Abstract

Background: In Vietnam, after the enactment of 37/2018/QĐ-TTg, a distinct shift could be observed in the international publications by radiological societies. Objective: This study examined trends in the international publications achieved by Vietnamese radiological societies following the enactment of 37/2018/QĐ-TTg. Methods: This retrospective study evaluated data that are freely accessible and available online and, therefore, did not require institutional review board approval. We assessed the publication characteristics of the members of four Vietnamese radiological societies: Vietnamese Society of Radiology and Nuclear Medicine (VSRNM, n = 67); Radiological Society of Ho Chi Minh City (RSHCM, n = 25); Vietnamese Society of Ultrasound in Medicine (VSUM, n = 29); and Vietnamese Society of Interventional Radiology (VSIR, n = 18), following the enactment of 37/2018/QĐ-TTg. Results: Following the enactment of 37/2018/QĐ-TTg, we observed that total publications, number of first authors, number of last authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus were significantly higher for the VSRNM and VSIR than for the RSHCM and VSUM. All publication parameters were significantly higher for men, individuals who secured professorship, PhD and Master’s degree holders, public hospital employees, those in the radiological field, and those in the north and south regions, compared with the values for women, individuals without professorships, Specialist II and I degree holders, private hospital employees, those in the nuclear medicine field, and those in the middle region, respectively. Conclusion: The enactment of 37/2018/QĐ-TTg triggered a new trend in international publication among the members of four Vietnamese radiological societies. However, strong discrepancies remain in total publications, number of first authors, number of last authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus among the members of the four main Vietnamese radiological societies.

Keywords: New regulation, 37/2018/QĐ-TTg, Publications, Vietnamese radiological societies.

1. Background

In Vietnam, before 2018, international publication was rare, and international publication was not a qualification criterion for either doctoral degree conferral or the hiring and advancement of associate and full professors. The trend toward international integration is necessary for a developing country such as Vietnam. As Vietnam moves toward increased international integration, international publications have gradually become an important criterion in the consideration to confer doctoral degrees and the hiring and advancement of associate and full professors. On 31 Aug 2018, the Prime Minister of the Vietnamese government approved a new regulation, named 37/2018/QĐ-TTg, which requests international publications indexed by the Web of Science or Scopus in the curriculum vitae of candidates for professorship. The medical profession, including the field of radiology, has undergone significant changes with respect to international publishing behaviors since the enactment of this law (1).

The radiology field in Vietnam is represented by four associations with...
large numbers of members, including the Vietnamese Society of Radiology and Nuclear Medicine (VSRNM); Radiological Society of Ho Chi Minh City (RSHCM); Vietnamese Society of Ultrasound in Medicine (VSUM); and Vietnamese Society of Interventional Radiology (VSIR).

Becoming a committee member in any of these societies requires significant scientific achievements and notable contributions to the profession. Changes in international publishing trends are likely to create many challenges for current association committee members of the association in their pedagogical roles (1).

2. OBJECTIVE

This original study was conducted to assess the international publication characteristics of the members of the four main Vietnamese radiological societies following the enactment of 37/2018/QĐ-TTg.

3. METHODS

No ethical committee or institutional review board approval was required due to the use of publicly available data. In this retrospective study, we evaluated the publication characteristics of the memberships of the four main radiological societies in Vietnam: VSRNM, RSHCM, VSUM, and VSIR.

Assessed parameters included gender, professorship, degree, type of hospitals, subspecialty, region, total publications, number of first authors, number of corresponding authors, number of last authors, number of co-authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus. SPSS version 23 (IBM Corporate Headquarters, Armonk, New York, USA) was used to perform statistical analyses. Qualitative variables are described as the frequency and percentage and were compared using Fisher’s exact test. Quantitative variables are described as the median and interquartile range and were compared by the Kruskal–Wallis test. A p-value less than 0.05 was considered significant.

4. RESULTS

Table 1. Comparison of basic features among four main Vietnamese radiological societies. § Fisher’s exact test # Kruskal–Wallis test. Abbreviations: VSNRM, Vietnamese Society of Radiology and Nuclear Medicine; RSHCM, Radiological Society of Ho Chi Minh City; VSUM, Vietnamese Society of Ultrasound in Medicine; VSIR, Vietnamese Society of Interventional Radiology; PhD, doctor of philosophy

|                      | Overall | VSRNM n = 67 | RSHCM n = 25 | VSUM n = 29 | VSIR n = 18 | p    |
|----------------------|---------|--------------|--------------|-------------|-------------|------|
| Gender               |         |              |              |             |             | 0.094|
| Women                | 21 (15.1%) | 7            | 5            | 8           | 1           |      |
| Men                  | 118 (84.9%) | 60           | 20           | 21          | 17          |      |
| Professorship        |         |              |              |             |             | 0.176|
| Professor            | 3 (2.2%)   | 2            | 0            | 0           | 1           |      |
| Associate Professor  | 27 (19.4%)  | 18           | 2            | 3           | 4           |      |
| No Professorship     | 109 (78.4%) | 47           | 23           | 26          | 13          |      |
| Degree               |         |              |              |             |             | 0.019%|
| PhD                  | 55 (39.6%)  | 35           | 6            | 4           | 10          |      |
| Master’s             | 32 (23.0%)  | 12           | 5            | 11          | 4           |      |
| Specialist II        | 38 (27.3%)  | 14           | 10           | 11          | 3           |      |
| Specialist I         | 9 (6.5%)    | 2            | 3            | 3           | 1           |      |
| Other                | 5 (3.6%)    | 4            | 1            | 0           | 0           |      |
| Hospital             |         |              |              |             |             | 0.739|
| Public               | 117 (84.2%) | 58           | 20           | 25          | 14          |      |
| Private              | 22 (15.8%)  | 9            | 5            | 4           | 4           |      |
| Subspecialty         |         |              |              |             |             | < 0.001%|
| Diagnostic and Interventional Radiology | 19 (13.7%)  | 7            | 1            | 2           | 9           |      |
| Diagnostic Radiology | 95 (68.4%)  | 45           | 21           | 27          | 2           |      |
| Interventional Radiology | 11 (7.9%)   | 2            | 2            | 0           | 7           |      |
| Nuclear Medicine     | 12 (8.6%)   | 11           | 1            | 0           | 0           |      |
| Other                | 2 (1.4%)    | 2            | 0            | 0           | 0           |      |
| Region               |         |              |              |             |             | < 0.001%|
| North                | 60 (43.2%)  | 38           | 0            | 13          | 9           |      |
| Middle               | 17 (12.2%)  | 9            | 0            | 5           | 3           |      |
| South                | 62 (44.6%)  | 20           | 25           | 11          | 6           |      |
| Publications         |         |              |              |             |             |      |
| Total Publications   | 0 (1)     | 0 (3)        | 0 (0)        | 0 (0)       | 0 (11)      | 0.014#|
| First Authors        | 0 (0)     | 0 (0)        | 0 (0)        | 0 (0)       | 0 (1)       | 0.04# |
| Corresponding Authors| 0 (0)     | 0 (0)        | 0 (0)        | 0 (0)       | 0 (0)       | 0.326 |
| Last Authors         | 0 (0)     | 0 (0)        | 0 (0)        | 0 (0)       | 0 (0)       | 0.043# |
| Co-Authors           | 0 (1)     | 0 (1)        | 0 (0)        | 0 (0)       | 0 (2)       | 0.074 |
| Web of Science       | 0 (1)     | 0 (1)        | 0 (0)        | 0 (0)       | 0 (7)       | 0.003# |
| Scopus               | 0 (1)     | 0 (3)        | 0 (0)        | 0 (0)       | 0 (7)       | 0.012# |

As shown in Table 1, the 139 individuals whose publication records were examined belong to one of the main...
radiological societies: VSRNM (n = 67), RSHCM (n = 25), VSUM (n = 29), and VSIR (n = 18). The male-to-female ratio was 118:21 for the overall population. Almost all of the standing and executive members of these societies work in the radiology departments of public hospitals, and diagnostic radiology was the most common subspecialty. The proportions of professors were relatively low in all examined societies. Members tended to hold Master’s degree, Doctor of Philosophy (PhD) degrees, Specialist I degrees, or Specialist II degrees, with high proportions holding PhD and Specialist II degrees. Members from the northern and southern regions were thought to be superior to those from the middle region. The number of total publications, number of first authors, number of corresponding authors, number of last authors, number of co-authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus were significantly higher for members of VSRNM and VSIR were than for members of RSHCM and VSUM.

**Publication features based on gender**
As shown in Figure 1, total publications, number of first authors, number of corresponding authors, number of last authors, number of co-authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus among men were significantly higher than those among women.

**Publication features based on professorship**
As shown in Figure 2, total publications, number of first authors, number of corresponding authors, number of last authors, number of co-authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus were significantly higher among professors than among associate professors or non-professors.

**Publication features based on degree**
As shown in Figure 3, total publications, number of first authors, number of corresponding authors, number of last authors, number of co-authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus were significantly higher among PhD and Master’s degree holders than among members with other degrees.
Publication features based on kinds of hospital
As shown in Figure 4, total publication, number of first authors, number of corresponding authors, number of last authors, number of co-authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus were significantly higher among employees of public hospitals than those among employees of private hospitals.

Publication features based on specific fields
As shown in Figure 5, total publications, number of first authors, number of corresponding authors, number of last authors, number of co-authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus were significantly lower among individuals with a nuclear medicine subspeciality than among those with a radiology subspeciality.

Publication features based on geographic region
As shown in Figure 6, total publications, number of first authors, number of corresponding authors, number of last authors, number of co-authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus of individuals located in the middle region were significantly lower than those located in the northern and southern regions.

5. DISCUSSION
Generally, large discrepancies were observed for the publication characteristics across members of the four main Vietnamese radiological societies. Total publications, number of first authors, number of last authors, number of articles indexed in Web of Science, and number of articles indexed in Scopus for members of VSRNM and VSIR were significantly higher than those for members of RSHCM and VSUM. These parameters were also significantly higher for men, individuals with professorship, PhD and Master's degree holders, public hospital employees, those in the radiological field, and those located in the northern and southern regions compared with the parameter values for women, those without professorship, those with Specialist II and I degrees, private hospital employees, those in the nuclear medicine field, and those located in the middle region, respectively.

The VSRNM is the largest radiological association in Vietnam, and VSRNM committee members are leading experts in both clinical and academic radiological fields; therefore, it is unsurprising to find that members of the VSRNM are associated with a larger number of international articles than the other societies (2). VSIR is a new association, only 10 years old, but is a fast-growing and impressive association. The developing field of interventional radiology, although newer than diagnostic radiology, is increasingly popular, and radiological treatments have become important alternatives to traditional treatment options. Therefore, the number of articles published by VSIR members is very high (3). The VSNRM and VSIR are two key associations that thrive in the northern region, which may explain the high number of articles that are produced in the northern region relative to other geographic areas (2,3).

A recent study noted the gender imbalance in the four largest radiology societies in Vietnam, with more men than women belonging to all societies. Men also outnumbered women among both PhD and Master's degree holders and across those with the titles of professor or associate professor. Therefore, the number of international papers produced by men, who are more likely to hold high-level academic degrees and titles, was significantly higher than the number produced by women (4). In another recent study, the number of international articles produced by PhD and Master's degree holders was found to be significantly higher than the number produced by Specialist II and Specialist I degree holders, which aligns with our findings (5). In Vietnam, many private hospitals have been newly established since the year 2000, and these hospitals tend to prioritize improvements in technique, expertise, and treatment over research. By contrast, the oldest, largest, and best-known hospitals in Vietnam are public hospitals (2,6), which tend to have access to sufficient human resources, modern modalities, and updated techniques to perform abundant research studies. Therefore, the number of international articles produced by public hospitals remains higher than those produced by private hospitals.

Nuclear medicine is a classic global specialty but is nascent in Vietnam. The Vietnam Ministry of Health agreed to establish the first medical radiology research group in Vietnam at Bach Mai Hospital in 1970, laying the groundwork for nuclear medicine to develop as a field in the country. The Department of Nuclear Medicine at Hanoi Medical University was founded in 1987 to teach nuclear medicine personnel in Vietnam. Since then, nuclear medicine departments have been established at several hospitals, including Army Center Hospital 108, Army Center Hospital 103, Cho Ray Hospital, and Da Nang General Hospital. To develop human resources for the nuclear medicine specialty, Hanoi Medical University is projected to be the first unit in Vietnam to offer residency training in nuclear medicine, starting in 2022 (7). The general lack of human resources in the field of nuclear medicine field and the late appearance of this specialty in Vietnam are likely contributors to the lower numbers of international articles associated with this specialty compared with the numbers of international articles associated with the radiological field.

Limitations of the study
This study had several limitations. First, this was conducted as a retrospective study with small sample size. Second, the data collected from the four main radiological societies do not represent all current Vietnamese radiologists. A small degree of uncontrolled bias is associated with the membership of some individuals in multiple societies and working across multiple subspecialties. Thus, further prospective studies with larger samples should be performed to validate our findings and follow the trend of international publications among not only Vietnamese radiological societies but also international radiological associations.
6. CONCLUSION

After the enactment of 37/2018/QĐ-TTg, we observed a significant change in the characteristics of international publications among committee members of VSRNM, VSIR, RSHCM, and VSUM. This change has resulted in both successes and challenges. The disparities observed across the four main societies and among their members are quite large. Future studies and interventions will be crucial to understanding the underlying roots of these gaps to improve the diversity of international publications produced by Vietnamese radiological societies.

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