A Comparative Genre-Based Study of Research Articles’ Method and Results Sections Authored by Iranian and English Native Speakers

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Abstract: The present genre-driven study aims at comparing Moves and Sub-moves deployed by Iranian and English medical writers while writing their research articles in English. To obtain the goals of the study, the researchers randomly selected a number of medical articles and compared them using Nwogu’s model [1]. The results of relevant statistical tests, Chi-square tests for goodness of fit, used for comparing the two groups of the articles dubbed (Iranian ISI articles) IrISI and EISI (English ISI articles) have shown that no significant difference exists between the two groups of the articles in terms of the Moves and Sub-moves used in the Method and Results sections of them. The findings can be beneficial for people interested in English for Specific Purposes (ESP) and medical experts. The findings can also increase language awareness and genre awareness among researchers who are interested in publishing their research outcomes in ISI-indexed journals in the Islamic Republic of Iran and some other world countries.

Keywords: writing; ESP; research articles; medical sciences; language; scientific writing

1. Introduction

Over the past few decades, scientific writing has become a major challenge for many non-native speakers of English, resulting in a number of research studies in Applied Linguistics and some other disciplines [2]. In order to increase their knowledge regarding scientific writing, a number of scholars in Applied Linguistics, Linguistics and Philosophy have carried out studies related to various genres including research articles [2]. According to Hyland [3], genre refers to ways of using language by members of a society. Hyland [3] goes on to say that among ways which people use for communication in a society, writing plays an important role, noting that since writing is a practice based on expectations, the reader’s chances for understanding the writer’s purpose are boosted if the author can anticipate what the reader might be expecting on the basis of the texts promulgated previously. Describing genres as forms of life or ways of being, Bazerman [4] links genres to social action, saying genres shape the thoughts people in a community form and the communications by which they interact. Bazerman [4] also says genres are the familiar places used by members of a social community to create intelligible communicative action, adding that the genres are also the guideposts the members use in order to explore the unfamiliar. A genre is thoroughly structured and conventionalized and has a number of limits like lexis and Moves which are exploited by people living in a society in an attempt to achieve communicative purposes [5, 6, 7]. Another definition of genre was provided by Berkenkotter and Huckin [8] who believe that “Genres are inherently dynamic rhetorical structures that can be manipulated according to the conditions of use, and . . . genre knowledge is therefore best conceptualized as a form of situated cognition embedded in disciplinary activities.”

For Swales [9], a genre is a tool for achieving a communicative goal which is shaped in response to specific rhetorical needs [10]. Thus, genre analysis can establish a comprehensive framework utilized for studying language use for a variety of applied linguistic purposes [5]. In fact, by using the framework, one can extract explicit and implicit conventions of genres in an attempt to help new members of the community build their generic competence.

Generic competence in general is said to be the “underlying construct that enables fluent communication across genres” [11]. In particular, it refers to the ability of the members to respond to both recurring and new communicative situations by “constructing, interpreting, using and exploiting” (linguistic and non-linguistic) conventions linked to any genre [12].

In a seminal paper, Bruce [13] categorizes genres into two parts, social and cognitive, saying a research article written by a scholar in one field of study is supposed to be a firmly established social genre of communication in the academic discourse community. Moreover, authors writing research articles try hard to have their arguments successfully incorporated into the disciplinary consensus [12],
which is believed to be its predominant cognitive genre [13].

Writing research articles in a language which is not your first language is a demanding job for many people including those who have to write in English. The writing process has many visible and invisible layers which require a writer to understand higher levels of discourse [14].

A generic analysis of research articles written by native and non-native speakers can be used to cover a wide variety of focuses ranging from moves and strategies [5] to rhetorical features [15, 16].

In order to examine different genres including research articles, scholars have utilized different categorizations introduced by a number of proponents (e.g., [17, 18, 19]).

Referring to genre as a tool for developing L1 and L2 instructions, Hyon [19] provides a map of genre theories in three research traditions, namely, (a) English for Specific Purposes (ESP), (b) North American New Rhetoric studies, and (c) Australian Systemic Functional Linguistics.

Traditionally a literary construct, genre is used as a comprehensive framework for analyzing the form and function of nonliterary discourse including scholarly research articles. It is also a medium used for developing educational practices in a number of fields such as linguistics, professional writing, rhetoric, composition studies and English for Specific Purposes (ESP) [19].

Over the past 30 years, genre has attracted attention from a number of scholars all around the world. As Candlin [20] says, “What is it about the term and the area of study it represents that attracts such attention? . . . Clearly, a concept that has found its time.”

For their part, Freedman and Medway [21] refer to importance of genre in composition studies, saying, “the word genre is on everyone’s lips, from researchers and scholars to curriculum planners and teachers.”

Among the three approaches introduced by [19], ESP is considered as critical for many English as Foreign Language (EFL) practitioners. However, it should be noted that Systemic Functional Linguistics (SFL) which was introduced by Halliday [22] is important for several researchers doing research studies (e.g., [5, 23]). This approach tries to build a bridge between language and its functions in different social settings. Moreover, the New Rhetoric approach which was first emerged among North American scholars has its own place among researchers. In the New Rhetoric research, the situational contexts in which genres take place are more important than what was the main focus of research studies in ESP i.e., forms and special emphasis on the social purposes [19].

Scholars and practitioners in ESP are interested in studying genre as an instrument for analyzing and teaching language both in its spoken and written forms to language learners specifically nonnative speakers in universities or other professional settings [5, 24, 25].

Orr [26] refers to the increasing importance of ESP studies, saying ESP “is an exciting movement in English language education that is opening up rich opportunities for English teachers and researchers in new professional domains.”

Following [10], ESP is basically a “teaching-led movement” closely linked to Applied Linguistics and English Language Teaching. A leading scholar in the ESP movement is Swales [27, 28, 9] who has carried out different studies in this regard. In recent years, two broad fields of ESP including English for Academic Purposes (EAP) and English for Professional Purposes (EPP) have attracted attention from ESP practitioners [29]. According to Ypsilantis and Kantaridou [30], EAP “refers mainly to the academic needs of students and of future professionals who would seek a career in the academic environment” and EPP refers to “the actual needs of (future) professionals at work.”

Structural Move analyses have also been utilized by a number of scholars to describe global organizational patterns in different genres including experimental research articles [9, 31], Master of Science and Doctor of Philosophy dissertations [32, 33], medical abstracts [34, 35] as well as research papers written in medical sciences [1, 36]. Kallestinova [37] states that “Moves are traffic signs that lead the reader through the road of your ideas. Each move plays an important role in your paper and should be presented with deep thought and care.” According to Swales [38], Moves in genre analysis can be defined as “a discoursal or rhetorical unit that performs a coherent communicative function in a written or spoken discourse.”

For Hyland [18], rhetorical Move analysis is the most common aspect of applied genre analysis and has provided applied linguists and other scholars, mostly those interested in ESP and EAP, with insightful ideas. Moreover, Hyland [18] points out that “analyzing this kind of patterning is the staple of much ESP and SFL research, and has yielded useful information about the ways texts are constructed and the rhetorical contexts in which in which they are used, as well as providing valuable input for genre-based teaching.”
Considering Swales’ [27, 28] pioneering studies regarding Moves and the analysis of Introduction section of research articles, Nwogu [1] defines the term Move in the following manner:

The term ‘Move’ is meant a text segment made up of a bundle of linguistic features (lexical meanings, propositional meanings, illocutionary forces, etc.) which gives the segment a uniform orientation and signal the content of discourse in it. Each move is taken to embody a number of “Constituent elements” or Sub-moves which combine to constitute information in the Move.

In Iran and many other world cultures, scholars mostly majoring in Applied Linguists have carried out research studies on different genres. For instance, Motamad Kozkehkonan [39] carries out a comparative textual analysis of English genre types; Mirzapour [40] conducts a study of English genre types (narrative/procedural) in terms of cohesive devices; Morazadeh Mogaddam [41] does a contrastive genre analysis of scientific vs. non-scientific texts; Ebrahimpour [42] conducts a contrastive genre analysis of narratives in English and Farsi in terms of referential devices; Khezerlou [43] focuses on narrative genres in Azerbaijani and English folktales; Molai [44] compares narrative genres in modern and post-modern war films; Kuhi [45] in a study entitled “an analysis of the move structure of textbook prefaces” analyzes the schematic structure of 21 textbooks in applied linguistics on the basis of earlier genre based studies (i.e., [9, 27]). Kuhi [46] also conducts another comparative study to explore interpersonal resources in academic written discourse and in a recent study, Yusefi [47] uses a genre-based approach to teaching EFL writing.

In terms of the medical sciences, a number of Iranian scholars working on genre studies have paid particular attention to research articles. For example, Mahzari and Maftoon [48] compare the Introduction section of a number of English/American medical research articles to Iranian ones; Mashhad Akbarilar [49] analyzes the generic structures of the abstracts of English medical articles in an attempt to highlight key writing tips for ESP students and researchers. In another study carried out by Sayfouri [50], rhetorical features of Introduction and Discussion sections of Iranian medical research articles in English have been compared to those of the English/American ones.

Similarly, Bonyadi, Gholami and Nasiri [51] compare and contrast the frequency and types of hedges used in Discussion sections of Environmental Sciences Research Articles (RAs) written by English native and non-native writers based on Salager-Meyer [52] taxonomy. Their study reveals significant differences between English and Farsi articles. In yet another comparative study, Behnam, Naem, Darvishzadeh [53], apply a taxonomy proposed by Hyland [54] to identify and classify the various hedge words employed in the Discussion sections of 100 qualitative and quantitative research articles. The study shows a statistically significant difference between the selected articles with respect to both frequency and form of the hedge words employed by the authors.

Following Swales’ [21] works on genre analysis, Marefat & Mohammadzadeh [55] analyze 90 English and Persian abstracts written in the field of literature, by English and Persian native speakers, on the basis of IMRD (Introduction, Method, Results, and Discussion) and CARS (Create A Research Space) models. They conclude that literature RA writers generally focus on two sections of articles, namely, Introduction and Results, and the majority of the writers neglect Method and Discussion, and do not mention the niche in the previous related work.

In another contrastive study, Rashidi & Baharlo [56] compare the rhetorical organization or macro-structure of Persian and English narrative genre utilized in short stories written by two famous writers. Following Hatch’s [57] approach in genre studies, they conclude that similar components have been used in terms of the narrative genres in Persian and English short stories. Rashidi & Baharlo [56] note that as previous studies showed genre-based studies can improve researchers’ knowledge regarding writing ability in different disciplines, saying literature is not an exception.

Considering the mentioned studies, one can say that a new line of research, which has not been investigated in previous studies, can be a comparative study of Moves and Sub-moves used in the Method and Results sections of English medical research articles written by Iranian researchers as well as native speakers of English. Thus, using a framework put forth by Nwogu [1] --Table 1 -- with regard to essential Moves and Sub-moves in the Method and Results sections of medical research papers, the authors of this study compare a number of recently published ISI-cited medical articles written by Iranian and English native speakers in an attempt to tackle the problem of writing scholarly articles faced by Iranian medical scientists for world-known journals [58].

| Table 1. Moves and Sub-moves of the Method and Results sections of medical research articles [1] |

**Table 1.** Moves and Sub-moves of the Method and Results sections of medical research articles [1]
2. Research Questions
This study aims to answer the following research questions with regard to the use of Moves and Sub-Moves in the Method and Results section of the selected medical research articles.

1. Is there any significant difference between English articles written by Iranian and English native speakers in terms of the frequencies of Move/Sub-move used in their Method section?
2. Is there any significant difference between English articles written by Iranian and English native speakers in terms of the overall frequencies of Moves/Sub-moves used in their Method section?
3. Is there any significant difference between English articles written by Iranian and English native speakers in terms of the frequencies of Move/Sub-move used in their Results section?
4. Is there any significant difference between English articles written by Iranian and English native speakers in terms of the overall frequencies of Moves/Sub-moves used in their Results section?

3. Method
The present study is a descriptive study in nature. Additionally, the variables of the current research included Moves and Sub-moves utilized in the Method and Results section of the English research articles written by Iranian and English native speakers which were all published in highly prestigious ISI-indexed journals in medical sciences.

3.1 The corpus
The corpus of the present comparative study consists of 40 Research Articles (RAs) also known as Original Articles published in ISI-indexed journals which cover general issues related to medical sciences in the Islamic Republic of Iran and some other countries such as the US, the UK, Australia and Canada. To put it simply, the corpus of the study included 20 articles written by Iranians and 20 articles written by English native speakers which have the standard structure of scholarly articles i.e., Introduction, Method, Results and Discussion (IMRD). It is critical to say that the articles, which have been selected randomly, have been published between 2011 and 2013 in 7 Iranian medical journals categorized as Iranian ISI journals (IrISI) and 14 English journals dubbed English ISI journals (EISI). Accessibility of the medical articles in ISI-indexed journals along with consistent editorial styles is among the criteria which had been considered for selecting the articles. Table 2 below shows a list of the journals used in the corpus of the study.

<table>
<thead>
<tr>
<th>Iranian ISI Journals (IrISI)</th>
<th>English ISI Journals (EISI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archives of Iranian Medicine</td>
<td>Emergency Medicine Australasia</td>
</tr>
<tr>
<td>Iranian Red Crescent Medical Journal</td>
<td>Annals of Internal Medicine</td>
</tr>
<tr>
<td>Journal of Research in Medical Sciences</td>
<td>Journal of Hospital Medicine</td>
</tr>
<tr>
<td>Archives of Razi Institute</td>
<td>International Journal of Clinical and Experimental Medicine</td>
</tr>
<tr>
<td>Iranian Journal of Basic Medical Sciences</td>
<td>Academic Emergency Medicine</td>
</tr>
<tr>
<td>Avicenna Journal of Medical Biotechnology</td>
<td>British Journal of Hospital Medicine</td>
</tr>
<tr>
<td></td>
<td>Teaching and Learning in Medicine: An International Journal</td>
</tr>
<tr>
<td></td>
<td>Alternative Medicine Review</td>
</tr>
<tr>
<td></td>
<td>American Journal of Emergency Medicine</td>
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<tr>
<td></td>
<td>Annals of Emergency Medicine</td>
</tr>
<tr>
<td></td>
<td>American Journal of Preventive Medicine</td>
</tr>
<tr>
<td></td>
<td>Journal of Royal Society of Medicine</td>
</tr>
<tr>
<td></td>
<td>The American Journal of Medicine</td>
</tr>
</tbody>
</table>

3.2. Justification for selecting ISI-indexed journals
A number of reasons will be counted for selecting articles published in ISI-indexed journals. According to Testa [59], articles published in

journals indexed by Thomson Reuters Corporation (formerly called the Institute for Scientific Information (ISI)) have been meticulously reviewed by experts of different disciplines. Moreover, experts working in the journals are said to be well-known scholars carrying out scientific projects in world-known universities. Hence, the articles are supposed to have high degrees of reliability and validity [59].

Considering the above mentioned issues with regard to ISI-indexed journals, one can say that no significant difference was, thus, expected to exist between the results of the use of the Moves and Sub-moves in the two groups of English medical articles, IrISI and EISI.

3.3. Procedure

In order to examine the corpus of the study, the researchers of the present research have used ESP/Move analysis. In other words, all the articles -- IrISI and EISI -- which have been selected randomly have been compared by using Nwogu’s [1] model in order to see whether any difference exists between them or not. The individual frequency of each Move and Sub-move in the Method and Results section of the articles has been counted and then compared using relevant statistical tests, Chi-square tests. Moreover, similar tests have been utilized for comparing the overall frequencies of Moves and Sub-moves in the articles written by Iranian and English native speakers all majoring in medical sciences. Finally, the relevant tables been shown and discussed.

4. Results

In order to answer the first question dealing with individual frequencies of Moves and Sub-moves used in the Method section of the ISI-indexed articles written by Iranian and English native speakers, the researcher ran Chi-square using Statistical Package for Social Sciences Version 22.

Based on the results displayed in Table 3 there were not any significant differences between the number of Moves in the Method section of the articles; first Move ($\chi^2$ (1) = 0, $p > .05$), second Move ($\chi^2$ (1) = .026, $p > .05$) and third Move ($\chi^2$ (1) = 0, $p > .05$). Thus, it can be concluded that the first null-hypothesis as there was not any significant difference between English articles written by Iranian and English native speakers in terms of the frequencies of Moves used in their Method section was not rejected.

**Table 3. Results of Chi-Square Tests for Goodness of Fit for the Sub-moves of the Method section Used by IrISI and EISI**

<table>
<thead>
<tr>
<th>Sub-Moves</th>
<th>4.1</th>
<th>4.2</th>
<th>4.3</th>
<th>5.1</th>
<th>5.2</th>
<th>5.3</th>
<th>6.1</th>
<th>6.2</th>
<th>6.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IrISI</td>
<td>20</td>
<td>19</td>
<td>20</td>
<td>19</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>EISI</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>19</td>
<td>20</td>
<td>18</td>
<td>18</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>$X^2$</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.11</td>
<td>.02</td>
<td>.11</td>
<td>.10</td>
<td>.02</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>.73</td>
<td>.87</td>
<td>.73</td>
<td>.74</td>
<td>.86</td>
<td>.86</td>
</tr>
</tbody>
</table>

Furthermore, analysis of chi-square was used to compare the English articles written by Iranian and English native speakers in terms of the frequencies of Sub-moves used in their Method section. Based on the results displayed in Table 4 it can be concluded that there were not any significant differences between the number of Sub-moves in the Method section of the articles; first Sub-move ($\chi^2$ (1) = 0, $p > .05$), second Sub-move ($\chi^2$ (1) = 0, $p > .05$), third Sub-move ($\chi^2$ (1) = 0, $p > .05$), fourth Sub-move ($\chi^2$ (1) = .11, $p > .05$), fifth Sub-move ($\chi^2$ (1) = .026, $p > .05$), sixth Sub-move ($\chi^2$ (1) = .11, $p > .05$), seventh Sub-move ($\chi^2$ (1) = 105, $p > .05$), eighth Sub-move ($\chi^2$ (1) = .029, $p > .05$) and ninth Sub-move ($\chi^2$ (1) = .027, $p > .05$).

**Table 4. Results of Chi-Square Tests for Goodness of Fit for the Sub-moves of the Method section Used by IrISI and EISI**

<table>
<thead>
<tr>
<th>Sub-Moves</th>
<th>4.1</th>
<th>4.2</th>
<th>4.3</th>
<th>5.1</th>
<th>5.2</th>
<th>5.3</th>
<th>6.1</th>
<th>6.2</th>
<th>6.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>IrISI</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>EISI</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>19</td>
<td>20</td>
<td>18</td>
<td>18</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>$X^2$</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.11</td>
<td>.02</td>
<td>.11</td>
<td>.10</td>
<td>.02</td>
<td>.02</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>.73</td>
<td>.87</td>
<td>.73</td>
<td>.74</td>
<td>.86</td>
<td>.86</td>
</tr>
</tbody>
</table>

Similarly, in an attempt to answer the second research question related to overall frequencies of Moves and Sub-moves in the IrISI and EISI articles, the authors used another Chi-square test. To put it simply, the analysis was run to compare the English articles written by Iranian and English native speakers in terms of the frequencies of Moves and Sub-moves used in their Method section. Based on the results displayed in Table 5 it can be concluded that there were not any significant differences between the number of Moves and Sub-moves in the Method section of the articles ($\chi^2$ (1) = .17, $p > .05$). Although the English native speakers made more use of the Moves and Sub-moves (English = 236 vs. Iranian = 227) in the Method section of their articles, the difference was not
statistically significant. Thus, the second null-hypothesis was not rejected.

<table>
<thead>
<tr>
<th>Table 5. Results of Chi-Square Tests for Goodness of Fit for the Moves/Sub-Moves Used by IrISI And EISI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Moves and sub-moves,</strong> Method section</td>
</tr>
<tr>
<td>Iranian ISI</td>
</tr>
</tbody>
</table>

To answer the third research question seeking to compare the articles in terms of the Moves and Sub-moves used in their Results section, the researchers utilized similar statistical tests. To put it another way, analysis of Chi-square was run to compare the English articles written by Iranian and English native speakers in terms of the frequencies of Moves used in their Results section. Based on the results indicated in Table 6 there were not any significant differences between the number of Moves in the Results section of the articles; first Move \((\chi^2 (1) = 0, p > .05)\) and second Move \((\chi^2 (1) = .031, p > .05)\). Thus, it can be concluded that the third null-hypothesis as there was not any significant difference between English articles written by Iranian and English native speakers in terms of the overall frequencies of Moves and Sub-moves used in their Results section was not rejected.

<table>
<thead>
<tr>
<th>Table 6. Results of Chi-Square Tests for Goodness of Fit for the Moves Used by IrISI And EISI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Moves, Results section</strong></td>
</tr>
<tr>
<td>Iranian ISI</td>
</tr>
<tr>
<td>20</td>
</tr>
</tbody>
</table>

Additionally, analysis of chi-square was utilized to compare the English articles written by Iranian and English native speakers in terms of the frequencies of Sub-moves used in their Results section. Based on the results displayed in Table 7 it can be concluded that there were not any significant differences between the number of Sub-moves in the Results section of articles; first Sub-move \((\chi^2 (1) = 0, p > .05)\), second Sub-move \((\chi^2 (1) = 0, p > .05)\) and third Sub-move \((\chi^2 (1) = .026, p > .05)\). Thus, the seventh null-hypothesis was not rejected.

<table>
<thead>
<tr>
<th>Table 7. Results of Chi-Square Tests for Goodness of Fit for the Sub-moves of the Results section Used by IrISI and EISI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sub-Moves</strong></td>
</tr>
<tr>
<td>Iranian ISI</td>
</tr>
<tr>
<td>English ISI</td>
</tr>
<tr>
<td>X²</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
</tr>
</tbody>
</table>

The fourth research question trying to compare the English articles written by Iranian and English native speakers in terms of the overall frequencies of Moves and Sub-moves used in their Results section was answered by running another chi-square test.

According to the results displayed in Table 8 it can be concluded that there were not any significant differences between the number of Moves and Sub-moves in the Results section of the articles \((\chi^2 (1) = .086, p > .05)\). Although the English native speakers made more use of the Moves and Sub-move (English = 95 vs. Iranian = 91) in the Results section of their articles, the difference was not statistically significant. Thus, the seventh null-hypothesis was supported.

<table>
<thead>
<tr>
<th>Table 8. Results of Chi-Square Tests for Goodness of Fit for the Moves/Sub-Moves Used by IrISI And EISI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Moves and sub-moves,</strong> Results section</td>
</tr>
<tr>
<td>Iranian ISI</td>
</tr>
<tr>
<td>95</td>
</tr>
</tbody>
</table>

A number of Moves and Sub-moves found in the Method and Results sections of the medical articles written by Iranian and English native speakers will be presented below.

* A total of 150 consecutive patients … were included in the study \((\text{Sub-move 4.2, from IrISI})\).
* All patients were intravenously sedated with an opiate (fentanyl) and/or short acting benzodiazepine (midazolam); lidocaine was also administered with inhalation and instillation during bronchoscopy for local anesthesia \((\text{Move 5, from IrISI})\).
* We analyzed the data of 484 patients with GI tract cancer including esophagus, stomach, and colorectal \((\text{Sub-move 4.2, from IrISI})\).
* Tables 1 and 2 show average concentrations of natural and artificial radioactive materials in terms of for 23 samples of wheat and 9 samples of corn \((\text{Move 7.1., from IrISI})\).
* We therefore created a database of successful drug-discovery and drug development projects that owe their origin, at least in part, to PSRI inventions. The most difficult task was to identify which drugs originated in PSRIs \((\text{Sub-move 4.1., from EISI})\).
* Our research has so far identified 153 FDA-approved drugs that were discovered at least in part by PSRIs during the past 40 years (Table 1 in the Supplementary Appendix, available with the full text of this article at NEJM.org) \((\text{Sub-move 7.1, from EISI})\).
5. Discussions and Conclusion

As it was indicated in Tables 3, 4, 6 and 7, the results of the comparisons made between the two groups of the articles authored by Iranians and English native speakers show that the Iranian medical experts used nearly equal number of Moves and Sub-moves in the Method and Results sections of their articles compared to English native speakers. The results of this section of study can be compared with that of Atai and Fallah [60] who investigated the Moves used in the Discussion section of a number of research articles written by Iranians and English native speakers majoring in applied linguistics. To put it simply, Iranian medical scholars have been more successful than Iranians majoring in applied linguistics in using standard native-like types of information/Moves in the Method and Results sections of their articles.

Moreover, Tables 5 and 8 demonstrated that the overall frequencies of Moves and Sub-moves used by medical experts who authored the articles in Iran and other world countries where English is the first language have been equal. This can show that Iranians could write the Method and Results sections of their articles as well as their English counterparts which might be considered as a critical issue for non-native speakers of English (1, 36).

The lack of a meaningful difference between the frequencies of Moves and Sub-moves in the Method and Results sections of the articles have confirmed that Iranians and English native speakers were successful in the application of the main types of information (Moves) while analyzing Moves and Sub-moves in the ISI-cited articles. The results can also be connected to the fact that all of the articles were published by ISI-indexed journals which have complex peer-review processes in Iran and the US, the UK, Canada, Australia and New Zealand.

The overall findings of the study also support what Sayfouri [50] has found in her study after counting Moves and Sub-moves in the IMRD sections of English medical articles published by Iranian and English/American ISI indexed journals. However, the results are not in line with part of her study related to a comparison made between Iranian non-ISI journals and Iranian ISI journals.

Moreover, this similarity between the frequencies of Moves and Sub-moves employed in the Method and Results section of the articles written by Iranian and English native speakers is due to the fact that the mentioned sections are not problematic for the authors since they have similar structures in different disciplines and lack of creativity in those sections describing experimental designs, procedures and the outcomes would be common [37]. However, cohesion and fluency in the process of writing the mentioned sections in English are crucial [37].

To shed some light on the importance of the issue, Kallestinov [37] says that presenting enough information in a scientifically written article can indicate a comprehensive and supported argument or a well-researched case, a fact which has been seen in the present study.

The overall outcomes of the study are also similar to a study carried out by Mahzari & Maftoon [48] who say that the generic organization of medical research articles in English and Persian are the same regarding their individual Move frequency. Further, this study proves Le & Ge [61]’s viewpoints regarding the ability of non-native speakers of English in writing scholarly articles in medical sciences. In other words, Iranian medical experts could write well-organized papers in the Method and Results sections, foreshadowing a statement by Hayes [62] who says that writing, including the writing of research papers, is “a generative activity requiring motivation, and it is an intellectual activity requiring cognitive processes and memory.”

This study, which compared a number of medical research articles written by Iranian and English native speakers in terms of Moves and Sub-moves, showed that Iranian medical experts could author informative research papers which were published in ISI-indexed journals. Considering the results of this study, one can claim that Iranian scientists have the potential to submit their papers to top medical journals publishing papers written by well-known figures in an attempt to manifest their talents for the nations’ well-being.

In conclusion, by developing such genre-based studies not only ESP learners, including those studying medical sciences, but ESP teachers can increase their knowledge of scientific writing. This
picture might help them solve the problems faced by ESP students and teachers. As Henry and Roseberry [63] say that ESP teachers and students should be aware of Moves and Sub-moves as well as rhetorical features which are problematic for many students and researchers seeking to write scholarly articles. According to Henry and Roseberry [63], “ESP practitioners need to be aware of not just this range of features, but where they are used and for what purpose.”

The present genre-driven study has a number of implications for ESP students and teachers in various disciplines in the Islamic Republic of Iran and other world countries which will be discussed in the following part.

6. Implication for English Language Teaching

The main concern of the present study was to compare medical articles written by Iranian and English native speakers in terms of the Moves and Sub-moves presented by the two groups of the authors in the articles, IrISI and EISI. According to Helen [64], conducting genre-based studies in medical sciences can lead to “interesting pedagogic applications with respect to the teaching of EFL professional/academic writing in medicine.” Studies investigating the differences in the English writing of native and non-native speakers can raise students’ awareness with regard to a large number of sophisticated but often “implicit linguistic, disciplinary and cultural aspects of professional writing in medicine,” [64]. Moreover, since the majority of ESP students trying to obtain Master’s degrees or PhD degrees in universities across the world should be fluent users of English language which is the official language of over 75 countries worldwide [65] and a language spoken by some 375 million people as the first language [66], comparative studies like the present one focusing on structural Move analysis can help them tackle their writing problems.

Following Partridge [67], skills and knowledge related to the conventional use of English language in medical sciences, including medical research papers, can “only be implicitly gained through enculturation into specific disciplinary communities.” Moreover, Berkenkotter and Huckin [68] say that starting up research studies which concentrate on rhetorical styles of native and non-native English authors majoring in medicine can solve some of the questions which are faced by medical students and researchers while writing English articles. Hence, this study can increase linguistic awareness [69] and genre awareness among doctors and medical experts in the Islamic Republic of Iran and many other world countries where English is said to be a foreign language.

7. References

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