH (Library of Congress Subject Heading) and words derived from the title in the library catalog of the University of Michigan. The findings showed that 73% of the words of titles overlap with all or at least part of headings or subdivisions. Furthermore, in 11% of the cases, words in title are exactly the same as in the heading and in more than 53% of the cases, words overlap with at least one word from the heading.

Wise (1989) compared subject headings with words from the newly released books in order to measure the updating of Congress subject headings. He had three-degree comparison criteria: 1- full implementation, 2- matching part of the heading; 3- incompatibility. His research showed full implementation of 41%, 52% of relative matching, and the incompatibility of 8% (Quoted from: Bozorgi, 1998).

Muddamalle (1998), regarding the different functions of two methods if natural language and the controlled vocabulary in information retrieval, suggested a mixture of them for doing searches.

The results of the research of Murphy *et al.,* (2003) showed that most of the indexers had not been familiar with the controlled vocabulary in the area of Neurological disorders.

Gross and Taylor (2005) dealt in a research titled "What Do We find, What Have We Got to Lose?" with the investigation of the effect of the usage of controlled vocabulary in the results of the 'keyword' searches. The results demonstrated that more than one third of the retrieved records by keyword searches are found via subject headings and in case of the lack of subject headings, sometimes the user may not retrieve more than %80 of the records.

Theodosiou *et al.,* (2006) dealt in a research with the investigation of the correlation of the keywords of biomedical articles with medical subject heading terms. The obtained statistics from this research showed that the rate of correlation between medical subject heading terms and the keywords selected by authors is averagely high.

Gil-Leiva and Alonso-Arroyo (2007) found out in their research that more than 46 percent of the keywords used by the authors in the areas of physics and engineering, agriculture, and sciences and information technology are matched with the descriptors used in data bases.

The findings of the research done by Liu (2009) demonstrated that the subject knowledge is of lingual skills in the searches of more important special topics.

Neveol *et al.,* (2010) have concluded, from an investigation of about 300 keywords used by indexers that more than % 60 of keywords appropriated by authors match with the terms used in the relevant index.

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In Iran as well Jokar and Anvari (2006) dealt with the analysis of 30 topics related to library and information from Books in Print (BIP) random in case of use from natural or controlled language in order to retrieve information from online bibliographic databases. The results showed that the retrieval of the natural language search is more than that of the controlled subject approach and in order to gain comprehensive records in subject searching in online bibliographic databases, a combined approach from both approaches of natural and controlled language should be taken in use.

Fatahi and Arasto (2007) dealt in a research with the investigation of the correlation rate of Persian subject headings with the keywords used in topics and table of contents of Persian books in the fields of the humanities, social sciences, and applied and pure sciences. 472 works were selected from among 88459 books as the sample and their keywords and tables of contents were derived. After comparing the keywords with their tables of subject headings, it came out that:

- Regarding the perfect correlation with title keywords and subject headings Farsi books and Farsi table, there were no significant differences between subject areas studied.
- Regarding the relative correlation and the lack of correlation between Farsi subject headings with topic's keywords and book's tables of contents, there were no significant differences between subject areas studied.
- Regarding the perfect correlation and the relative correlation between Farsi subject headings with topic's keywords and book's tables of contents, there were no significant differences between subject areas studied.
- Regarding the lack of correlation of topic's keywords with keywords of tables of contents, there were significant differences between subject areas studied.
- Regarding the lack of correlation of topic's keywords with keywords of tables of contents, there were no significant differences between subject areas studied.

Researches that have been mentioned in the literature show that most of what the researches done have dealt with the controlled vocabularies by subject headings and thesauri for efficient information retrieval. The results of some of the researches demonstrated that retrieval based on the indexer's keywords have averagely better results for users compared to using those of the subject headings (controlled vocabulary). Although some researchers believe that a combination of both approaches is favorable for the information retrieval. As a result, more researches are needed to be done about all scientific areas to be able to present, clarifying the subject matter, better scientific suggestions for the improvement of this process and maximizing the results of the retrieval of the stored information.

It should be mentioned that in this research the perfect correlation, relative correlation, and the lack of correlation among the keywords are investigated that each of them will be briefly explained.

Perfect Correlation: it is referred in this research to the keywords that exactly exist in the thesaurus, or they differ in being singular or plural, or they have had different spelling such as Keyword "orthodontic" descriptors "orthodontics".

Relative Correlation: it is referred in this research to keywords that are written in the thesaurus with thin letters and have had the reference "use it" and/or some keywords that are accepted in the thesaurus but have had a number of keywords more or less than the related keywords and in fact a part of the keyword has been similar with the thesaurus and also the keywords with their resembling have been present in the thesaurus such as: the keyword "Cataract" that is not accepted in the thesaurus and has guided the referrer with the reference "use it" to the accepted descriptor "Cataracts".

The lack of Correlation: it is referred in this research to the keywords that have not been present in the Farsi thesaurus. Here, it is referred to some the most important researches done in and outside of the country which are in a way related to the subjects presented in this study.

Research's Questions

1- How is the frequency of the number of keywords present in each article?

2- How is the perfect correlation rate between keywords in articles of Persian Medical journals and Persian Medical thesaurus in the investigated fields?

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3- How is the relative correlation rate between keywords in articles of Persian Medical journals and Persian Medical thesaurus in the investigated fields?

4- How is the lack of correlation between keywords in articles of Persian Medical journals and Persian Medical thesaurus in the investigated fields?

5- How is the rate of usage by authors in basic sciences and clinical areas for identifying key words from articles in Persian medical journals from Persian Medical Terminology?

Research Hypotheses

1- There exists a significant difference between perfect correlation of the keywords in articles of Persian medical journals and Persian medical thesaurus in two areas of basic and clinical sciences.

2- There exists a significant difference between relative correlation of the keywords in articles of Persian medical journals and Persian medical thesaurus in two areas of basic and clinical sciences.

3- There exists a significant difference between the lack of correlation of the keywords in articles of Persian medical journals and Persian medical thesaurus in two areas of basic and clinical sciences.

MATERIALS AND METHODS

Methodology

The method of research is content analysis and data "chi-squared test" is used to analyze the data via descriptive statistics due to non-normal distribution of data. The statistical population includes 1005 keywords from 269 published articles in 58 Persian medical journals with scientific-research degree of 1 & 2 from the commission of the country's medical journals (The Ministry of Health, Treatment, and Medical Education) from the beginning of 2008 until the end of 2009. Sampling is done randomly sampling based on the formula for the cross-sectional studies. Data gathering tool is a researcher-made checklist that included information such as: journal title, article title, and subject area of the article (basic sciences or clinical sciences), article's publication year, the number of keywords is perfectly correlated with the thesaurus, the number of keywords is relatively correlated with the thesaurus, the number of keywords is not correlated with the thesaurus. Validity of the checklist is confirmed by experts in the field of librarianship as a tool to measure the correlation rate of keywords of articles in Persian medical journals with Persian medical thesaurus.

Analysis of Research Data

First Question

In responding to the question number one of this research considering frequency of the number of keywords present in each article, results are shown in table (1).

Table 1: Frequency Distribution and Percentage of Articles with the Number of Keywords in each Article

Number of Keywords	Number of Articles	Percentage in Proportion to the total Number of Articles
2	3	1.1
3	101	37.6
4	101	37.6
5	37	13.7
6	20	7.4
7	4	1.5
8	2	0.7
14	1	0.4
Total	269	100

Table 1 show that the total number of articles in Persian medical journals is 269 articles of which three and four-keyword articles have the most percentage (37.6), and 14-keyword articles have the least percentage (0.4).

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Second Question
The results of responding the second question of the research regarding the perfect correlation between keywords of articles in Persian medical journals and Persian medical thesaurus is presented in Table (2).

Table 2: Frequency Distribution of the Perfect Correlation between Keywords of Articles in Persian Medical Journals and Persian Medical Thesaurus

Area	Number of Keyword	Percentage
Basic Sciences	210	54.3
Clinical Sciences	177	45.7
Total	387	100

The findings of this part of the research represent that totally a number of 387 keywords from 1005 keywords of articles in Persian medical journals have perfect correlation with Persian medical thesaurus of which 54.3 percent is related to the basic sciences and 45.7 percent is related to the clinical sciences.

Third Question
The results of responding the third question of the research regarding the relative correlation between keywords of articles in Persian medical journals and Persian medical thesaurus is presented in Table (3).

Table 3: Frequency Distribution of the Relative Correlation between Keywords of Articles in Persian Medical Journals and Persian Medical Thesaurus

Area	Number of Keyword	Percentage
Basic Sciences	233	56.3
Clinical Sciences	181	43.7
Total	414	100

The findings of this part of the research represent that totally a number of 414 keywords from articles in Persian medical journals have relative correlation with Persian medical thesaurus (about 41 percent) of which 56.3 percent is related to the basic sciences and 43.7 percent is related to the clinical sciences.

Fourth Question
The results of responding the fourth question of the research regarding the lack of correlation between keywords of articles in Persian medical journals and Persian medical thesaurus is presented in Table (4).

Table 4: Frequency Distribution of the Lack of Correlation between Keywords of Articles in Persian Medical Journals and Persian Medical Thesaurus

Area	Number of Keyword	Percentage
Basic Sciences	96	47
Clinical Sciences	108	53
Total	204	100

The findings of this part of the research represent that totally a number of 204 keywords from articles in Persian medical journals do not have any correlation with Persian medical thesaurus (a little more than 20 percent) of which 47 percent is related to the basic sciences and 53 percent is related to the clinical sciences.

Fifth Question
The results of responding the second question of the research regarding the rate of use by the indexers of Basic and clinical sciences fields from Persian medical thesaurus for determining the keywords for articles in Persian medical journals are presented in Table (5).

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Table 5: Frequency Distribution of the Rate of Different Levels of Correlation of Keywords with Persian Medical Thesaurus in each Studied Areas

AREA	Perfect Correlation		Relative Correlation		Lack of Correlation		Total	
	No. of KW*	%	No. of KW	%	No. of KW	%	No. of KW	%
Basic Sciences	210	39	233	43	96	18	539	100
Clinical Sciences	177	38	181	39	108	23	466	100

*Number of Keyword

From the total 1005 keywords, 539 keywords (%53.6) are related to the area of basic sciences and 466 keywords (%46.4) are related to the area of clinical sciences. Totally, from the sum of keywords of basic and clinical sciences (387 keywords), 38.5 percent of keywords have perfect correlation with Persian medical thesaurus. From the sum of keywords of basic and clinical sciences, 414 keywords or 41 percent of keywords have relative correlation with Persian medical thesaurus and from the sum of keywords of basic and clinical sciences 204 keywords or 20.5 percent of keywords have no correlation with Persian medical thesaurus.

First Hypothesis: There exists a significant difference between perfect correlation of the keywords in articles of Persian medical journals and Persian medical thesaurus in two areas of basic and clinical sciences.

The first hypothesis is investigated by statistical 'chi-squared test' in statistical error level of 5 percent and it indicates that there does not exist a significant difference between perfect correlation of the keywords in articles of Persian medical journals and Persian medical thesaurus in two medical areas of basic and clinical sciences ($P>0.05$, $P=0.364$) and consequently the first hypothesis is rejected.

Second Hypothesis: There exists a significant difference between relative correlation of the keywords in articles of Persian medical journals and Persian medical thesaurus in two areas of basic and clinical sciences.

The second hypothesis is investigated by statistical 'chi-squared test' in statistical error level of 5 percent and it indicates that there exists a significant difference between relative correlation of the keywords in articles of Persian medical journals and Persian medical thesaurus in two medical areas of basic and clinical sciences ($P<0.05$, $P=0.020$) and consequently the second hypothesis is confirmed.

Third Hypothesis: There exists a significant difference between the lack of correlation of the keywords in articles of Persian medical journals and Persian medical thesaurus in two areas of basic and clinical sciences.

The third hypothesis is also investigated by statistical 'chi-squared test' in statistical error level of 5 percent and the findings indicate that there does not exist a significant difference between the lack of correlation of the keywords in articles of Persian medical journals and Persian medical thesaurus in two medical areas of basic and clinical sciences ($P>0.05$, $P=0.500$) and consequently the third hypothesis is rejected.

DISCUSSION AND CONCLUSION

Keywords are the forehead of the articles present in journals and if they are exactly, harmoniously, and based-on-thesauruses selected, they can perfectly improve the process of storing and retrieving information. Therefore, the interaction between beneficiary individuals in the process of production, storage, and retrieval of information and creating harmony and congruity, as much as possible, can lead to the improvement of the results of seeking and to the promotion of the function of information databases and the improvement of the function of the searchers.

First Question

As it is mentioned in the Findings Section, the number of keywords of articles in Persian medical journals is not harmonious and it has a scattered distribution in a way that some articles have the minimum and some have the maximum number of keywords.

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Second Question

Results from 38/5 percent of perfect correlation between the keywords of articles of Persian medical journals with the Persian medical Thesaurus showed that the experts of the field of clinical sciences compared to the experts of basic sciences have had less attention to the use of the Persian medical thesaurus in the determination of keywords that this itself can be resulted from their busy work in hospitals and clinics and their shortage of time for taking part in training courses for getting familiar and getting to use Persian medical thesaurus. In the researches done by Frost (1989) it was seen that in 11 percent of the cases the title words were exactly similar with the headings, Gross and Taylor (2005) also found out that in more than one third of the retrieved records by keyword searches are found via subject headings and Theodosiou, Angelis, and Vakali (2006) found out in their research with the rate of correlation between medical subject heading terms and the keywords selected by authors is averagely high. Gil-Leiva and Alonso-Arroyo (2007) found out in their research that more than 46 percent of the keywords used by the authors are seen in the descriptors. The results of the research by Neveol, Dogan, and Lu (2010) showed that author's keywords have been increasingly accessible in biomedical articles and there is a relationship between more than % 60 of keywords appropriated by authors and the terms used in the relevant index. As a result, the percentage of matching in the present research is lower compared to those of the previous researches. In the research done by Fatahi and Arasto Pour (2007), a significant difference was observed regarding the perfect correlation between Persian subject headings with the keywords used in titles among different areas.

Third Question

The result of findings about 41 percent of the relative correlation that exists between keywords in articles of Persian Medical journals and Persian Medical thesaurus is similar to perfect correlation in two areas of basic and clinical sciences. In this regard, Frost (1989) has found in his research that in more than 53 percent of the cases title words overlap at least with one word from the heading and the research by Wise (1989) showed the figure 52 percent. There was not seen any significant difference regarding the relative correlation between Persian Subject Headings and title keywords and tables of contents of Persian book in the research done by Fatahi and Arasto (2007).

Fourth Question

According to the results of findings, a rate of a little more than 20 percent of keywords of articles in Persian medical journals does not have any correlation with Persian medical thesaurus that naturally from this numbers the share of the experts of the field of clinical sciences is more regarding the use of Persian medical thesaurus in order to determine keywords. Maybe one of the reasons of this condition is the lack of cooperation on the experts of this field in sending common professional terms in their own area to the office of Persian medical thesaurus or maybe based on the opinion of Murphy *et al.,* (2003), unfamiliarity of this group of indexers with the controlled vocabulary is the reason. Or maybe according to the opinion of Liu (2009), medical experts due to the subject knowledge they have, do not feel any requirements to the aspects of lingual skill because of their dominance or attention. This part of the findings, compared to those of the research by Wise (1989) that had reported the lack of correlation about %8, is more than twice. In this regard, the research by Fatahi and Arasto (2007) showed that regarding the lack of correlation of Persian Subject Headings with title keywords and tables of contents of Persian book, there is no significant difference.

Fifth Question

The results of responding the second question of the research regarding the rate of use by the indexers of Basic and clinical sciences fields from Persian medical thesaurus for determining the keywords for articles in Persian medical journals indicated that among the articles under study, the percentage of relative correlation of words used by writer of articles with the thesaurus have been more than the percentages related to perfect correlation or the lack of correlation. The reason of higher percentage of the relative correlation may be assigned to the problems that are present on the way of publication of new editions of the Persian thesaurus as a consequence of which this information resource is not constantly updated. In addition, most of the authors of articles, who are experts in their own subject areas, use the

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terms common among themselves more frequently than Persian medical thesaurus for deriving keywords. Comparing with previous works, it can be referred to the research done by Wise (1989) that has reported the rate of updating of Congress Subject Headings compared to the words of the newly released books in the form of perfect correlation about 41 percent, relative correlation 52 percent, and the lack of correlation of 8 percent. Frost (1989) has reported 11 percent perfect correlation and 73 percent relative correlation. Murphy *et al.,* (2003) also introduced the biggest problem in searches as the lack of harmony among the terms used by writers, indexers, and seekers and according to their opinion; most of the writers are not familiar with the words used in thesauruses or Subject Headings in different subject areas. Gross and Taylor (2005) have observed about 34 percent of perfect correlation between the keywords determined by the authors of articles and the controlled vocabulary that is the thesaurus. But some researchers have reported better results; for example, Theodosiou *et al.,* (2006) found out that there is a high correlation between medical heading terns and the keywords selected by the authors of medical articles. Neveol *et al.,* (2010) have also reported that more than 60 percent of author's keywords are correlated with the words in the thesaurus. Although the grounds of the research of Fatahi and Arasto (2007) is to some extent different from that of the present research which this distinction may have been resulted from the differences of medical subject areas with humanity, social areas and/or different areas of study, which is keywords of the articles in comparison with the title keywords and tables of contents of books. Maybe it is possible to deduce from the existence of a significant difference and maybe it requires more extended researches. Furthermore, Liu (2009) concluded that subject knowledge is much more important than lingual skills in specialty subject searching and will lead to the proximity of the searcher's language and the controlled language. Of course on the contrary, Muddamalle (1998) and Jokar and Anvari (2006) have concluded that information retrieval will be with more favorable results with a combination of the controlled language (thesaurus or Subject Heading) and the natural language.

First Hypothesis
Regarding the first hypothesis of the research, the results demonstrated that subject areas (Basic and Clinical) have not had any effects on the rate of perfect correlation of keywords with Persian medical thesaurus. In other words, it cannot be said that in what subject areas the rate of perfect correlation is higher. In this regard, Fatahi and Arasto (2007) have reached to a different conclusion in their research in which regarding the perfect correlation of Persian Subject Headings with title words and tables of contents of Persian books there is being seen a significant difference between different subject areas (social sciences, humanities, pure sciences, applied sciences). The reason of the difference between the areas can be due to the difference in classification of the gathered data and more specialties in the investigated areas.

Second Hypothesis
Regarding the second hypothesis of the research, the results demonstrated that relative correlation between keywords of articles in Persian medical journals and Persian medical thesaurus is more in the area of basic sciences than that of the area of clinical sciences. Therefore, it can be said that the subject areas (basic and clinical) have had effects on the rate of relative correlation of keywords with Persian medical thesaurus. In this regard, Fatahi and Arasto (2007) have reached to a different conclusion in their research in which regarding the relative correlation of Persian Subject Headings with title words and tables of contents of Persian books there is not a significant difference between different investigated subject areas. It is possible to say that the difference between the present research and the mentioned research is resulted from the type of document (article and book) or it can be due to the difference in classification of the gathered data and more specialties in the investigated areas.

Third Hypothesis
Regarding the last hypothesis of the research, it cannot be said that in what area the writers of the Persian medical thesaurus have acted more successfully. In this regard, Fatahi and Arasto (2007) have concluded in their research that, regarding the lack of correlation between Persian Subject Headings and title keywords and the tables of the contents of Persian books, there exist no significant differences. Consequently, in this regard, there is a correlation between these two researches.

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Totally, this research showed that among correlations, the relative correlation of keywords is higher with Persian medical thesaurus that this shows that there is a lack of harmony between writer's terms, terms present in thesauruses, and terms of the searchers which all these are resulted from the unfamiliarity of writers with controlled vocabulary and/or the fact that writers of articles in Persian medical journals, who are experts in their own area, do not have required cooperation with the office of Persian medical thesaurus. Another reason is probably the fact that Persian medical thesaurus has not been updated since 1384 and knowing fact that the medical science is very dynamic, the thesaurus may lack the new terms that have become common in this area. It is obvious that this condition hinders the job of information retrieval. Currently, due to the presence of defects in Persian medical thesaurus, big libraries such as the library of the Mashhad's University of Medical Sciences do the equivalent operation Keywords by medical Subject Headings. It is much better that universities send their terms to the office of Persian medical thesaurus and the writers of Persian medical article should use the Persian medical thesaurus for deriving term in order to improve the condition of information retrieval. This will help those who are involved in the process of storage and retrieval of information to guide, using keywords selected by the writers of scientific articles, users/searchers to an easier and more relevant information about their needed documents and information.

Suggestions
Based on the obtained results, the following are suggested:
1- Necessary cooperation and support Forum and dynamic institutions (Academy of Medical Sciences of Islamic Republic of Iran) to identify qualified subject specialist to collaborate with Persian medical thesaurus;
2- The need for courses and specialized training by professional medical associations to update the information of thesaurus builders;
3- Collaboration with medical experts to write specialized terminology commonly used in the medical field office of Persian medical thesaurus;
4- Need for homogeneity in a medical journal article keywords and rules for writing Persian in singular and plural forms.

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