ORIGINAL ARTICLES

International scientific publication achievements of medical, public health and pharmacy universities, faculties and research institutes in Vietnam in 2019

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ABSTRACT

Objective: To describe the international scientific publication capacity of medical, public health and pharmacy universities, faculties and research institutes in Vietnam in 2019.

Methodology: This was a cross-sectional study. The research participants included 2,200 lecturers, researchers of medical, public health and pharmacy universities, faculties and research institutes in Vietnam who already had personal accounts on the ResearchGate database by June 2019.

Results: Five institutes with the highest proportions of lecturers, researchers who had more than 30 international scientific articles were National Institute of Hygiene and Epidemiology (NIHE) (15.8%), Hanoi University of Public Health (HUPH) (11.15%), Ton Duc Thang University (TDTU) (9.5%), Department of Medicine and Pharmacy of Hanoi National University (5.5%) and Hanoi Medical University (3.1%). Based on h-index, the measure of productivity and the impact of research on the international scientific community, results showed that institutes with the highest proportions of lecturers, researchers with h-index ≥ 10 were NIHE (19.3%), HUPH (9%), Military Medical Academy (5%), TDTU (4.8%) and Nguyen Tat Thanh University (3.8%).

Conclusion: The international scientific publication capacity of the majority of medical, public health and pharmacy universities, faculties and research institutes in Vietnam was still quite limited. In general, Public Health faculties/universities/institutes had higher international scientific publication capacity than the pharmacy and medical institutions.

Keywords: *International scientific publication capacity, medical, public health, pharmacy, lecturers, researchers, ResearchGate*

BACKGROUND

Rapid social development at different levels requires a lot of novel research questions and issues, for which scientific research proves its increasing importance role in providing evidence-based findings that help to improve many aspects of daily life. Moreover, usually a research project is considered completed scientifically only if its findings are formally published in peer-reviewed journals.

The concept of "publish or perish" is popular with international academicians, frequently discussed and usually used to indicate the importance of publication in measuring researchers' capability and reputation. (1) Publishing in international journals is an

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evidence showing researching dexterity and professionalism both individually and organizationally (2). Furthermore, the opinion "no publication, no funding" is strengthening its value in the eyes of scholars and patrons around the world.

Scientific research activity is one of the core missions of lecturers, especially to those who are working in research-oriented universities. (3) Teaching and conducting research projects are the measures for lecturers' professionalism. Implementing research projects also helps academicians improve their lectures' quality (4, 5). Findings presented in the forms of journal articles are not only the measure of scientists' research and international integration ability but also one of the most essential scales to evaluate and rank universities' research capacity. Currently, various indexes are being used to assess international publication and reputation of scholars, such as h-index, i10-index, ResearchGate score, etc (6-12). These indexes are calculated and available on some databases, i.e. ResearchGate, Google Scholar, etc (13, 14). The achievement of each country on international publications is ranked annually and categorized by fields, using various indexes of Scimago Journal & Country Rank database such as "international publication", "cited articles", "citation", "self-citation", "citations per article" and "h-index" (using data from 1996 to 2017) (15).

In Vietnam, since 2019, publishing scientific articles on international peer-reviewed journals has become a mandatory criteria in promoting academic ranks as well as in the training of Doctors of Philosophy (16). Other than the number of publications, the average number of citations per article of candidates for professor title recently raised attention from academia. Additionally, publishing scientific articles on international journals is a vital criteria for university ranking (including both scientific and globalization criteria), which is a foundation for grant funding organizations to approve proposals and evaluate projects' quality. National Foundation for Science & Technology Development (NAFOSTED) also uses the index of international publication to consider grant scientific research projects. In the last five years, there were a variety of ranking analysis reports of Vietnamese universities' publication achievements based on the number of articles (17, 18). However, some of the indexes for international publication scoring are new. On the other hand, research that fully assesses international publishing achievement of medical universities and institutes was not available.

Our research objective was to describe the international publication achievements of medicine, public health and pharmacy universities, falcuties and institutes in Vietnam in 2019. We focused on analyzing three main indexes, including the number of international journal articles, number of citations, and h-index. H-index is an author-level metric consisted of a researcher's productivity, credit from fellow academicians and his (or her) project's impact on the research community. H-index of a researcher is defined as the maximum value of h, in which he (or she) published h papers that have each been cited at least h times (11). According to its creator, an associate professor should have a minimum h-index of 12 and a professor's h-index should be at least 18. If a researcher's h-index is 20 or higher after 20 years of working, he (or she) is considered to be a successful scholar.

METHODOLOGY

Study design and population

A cross-sectional study was conducted to describe the international scientific publication capacity of medical, public health and pharmacy universities, faculties and research institutes in Vietnam in 2019. This study was implemented from June to December 2019. Participants of the study were publication profiles of lecturers and researchers working in universities, institutes, faculties majoring in medicine, public health and pharmacy, who had academic profiles on the ResearchGate database by June 2019. ResearchGate database was chosen for this study due to its utility of searching lecturers, researchers by the names of their workplaces. For instance, using the keyword "Hanoi University of Public Health", readers could find every ResearchGate members who were working at Hanoi University of Public Health. Furthermore, ResearchGate offerred the function to automatically update members' international articles, as well as the availability of several indexes that indicated the international publishing capability of its members, including h-index, number of citations, etc.

Participants of the study must met the following criteria, including: (1) Working at medical and pharmacy universities, institutes in Vietnam and (2) ResearchGate profile was available by June 2019. Any available profiles with unclear information (to classify based on occupation) were excluded from the sample.

Sampling procedures

All of ResearchGate members, who were lecturers and researchers currently working at universities, faculties and research institutes majoring in medicine, public health and pharmacy were selected. The sampling process must follow the research criteria. Based on analyzed data, the proportion of Vietnamese universities, faculties and research institutes majoring in medicine, public health and pharmacy in Vietnam had lecturers, researchers with ResearchGate accounts (or the response rate) was 53.57%.

Variables

Study variables were (1) general information of scientists (including name, ResearchGate profile link…) and (2) international publishing capability of scientists (including the number of articles, citation, ResearchGate index, h-index).

Statistical analyses

Data were imported by Microsoft Excel and analyzed by SPSS 23. Descriptive statistics were applied by calculating proportions and percentages.

RESULTS

Among the initial sample of 30 units with ResearchGate-profile-available lecturers and researcher, 15 units that had the most of ResearchGate members up until June 2019 were described in Table 1. Remaining institutions, which had less than 30 members available on the ResearchGate database or inadequate numbers of lecturers or researchers with at least one international article, were excluded from the sample for the analysis of international publishing capability.

Findings from the analysis of three main indexes, including the number of international published papers, publication capability based on h-index and the total number of citations by the ResearchGate database by June 2019 of 15 medical, public health and pharmacy universities, research institutes, showed that: National Institute of Hygiene and Epidemiology (NIHE), Hanoi University of Public Health (HUPH), Ton Duc Thang University (TDTU), Military Medical University and Nguyen Tat Thanh University were the five leading institutions that had higher indexes of international publication than others. The indexes that indicated the international publishing capability of remaining institutions were mutually low. In addition, both training and research institutions in public health had higher scores than those in clinical medicine and pharmacy. Table 1 and Figure 1 to Figure 3 show the details of assessment indexes.

Table 1. 15 leading institutions in number of lecturers and researchers registered on ResearchGate database by June 2019 (n=2.200)

Name	**Number of members**	Number of members with at least 1 article (n, %)	Number of members with at least 10 articles (n, %)	Number of members with h-index higher than 1 (n, %)	Number of members with h-index higher than 5 (n, %)	Number of members with more than 50 citations (n, %)	Number of members with more than 1000 citations (n, %)
University of Medicine and Pharmacy, Ho Chi Minh city	**595**	140 *23.5%*	27 *4.5%*	120 *20.2%*	22 3.7%	39 *6.6%*	2 0.3%
Can Tho University of Medicine and Pharmacy	**370**	35 *9.5%*	10 *2.7%*	33 *8.9%*	10 *2.7%*	17 *4.6%*	4 *1.1%*
Hanoi Medical University	**295**	87 *29.5%*	12 *4.1%*	79 *26.8%*	23 *7.8%*	34 *11.5%*	2 *0.7%*
Hanoi University of Pharmacy	**192**	47 *24.5%*	22 *11.5%*	43 *22.4%*	10 *5.2%*	15 *7.8%*	1 *0.5%*
Hue University of Medicine and Pharmacy	**157**	56 *35.7%*	16 *10.2%*	48 *30.6%*	10 *6.4%*	17 *10.8%*	1 *0.6%*
University of Medicine Pham Ngoc Thach	**141**	46 *32.6%*	9 *6.4%*	39 *27.7%*	10 *7.1%*	17 *12.1%*	1 *0.7%*

Name	**Number of members**	Number of members with at least 1 article (n, %)	Number of members with at least 10 articles (n, %)	Number of members with h-index higher than 1 (n, %)	Number of members with h-index higher than 5 (n, %)	Number of members with more than 50 citations (n, %)	Number of members with more than 1000 citations (n, %)
Hanoi University of Public Health	**78**	58 *74.4%*	24 *30.8%*	55 *70.5%*	20 *25.6%*	22 *28.2%*	2 2.6%
Tan Tao University (School of Medicine)	**76**	14 *18.4%*	7 *9.2%*	12 *15.8%*	7 *9.2%*	7 9.2%	2 2.6%
Military Medical University	**60**	30 *50%*	10 *16.7%*	27 *45%*	8 *13.3%*	9 *15%*	0 *0%*
National Institute of Hygiene and Epidemiology	**57**	42 *73.7%*	26 *45.6%*	42 *73.7%*	26 *45.6%*	33 *57.9%*	8 *14%*
Nguyen Tat Thanh University	**53**	4 *7.5%*	2 *3.8%*	3 *5.7%*	2 *3.8%*	2 *3.8%*	0 *0%*
Ton Duc Thang University (Faculties of Applied Science and Pharmacy)	**42**	24 *57.1%*	10 *23.8%*	22 *52.4%*	4 *9.5%*	11 *26.2%*	0 *0%*
Vietnam National University (School of Medicine and Pharmacy)	**38**	11 *28.9%*	3 *7.9%*	9 *23.7%*	2 *5.3%*	3 *7.9%*	0 *0%*
Hai Phong University Medicine And Phamarcy	**36**	6 *16.7%*	3 *8.3%*	6 *16.7%*	2 *5.6%*	2 *5.6%*	0 *0%*
Ho Chi Minh City Pasteur Institute	**10**	4 *40%*	1 *10%*	4 *40%*	2 20%	2 20%	0 20%
Total	**2.200** ***100%***	604 *27.45%*	182 *8.27%*	541 *24.59%*	157 *7.14%*	230 *10.45%*	23 *1.05%*

Table 1 shows the three institutions with the topmost numbers of ResearchGate - registered lecturers and researchers by June 2019, including University of Medicine and Pharmacy, Ho Chi Minh city (595 members), Can Tho University of Medicine and Pharmacy (380 members) and Hanoi Medical University (295 members). The

three institutions with the least in number of ResearchGate -registered members were School of Medicine and Pharmacy of Vietnam National University (38 members), Hai Phong University of Medicine and Pharmacy (36 members) and Ho Chi Minh Pasteur Institute (10 members).

In terms of international publication capability assessment based on the number of articles on international journals, Figure 1 shows different proportions of lecturers and researchers with at least one international article from the 15 leading medical/public health/pharmacy institutions.

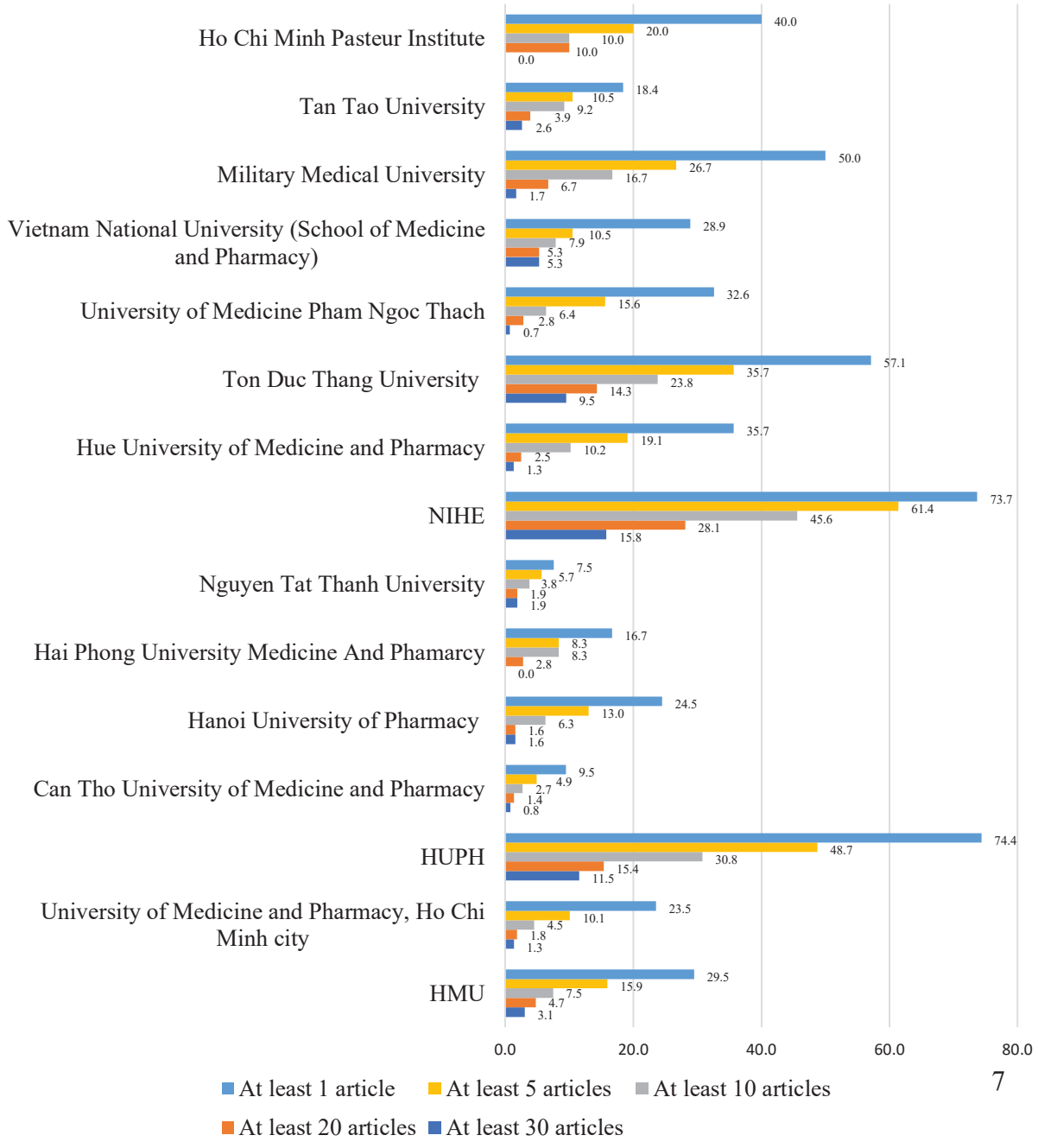

Figure 1: International publication capacity of the leading 15 medical, public health and pharmacy universities, institute in Vietnam with the number of published papers, June 2019

Can Tho University of Medicine and Pharmacy had the lowest proportion with 9.4%. On the other hand, Hanoi University of Public Health had the highest proportion with 74.4%. National Institute of Hygiene and Epidemiology had the second-highest proportion with 73.7%. The rate of each remaining institutions varied from 16.7% to 57.1%. However, regarding the proportion of lecturers and researchers with at least 30 articles, NIHE was at the top with 15.8%, HUPH came next with 11.9% and the faculties of Applied Science and Pharmacy of TDTU was the last of the top 3 with 9.5%. School of Medicine and Pharmacy of Vietnam National University (VNU) had 5.5% of this proportion and Hanoi Medical University (HMU) had 3.1% in the same category. The proportions of remaining faculties/institutions varied from 0% to 2.6%.

Findings in international publication capability assessment based on h-index are shown in Figure 2, in which NIHE and HUPH, with 73.7% and 70.5% respectively, were the two institutions with the highest proportions of lecturers and researchers with h-index equal or greater than 1. Faculties of Applied Science and Pharmacy of TDTU and Military Medical University had 52.4% and 45%, respectively. The other institutes' rates were below 40%, and Nguyen Tat Thanh University had only 5.7%, which was the lowest rate.

Figure 2 also shows that the proportions of researchers and teachers with h-index equal or greater than 10 were generally low. 19.3% was the highest value, which belonged to NIHE, and HUPH was in the second place with 7.7%. Military Medical University had 5%, TDTU had 4.8% and Nguyen Tat Thanh University had 3.8%. Other universities/ institutes had less than 3.5% of researchers and teachers with h-index equal or greater than 10. Hai Phong University of Medicine and Pharmacy and Ho Chi Minh Pasteur Institute had no researcher or lecturer who had a h-index of at least 10.

Nguyen Tat Thanh University had 5.7% of faculty members with h-index equal or greater than 1, which was the lowest rate among 15 institutes/universities. However, this university had 3.8% researchers or teachers with h-index of at least 10. This figure was better than eight other studied institutes. By June 2019, there were only five researchers/ lecturers who work in medical, public health and pharmacy fields in Vietnam with h-index of at least 33.

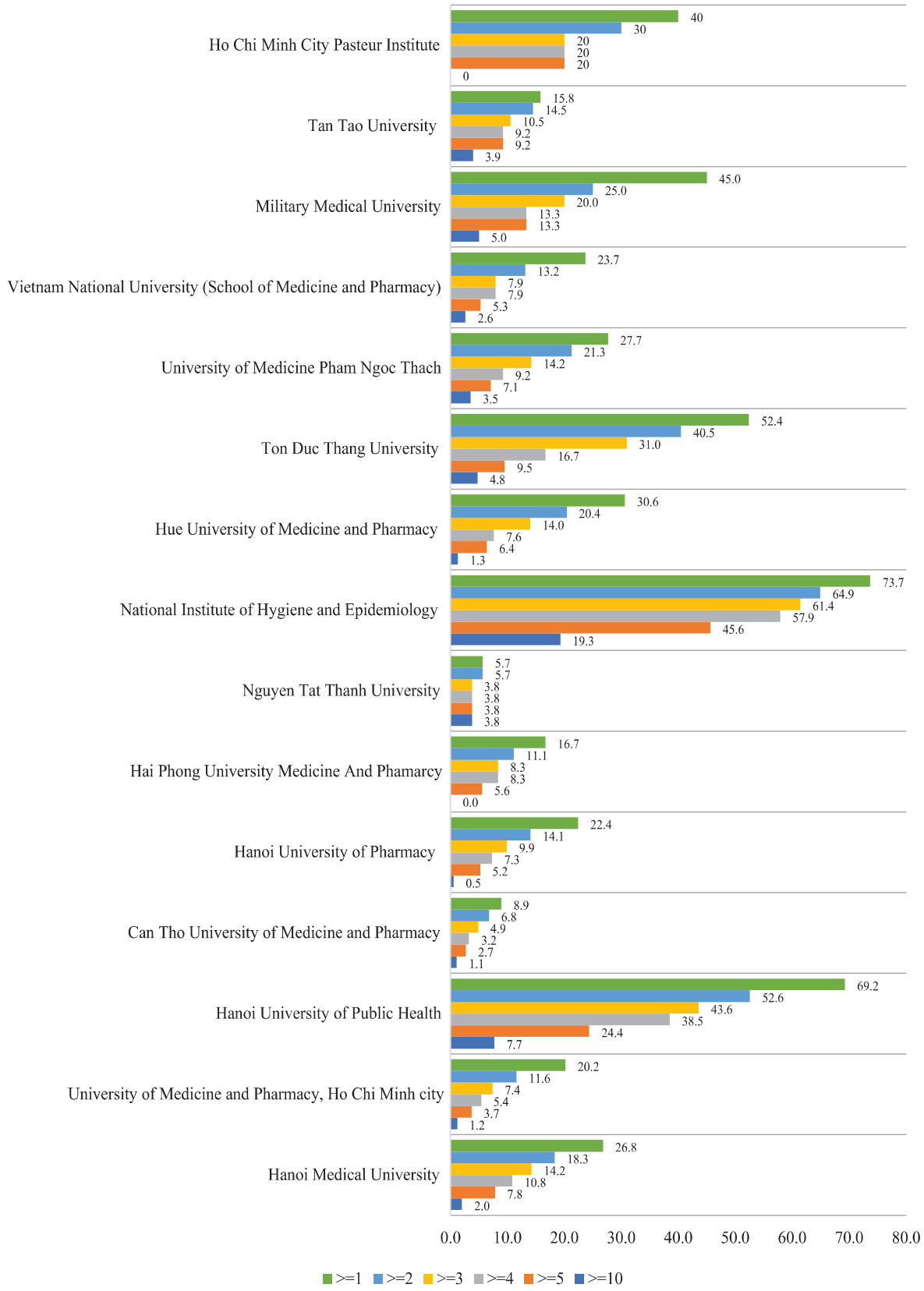

Figure 2: International publication capacity of 15 leading universities and institutes majoring in Medicine, Public Health and Pharmacy based on h-index by June 2019

Figure 3 shows the data on numbers of citations by June 2019 of 15 institutions. NIHE had the highest proportion of researchers and teachers (57.9%) who had at least 50 citations and HUPH had the second-highest proportion with 35.6%. The other institutes' rates were below 26.2%. Nguyen Tat Thanh University had the lowest proportion with only 3.8% of researchers and teachers who had at least 50 citations.

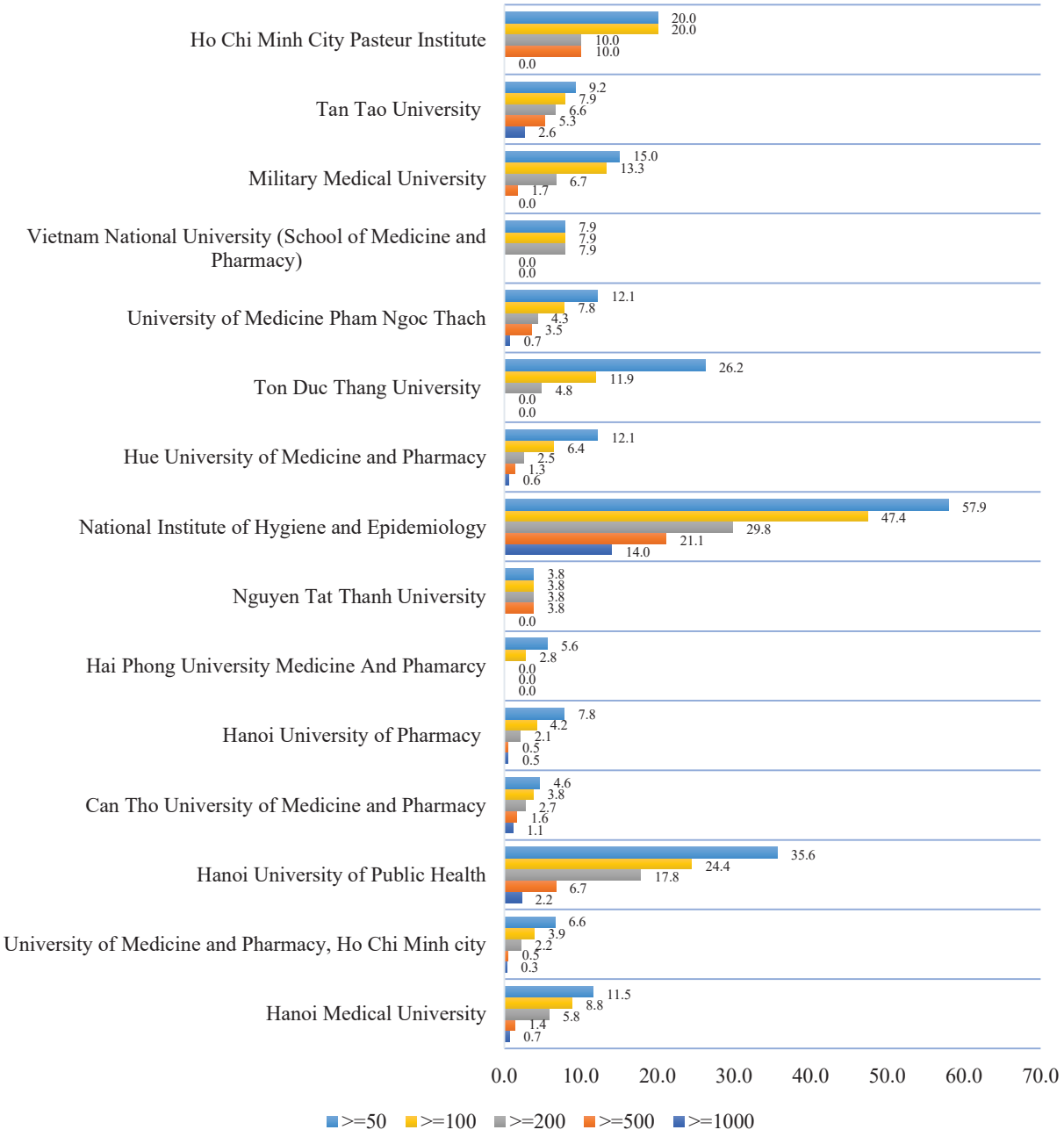

Figure3: International publication capacity of 15 leading universities and institutes majoring in Medicine, Public Health and Pharmacy based on citations by June 2019

Another essential index was the percentage of researchers and teachers who had at least 1000 citations. NIHE had the highest proportion with 14%, which was 5.3 times higher than the proportion of the second-highest university (Tan Tao University). HUPH came the third in this category with 2.2% and Can Tho University of Medicine and Pharmacy had 1.1%. The remaining 11 institutes' rates scattered from 0% to 0.7%.

DISCUSSION

According to research findings, training and research universities/institutes in Public Health, such as NIHE and HUPH, had higher scores in international publication achievement metrics than those in Clinical Medicine and Pharmacy, i. e. Hanoi Medical University, School of Medicine and Pharmacy of Vietnam National University, etc. Due to the broadening health researching field and high coverage of research subjects with large sample sizes, Public Health researches had practical applications in preventive medicine. Therefore, Public Health research articles had higher citations than those in Clinical Medicine, which usually consist of smaller sample sizes, higher complexity and longer research periods. Furthermore, Public Health is a relatively new field compared with medicine and pharmacy, thus most Public Health scientists are trained in developed countries including the United States of America, Britain, and Australia. Therefore, public health researchers usually have excellent English skills, which is a huge advantage for writing scientific papers published in international peer-reviewed journals. On the other hand, NIHE had a quite small amount of ResearchGate-registered researchers (57 members) comparing to other institutions. Therefore, in order to have a complete and representative assessment, more researchers and lecturers from these institutions should be encouraged to be registered on the ResearchGate database.

Although there were some research projects on evaluating and ranking international publication capacity of Vietnamese universities in recent years, the findings only showed an overview situation and none of these researches conducted in Medicine, Public health and Pharmacy universities/ institutes, especially at the individual scale (17, 18). This study is considered to be the first one to explore the international publication achievement at individual level in Vietnam. It provided an overview of common metrics on assessing researchers' recognition and international publication capacity of medical, public health and pharmacy universities/ institutes in Vietanm. It is irrefutable that this study precedes other researches on using validated data-collection tools to evaluate and rank international publication capacity of those institutions in particular and Vietnamese training and research institutions in general.

Although this study reported certain important results, some methodological limitations must be taken into consideration. By June 2019, 46.43% of medical, public health and pharmacy universities/faculties/ institutes in Vietnam had no ResearchGate-registered lecturers/researchers or a relatively small amount of mostly outdated profiles. Some institutions had not enough lecturers/ researchers registered on ResearchGate to represent the organizations to be included in international publication capacity analysis.

In addition, ResearchGate was not widely acknowledged among Vietnamese Medical, Public Health, Pharmacy training and research universities/schools/institutes. Futhermore, our research focused on mining data from ResearchGate database, therefore it was possible that other profiles of researchers and lecturers were available on different databases such as ORCID, Google Scholar, etc. Especially in the data collection process, including forming profiles of Vietnamese training and research universities/schools/institutes in Medicine, Public Health and Pharmacy for capacity assessment analysis, ResearchGate database was solely used to collect information. ORCID database offers credible but insufficient information due to its inability to update automatically. Moreover, ORCID doesn't feature assessment metrics such as h-index or number of citation.

There was no validated tool available for evaluating international publication quality and ranking capacity of chosen universities/schools/institutes. Furthermore, there was no collaboration with other universities/schools/institutes during data collection process to verify the validity of data collected from each institute, thus may lead to biased findings. Some researchers and teachers published multiple international papers but possibly did not register on ResearchGate database at the time of data collection (by June 2019), for which the results may not represent the actual situation. In order to have a complete and accurate assessment, it is necessary to conduct larger coverage and more in-depth researches with collaboration from all of Vietnamese training and research institutions majoring in medicine, public health and pharmacy, especially in encouraging lecturers and researchers to register and update their information on the ResearchGate database or other databases such as ORCID, Google Scholar.

CONCLUSION

The international publication achievements of training and research universities/faculties/institutes in medicine, public health and pharmacy in Vietnam were still relatively low. National Institute of Hygiene and Epidemiology, Hanoi University of Public Health, Faculties of Applied Science and Pharmacy in Ton Duc Thang University, Military Medical University, Hue University of Medicine and Pharmacy, University of Medicine Pham Ngoc Thach, Hanoi Medical University, School of Medicine and Pharmacy in Vietnam National University, Hanoi University of Pharmacy, and University of Medicine and Pharmacy in Ho Chi Minh city were the 10 leading institutions in international publication achievements. In general, public health schools/universities and health research institutes had higher international publication achievements than those in clinical medicine.

RECOMMENDATIONS

Research findings suggest that departments of Science and Technology from training and research institutions should document and update publication capacity, encourage academicians to conduct quality studies, publish papers on international journal and register their information to online databases such as ResearchGate, ORCID, etc. Researchers and lecturers should actively

improve their research and publishing skills, specify their research interests and prioritize personal research development. It is necessary for universities and institutes to plan and determine budget for international publication, in order to improve their publication capacity, for which academicians should increase their number of articles on credible international peer-reviewed journals indexed on ISI, Scopus, PubMed… as well as improve their h-index and number of citations.

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