



Scientific output of professors and doctors habilitatus from Medical University of Silesia in Katowice – a comparison of two schools of medicine

Dorobek naukowy profesorów i doktorów habilitowanych
w Śląskim Uniwersytecie Medycznym w Katowicach –
porównanie dwóch wydziałów lekarskich

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ABSTRACT

The purpose of the study was to compare the scientific output of professors and doctors habilitatus of two schools of medicine of the Medical University of Silesia.

MATERIAL I METHODS: Data of scientific output (full text papers from the Web of Science and Scopus) of scientists from the School of Medicine in Zabrze (October 2015) and Katowice (October 2016) were presented.

RESULTS: The mean scientist's age, the mean age of obtaining a PhD, the age of obtained habilitation degree, the age of professorship, the interval from PhD to habilitation and the interval from habilitation to professorship did not differ between the schools of medicine. The scientific output established as the total number of publications differed significantly and was 144.6 ± 124.2 for the School of Medicine in Zabrze and 260.6 ± 227 in the School of Medicine in Katowice ($p < 0.0001$). Other factors indicating scientific output, such as the number of publications with an Impact Factor, the total Impact Factor, the citation index according to Web of Science or Scopus with and without citations of all co-authors and the h-index according to the Web of Science or Scopus did not differ.

CONCLUSION: The scientific output of the two schools of medicine does not differ except the total number of publications.

KEY WORDS

citation index, h-index, scientific output, Scopus, Web of Science

Received: 27.09.2017

Revised: 18.12.2017

Accepted: 18.12.2017

Published online: 26.10.2018

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STRESZCZENIE

Celem pracy było porównanie dorobku naukowego profesorów i doktorów habilitowanych Wydziału Lekarskiego z Oddziałem Lekarsko-Dentystycznym w Zabrze (w październiku 2015 r.) z analogicznymi danymi dla Wydziału Lekarskiego w Katowicach (w październiku 2016 r.) Śląskiego Uniwersytetu Medycznego w Katowicach.

MATERIAŁ I METODY: Dane dotyczące dorobku naukowego dla publikacji pełnotekstowych zostały zebrane z baz Web of Science i Scopus.

WYNIKI: Średnie wartości wieku badanych naukowców, wieku uzyskania stopnia doktora i doktora habilitowanego, wieku uzyskania tytułu profesora, czasu od doktoratu do habilitacji oraz czasu od habilitacji do profesury nie różniły się między wydziałami. Spośród parametrów bibliometrycznych tylko całkowita liczba publikacji wynosząca $144,6 \pm 124,2$ dla wydziału w Zabrze oraz $260,6 \pm 227$ dla wydziału w Katowicach różniła się statystycznie ($p < 0,0001$). Pozostałe kryteria, czyli liczba prac z Impact Factor, całkowita wartość Impact Factor, indeks cytacji według baz Web of Science i Scopus bez wykluczenia i po wykluczeniu autocytacji i cytacji współautorów, a także współczynnik h według obu baz nie różniły się istotnie.

WNIOSEK: Dorobek naukowy obu wydziałów lekarskich nie różni się z wyjątkiem całkowitej liczby publikacji.

SŁOWA KLUCZOWE

dorobek naukowy, indeks cytacji, indeks h, Scopus, Web of Science

INTRODUCTION

Science and the education process are two main missions of all universities. The quantity and quality of scientific output are crucial criteria for external assessment of the ranking any university. The success in research may be easily established using commonly available databases, the Web of Science and Scopus. These databases allow one to find complex information regarding individual scientific outputs, including several factors indicating the quantity and quality of scientific output. Among them are: the total number of publications, the number of publications with an Impact Factor, the total Impact Factor, the citation index and the h-index. Recently, the h-index has become one of the most important methods to evaluate individual scientific quantitative/qualitative outputs (1–10) and has been compared with other bibliometric tools. In our recent study, the scientific output of the School of Medicine with the Division of Dentistry in Zabrze was presented [11].

The aim of the current study was to compare the scientific output of professors and doctors habilitatus from the School of Medicine with the Division of Dentistry in Zabrze with analogous data from the School of Medicine in Katowice, both from the Medical University of Silesia, Katowice, Poland.

Scopus in October 2015 for the school in Zabrze and in October 2016 for the school in Katowice. The data for the School of Medicine in Zabrze were the same as presented in our previous paper [11]. Only full text papers were included. Other personal data, concerning the age, the age at PhD, habilitation and professorship were found in the database of the Medical University of Silesia, Katowice (www.sum.edu.pl). All the data gathered concerned all members of both schools of medicine – doctor habilitatus and professors in October 2015 for Zabrze and in October 2016 for Katowice. The term “doctor habilitatus” was used because in Poland and some other European countries this definition is present in daily university practice.

Statistics

All the calculations were performed by means of the Statistica program (StatSoft, Tulsa, OK, USA). Descriptive statistics are presented as mean values and standard deviations. The Student t-test for independent variables or Mann-Whitney U-test were employed, whichever was appropriate, for comparative analyses. The comparison of structure of the analyzed cohorts was based on the chi-square test. Statistical significance was assumed at $p < 0.05$.

RESULTS

MATERIAL AND METHODS

The scientific output of individual scientists was derived from open databases: the Web of Science and

Data were collected for 220 university scholars and scientists. For both schools of medicine the number of persons was equal ($n = 110$). In Table I the results on data of the mean scientist's age, the mean age of



obtaining a PhD, the age at habilitation and the age at professorship for both schools are presented. These data did not differ between the compared schools of medicine.

Table I. Data on age, age of obtaining PhD, habilitation and professorship (mean, SD)

Tabela I. Wiek metrykalny, wiek uzyskania stopnia doktora, doktora habilitowanego i tytułu naukowego (średnia, SD)

Variable	Zabrze	Katowice
age [yrs]	55.7 ± 7.2	56.3 ± 8.1
age at PhD [yrs]	32.7 ± 3.2	32.6 ± 3.5
age at habilitation [yrs]	45.8 ± 5.6	44.9 ± 6.2
age at professorship [yrs]	51.2 ± 5.9	50.8 ± 5.8

None of values differed significantly.

The scientific output data are presented in Table II. The scientific output established as the total number of publications differed significantly and was 144.6 ± 124.2 for the School of Medicine in Zabrze and 260.6 ± 227 in the School of Medicine in Katowice ($p < 0.0001$). Other factors indicating the scientific output such as the number of publications with an Impact Factor, the total Impact Factor, the citation index according to the Web of Science or Scopus with and without citations of all co-authors and the h-index according to the Web of Science or Scopus did not differ.

Table II. Scientific output for both faculties (mean, SD)

Tabela II. Dorobek naukowy dla obu wydziałów (średnia, SD)

Variable	Zabrze	Katowice
Total number of papers	144.6 ± 124.2	260.6 ± 226.7*
Number of papers with IF	33.8 ± 31.3	39.4 ± 41.1
Total IF	61.7 ± 73.2	96.0 ± 175.0
Citation index according to Web of Science	387 ± 531	663 ± 2378
H-index according to Web of Science	8.6 ± 5.3	9.1 ± 6.9
Citation index according to Scopus	514 ± 736	1013 ± 4970
H-index according to Scopus	9.6 ± 6.0	10.1 ± 7.9
Citation index according to Scopus without citations of all co-authors	411 ± 601	860 ± 4287
H-index according to Scopus without citations of all co-authors	8.6 ± 5.2	9.22 ± 7.3

* $p < 0.0001$

Other variables did not differ significantly.

We also calculated the scientific output of the 10-percent group of leaders (11 researchers – Table III), expressing it as a percent of the total (i.e., obtained by the whole Faculty) bibliometric parameters: the number of publications, the number of publications with IF, the citation index according to the Web of Science and the citation index without self-citation according to the Scopus. In the group of leaders the number of publications and the number of publications with an IF did not differ between the faculties, therefore they have comparable role in regard to the size of scientific output for the whole school of medicine. However, the

comparisons of citation indexes indicating output quality have shown that their contribution to the whole school of medicine was greater for Katowice. The individual values of the citation index according to Scopus without citations of all the co-authors for scientists from both faculties are presented in Figure 1, separately for the 10% leaders (Part A) and for the remaining 90% of the staff (Part B). It can be noticed that the discrepancy in the total number of citations between the compared schools of medicine (94 603 in Katowice vs. 45 266 in Zabrze) is strongly determined by the output of the three most cited professors from Katowice.

Table III. Output for top 10% (11 scientists) expressed as percentage of total output of the Faculty

Tabela III. Dorobek dla 10% liderów (11 osób) wyrażony jako odsetek dorobku całego wydziału

Parameter	Zabrze	Katowice	p value
Total number of papers	28.43	29.79	NS
Number of papers with IF	30.82	35.32	NS
Citation index according to Web of Science	43.86	64.51	< 0.01
Citation index according to Scopus	46.47	71.75	< 0.001
Citation index according to Scopus without citations of all co-authors	45.85	72.03	< 0.001

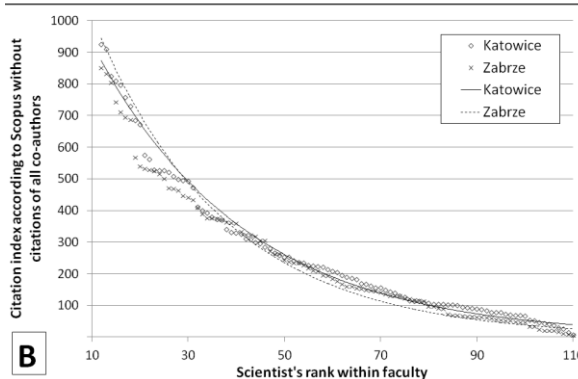
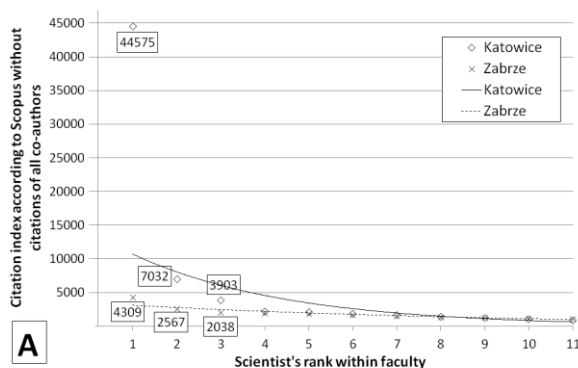


Fig. 1. Individual values of citation index according to Scopus without citations of all co-authors for scientists from both faculties, presented separately for 10% leaders (Part A) and remaining 90% of staff (Part B).

Ryc. 1. Wyniki indeksu cytacji dla pojedynczych osób z obu wydziałów według bazy Scopus bez cytacji przez wszystkich współautorów, prezentowane dla 10% liderów (część A) i pozostałych 90% osób (część B).



We also calculated the scientific output of the 10-percent group of subjects with the least research activity (11 researchers – Table IV), and for both faculties their output was poor and did not differ between the faculties.

Table IV. Output for 10% (11 scientists) with the lowest output expressed as percentage of the total output of the Faculty
Tabela IV. Dorobek dla 10% (11 osób) z najniższym dorobkiem wyrażony jako odsetek dorobku całego wydziału

Parameter	Zabrze	Katowice	p value
Total number of papers	2.85	2.58	NS
Number of papers with IF	1.67	1.98	NS
Citation index according to Web of Science	0.63	0.57	NS
Citation index according to Scopus	0.62	0.45	NS
Citation index according to Scopus without citations of all co-authors	0.54	0.45	NS

DISCUSSION

In the current study the data of the scientific output of two schools of medicine of the Medical University of Silesia are presented. Generally, the total scientific output is comparable for both, but more detailed statistical analyses have provided some interesting results. Despite the lack of significant differences in regard to the mean values (beside the total number of publications) the Faculty in Katowice gained higher values in all the categories. However, nowadays the most important criterion is the Hirsch index and in

regard to this parameter, both faculties attained almost the same values. This observation supports the final conclusion of the study.

Especially valuable findings were noted in analyses limited to the top researchers. The leaders in each society typically have an impact on the whole society. For both faculties the top 11 researchers (10% of the staff) contributed a significant part of the whole scientific output. The quantity expressed by the number of publications and publications with an IF did not differ between the faculties but in regard to quality, expressed by citation indexes, the School of Medicine in Katowice presented a significantly higher level. Hence, the role of the top researchers was even greater regarding the output in Katowice.

In regard to the whole output of both schools of medicine, one should note that the wide range concerns all the presented parameters expressing scientific output. For example: for the School of Medicine in Zabrze, the lowest number of publications was 19 and the highest 941 or the citation index values varied from 3 to 3281. Respective data for Katowice were: 38 and 1619 for the lowest and the highest number of publications and 13 to 24 038 for the number of citations of the least and the most frequently cited researcher (the numbers of citations given here are based on data from the Web of Science, whereas Figure 1 presents the information from the Scopus database).

As a limitation of the study the 1-year difference between the moment of collecting data for the compared schools of medicine (October 2015 versus October 2016) may be considered.

Concluding, the scientific output for both schools of medicine does not differ except for the total number of publications.

Author's contribution

Study design – W. Pluskiewicz, P. Adamczyk, B. Drozdowska
Data collection – R. Kuźniewicz
Data interpretation – W. Pluskiewicz, P. Adamczyk, B. Drozdowska
Statistical analysis – P. Adamczyk, W. Pluskiewicz
Manuscript preparation – W. Pluskiewicz, P. Adamczyk,
Literature research – W. Pluskiewicz

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