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Comparison among Selected Journal Quality indicators of Public Health Journals

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ABSTRACT

Purpose– *The research work undertaken herein analysed research quality indicators and parameters of significance towards assessment of scientific journals published in the domain of public health. Selected research appraisal instruments highlighted comparisons between indicators and disparities amid different values. Likewise, research apprehended performance features of highly cited journals and displayed level and sort off correlations within tested indicators to enable predicting journals informational values. Bibliometric indicators and Scientometrics tools used to assess journals quality ranking benefit from complex algorithms and reputable databases. The main objective of this research work is to judge currently employed (2015) scientific journal quality indices with stress on the widely used four indicators, namely: Journal Impact Factor (JIF), Eigenfactor score (ES), Scimago Journal Rank indicator (SJR) and H5. Particular public health journals were chosen from their category within Web of Science. JIFs and ESs are obtained from Journal Citation Report and the SJR from the Scimago Journal and country rank website.*

Design/Methodology/approach– *The 260 selected public health journals were recorded but in discussion area 50 journals data is displayed only and their associated information retrieved from their original sites in relating associated JIF, SJR, ES and H5-indexquality indexes for ranking and judging their quality. All journals were considered to selected indices. Similarly, correlations between indicators were depicted using Pearson's and Spearman's statistical correlations, calculated using SPSS software. All journals surveyed have the leading standard of quality as being indexed in prominent and esteemed databases such as: Web of Science (WoS) and Scopus.*

Findings–*Examined JIFs ranged between 14.722 and 0.13; ES varied between 0.08229 and 0.00007, while JSR oscillated between 7.227 and 0.129 and H5-index swung between 92 and 4. A high Pearson's* **(***r***)** *statistical correlation occurred between JIF and both SJR and H5 indicators for journals in this category* **(***r = 0.898 and r = 0.8577, respectively***)***, while being rather lower between JIF and ES values* **(***r = 0.544***).** *With respect to Spearman's rho statistical correlation, a high correlation appeared between JIF and each of SJR and ES indicators for journals in Public health* **(***coefficient value of 0.811 and 0.700, respectively***)** *and a nearly similar correlation between JIF and H5 rankings* **(***coefficient value = 0.642***).**

Practical implications

The study is highly applicable in understanding the importance and application of various indices like JIF, SJR, ES and H5-index to determine the quality of Journals. Further, it provides an insight towards determining the correlations between the indicators in determining global ranking of public health journals.

Research Type :*Research Paper*

Keywords: *Journal Rank, Bibliometric indicators, Impact factor, Scimago indicator, Eigenfactor score, H5-Index, Public health journals*

INTRODUCTION

Availing research results, material, conclusions and findings to scientific assemblies; negotiations by academic settings; deliberations in the media and considerations by researcher forums is of paramount importance and value for the generation of accredited research outcomes, citation implications, detailed research work, ongoing studies and general research spheres or scientific boards.

Scientific research assessment is of advantage to various experts, professional cadres, specialized societies, individual scientists, interested researchers, learned establishments, funding entities, private enterprises, academics, librarians, writers, and authors; while targeting reputed journals for publication **(Nagaraja & Vasanthakumar, 2011)**. Apparently, high research quality of various sources is vital for appointing, hiring, advancing and promoting the parties concerned, especially when being published in high quality and reputable public health scientific journals. Quality criteria and scale usually are regulated through well-established Scientometric tools and measures. Use of bibliometric indicators in the assessment of research and scientific journals has its pros and cons. Presently, the most reverted-to bibliometric and Scientometrics indicators in the scientific field comprise: Journal Impact Factor or Eugene Garfield factor (JIF), Eigen factor score (ES), Scimago Journal Rank indicator, and H5 indicator. Table 1 gives an overall overview of the significant parameters concerning those factors, which are also depicted in the honeycomb of Figure (1). Several parameters affect the number of citations of a journal, including: journal history, journal's indexing in an accredited database, rate of international cooperation, and country of publication **(Hussain & Swain, 2011; Jamali, Salehi-Marzijarani, & Ayatollahi, 2014)**.

Generally, academic and research institutions rely on one or the other of these indi-

cators in classifying scientific and academic writing, rarely it be when a combination of those used for ranking and classification. Among the four indicators, JIF is the most widely used indicator from the authors' experience and work.A brief overview of the four bibliographic indices is given in the next sections.

Relying on a single indicator (most commonly JIF) and ignoring the others is a widespread practice, but it may lead to disregard of a valuable body of scientific research that would have otherwise benefited the institution, especially for non-English publications, which tend to be less cited than their English counterparts. The JIF has been criticized by some authors for having severe shortcomings like English-language bias and influence of self-citation (**Ramin & Shirazi, 2012)**. Thus, this study is trying to compare those factors with regards to public health journals, show their discrepancies, and draw some suggestions for practice based on those results.

JOURNAL IMPACT FACTOR

One of the oldest and well-established factors used to measure journal influence. It was devised by Eugene Garfield (hence the other name, Eugene Garfield factor), who is also the founder of Institute for Scientific Information. The factor is calculated annually by dividing the number of citations to articles published in the journal for the past two years, by the number of articles published in the journal in the same time frame **(Garfield, 2006)**.

SCIMAGO JOURNAL RANKING

A scientific indicator developed by Scimago lab and backed up by the Scopus database. The project has rankings for both journals and countries. The SJR indicator is based on an algorithm like Google's PageRank, one of the well-known search ranking algorithms that were developed by Google's cofounder, Lawrence Page. Citations are based on the Scopus database, covering a window of 3 years. The ranking takes into account journal prestige, which gives more weight to citations for highly ranked journals **(Scimago, 2007).**

EIGEN FACTOR SCORE

An academic project that was established in 2007 in the University of Washington. It is used to rank journal citations. It gives more weight to citations from highly ranked journals. The factor also varies with the journal size, doubling the journal size doubles the resulting Eigen factor. The algorithm used is similar to Google's PageRank (**Ramin & Shirazi, 2012)**. Citations are based on the Web of Science database, covering a window of 5 years. The factors are calculated and posted on the Eigen factor project's website where they can be accessed and viewed **(Kim and Hong, 2016).**

H5-INDEX

The original H-index (or Hirsch index, after its creator) is an author-level metric, in contrast to publication-level metrics, like the four-metrics used in this study. Basically, an author with an index of h, has published h papers, each of which has been cited h times. Google Scholar took this one step further and devised the H-5 index as a similar tool for ranking publications, rather than authors. It is called H-5. A journal with an index of h has published at least h articles, each of which has been cited h times in other articles, for the period of the last five years **(Google Scholar, 2016)**.

Table 1. An overall Guidance for Significant Journal Quality Indicators

Affecting factor & criterion	**JIF**	**SJR**	**ES**	**H5**
Calculation		Compute journal prestige SJR (PSJR), a size-dependent measure. Normalize PSJR to a size-independent measure, the SJR indicator.	Algorithm similar to Google PageRank.	h = largest # that gives: At least h articles were cited, At least h citations per article.
Journal influence		√	√	
# citations	√	√	√	
Prestige of citation source		√	√	
Base of source journal		Elsevier's Scopus database	Web of Science	Wide range
Journal self-citation		√		
Free access				√

(Zacca-González et al, 2014; Pajić,2015; Google Scholar, 2016)

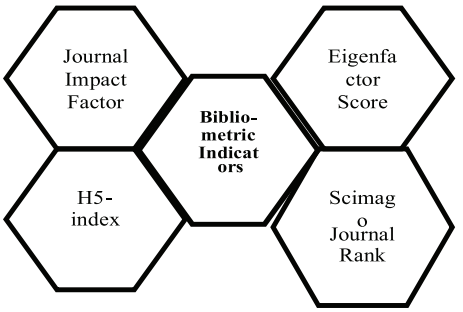


Figure 1. The honeycomb of bibliometric journal indicators

OBJECTIVE

In this research study, the quality metrics and indicators of each of the selected public health journals were then compared in relation to the others. The main objective of this research study was to ascertain database coverage of public health journals in Scopus and Web of Science and to compare the bibliometric factors of these journals as guided by the JIF, ES, SJR and H5 index indicators.

MATERIALS AND METHODS

Certain public health journals were selected and scrutinized for this research study. Applicable information and needed data were gathered from source databases as stemmed from the journal ranking section of Scimago journal and country ranking website and from Web of Science (WoS) Core Collection official website and citations. ISI-and Scopus-indexed journals were tapped for calculation of conceivable journal indicators. The 2015 JIFs and ESs were obtained from Journal Citation Report® (JCR) through WoS. The 2015 SJR and h-index indicators were withdrawn by the Scimago Journal, and country rank provided by Scopus and Google Scholar Citations (GS) metrics under the category of "Public health".

Ranks of every journal as per each metric were also specified and associated statistically. The correlations between extracted indices were assessed using Spearman's and Pearson's' correlation coefficients using Statistical Package for the Social Sciences (SPSS) version 21.0, 2012 release.

RESULTS AND DISCUSSION

Ranking of the journals corresponding to all four indices (IF, ES, SJR and H5) were paired and cross-compared. Correlations between indices were evaluated using Pearson and Spearman correlations, calculated using SPSS 21.0. In general, 260 journals were tabulated and asserted as having "public health" as their specific discipline and platform for the study's comparison purposes. All selected journals were indexed in both ISI and Scopus, with rankings as per Scimago, JIF, ES and H5 in 2015. Table 2 shows the ISI- and Scopus-indexed information for the 260 chosen public health journals.

Detailed information for all selected journals is listed in Table 2. The table evidently shows that very few of the selected public health journals had the same ranking across the selected four indices. This makes it a harder job to compare metrics across the different indicators. Examples of journals with comparable ranks among the different indices include those journals arriving at tail of the table such as: ZdravstvenoVarstvo, Archives Des Maladies ProfessionnellesET De L Environment, and SaludColectiva. All tested journals were assumed to have high standard of quality since they were indexed in the two most prominent and reputable scientific databases, WoS and Scopus.

Table 2. Comparative Rankings of public health journals in 2015 in terms of JIF, ES, SJR AND H5-Index Indices.

Journal Title	Journal Impact Factor		Eigenfactor score		Scimago Journal Rank		H5-Index	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Lancet Global Health	14.722	1	0.00841	49	7.227	1	32	67
MMWR (Morbidity and Mortality Weekly Report)	10.588	2	0.08229	1	5.77	2	86	2
Annual Review of Public Health	10.24	3	0.00728	54	5.049	4	40	38
Epidemiologic Reviews	9.333	4	0.00395	106	3.917	6	0	248
Environmental Health Perspectives	8.443	5	0.05378	4	3.529	7	92	1
International Journal of Epidemiology	7.522	6	0.04205	8	4.381	5	79	3
European Journal of Epidemiology	7.105	7	0.01536	29	3.071	9	41	35
Tobacco Control	6.321	8	0.01947	23	2.855	12	51	18
Epidemiology	6.075	9	0.02447	15	2.981	11	52	16
Journal of Toxicology and Environmental Health-Part B-Critical Reviews	5.552	10	0.00254	142	2.341	19	0	248
Bulletin of The World Health Organization	5.296	11	0.02014	22	2.819	13	53	14
American Journal of Epidemiology	5.036	12	0.05118	6	3.047	10	68	8
Journal of Clinical Epidemiology	4.703	13	0.03239	11	2.559	17	55	10
American Journal of Preventive Medicine	4.465	14	0.04437	7	2.764	15	76	4
Indoor Air	4.33	15	0.00536	77	1.666	36	34	55
American Journal of Public Health	4.138	16	0.06481	3	2.52	18	74	5
International Journal of Hygiene and Environmental Health	3.98	17	0.00687	57	1.499	42	37	44

Journal of Epidemiology and Community Health	3.865	18	0.02063	21	1.89	31	55	10
Journal of Adolescent Health	3.838	19	0.02525	13	1.91	27	55	10
Nicotine & Tobacco Research	3.811	20	0.02344	17	1.904	28	44	27
Scandinavian Journal of Work Environment & Health	3.793	21	0.00609	68	1.835	32	34	55
Occupational and Environmental Medicine	3.745	22	0.01138	42	1.597	38	43	28
Palliative Medicine	3.685	23	0.00681	58	1.914	26	40	38
Infection Control and Hospital Epidemiology	3.669	24	0.02273	18	1.985	25	48	21
Cancer Epidemiology Biomarkers & Prevention	3.622	25	0.03847	9	2.579	16	60	9
Aids Patient Care and Stds	3.578	26	0.00716	55	1.998	24	36	48
Journal of Global Health	3.559	27	0.0018	171	0	253	0	248
Environmental Health	3.453	28	0.00998	45	1.898	29	42	31
Health Expectations	3.207	29	0.00415	102	0.767	126	29	80
Drug Safety	3.206	30	0.00636	61	1.359	54	37	44
Journal of Health and Social Behaviour	3.19	31	0.00641	60	1.727	34	31	70
Journal of Exposure Science and Environmental Epidemiology	3.141	32	0.00609	68	1.442	49	33	62
Environmental Research	3.088	33	0.01406	31	1.452	48	45	23
Medical Care	3.081	34	0.02257	19	2.004	23	45	23
Aids and Behaviour	3.063	35	0.02484	14	2.006	22	52	16
Paediatric and Perinatal Epidemiology	2.958	36	0.00625	62	5.514	3	34	55
Prevention Science	2.926	37	0.00623	64	1.514	41	32	67

Preventive Medicine	2.893	38	0.02369	16	1.621	37	54	13
Social Science & Medicine	2.814	39	0.05174	5	1.894	30	71	7
Neuroepidemiology	2.784	40	0.00517	78	1.726	35	28	86
Population Health Metrics	2.768	41	0.00562	75	3.231	8	31	70
International Journal of Public Health	2.754	42	0.00554	76	1.21	69	29	80
European Journal of Public Health	2.751	43	0.01233	38	1.284	60	43	28
Antimicrobial Resistance and Infection Control	2.716	44	0.00133	193	1.096	81	20	146
Cancer Causes & Control	2.68	45	0.01672	28	1.584	39	42	31
Cancer Epidemiology	2.644	46	0.00833	50	1.439	50	34	55
Genetic Epidemiology	2.553	47	0.01178	40	2.101	21	34	55
Journal of Epidemiology	2.546	48	0.0049	84	1.463	46	31	70
Globalization and Health	2.54	49	0.00429	98	1.261	63	30	76
Critical Public Health	2.53	50	0.0021	155	0.936	94	22	127

The 260 selected journals were classified with “public health”as the main discipline and domain under review but 50 journals were selected for display. All journals were indexed in WoS and Scopus databases. In terms of JIF (JIF score in parenthesis), the most cited top three journals were: Lancet Global Health (14.722), MMWR - Morbidity and Mortality Weekly Report (10.588) and Annual Review of Public Health (10.24). These journals were closely followed by Epidemiologic Reviews (9.333) and Environmental Health Perspectives (8.443).In contrast, the lowest citations were scored by Archives Des Maladies ProfessionnellesET De L Environment (0.184) and SaludColectiva (0.13).Eigenfactor Score (ES score in parenthesis) revealed that the three journals that ranked at the top were: MMWR-Morbidity and Mortality Weekly Report (0.08229), Journal of BMC Public Heath (0.08031) and American Journal of Public Health (0.06481). Both of ZdravstvenoVarstvo, and Archives Des Maladies ProfessionellesET De L Environment, scored 0.00007, the lowest ES score recorded for the journals selected in the study.

SJR indicator incidentally coincided with JIF for ranking its top three journals (SJR score in parenthesis):Lancet Global Health (7.227),MMWR-Morbidity and Mortality Weekly Report & Technology (5.77) and Paediatric and Perinatal Epidemiology

(5.514). SantePublique, and Archives DesMaladies ProfessionnellesET De L Environment, stalked at the end of the list of the assessed journals, with SJR scores of 0.151 and 0.129, respectively.

As for H-5 Index, the top three journals were (H-5 index in parenthesis): Environmental Health Perspectives(92), MMWR-Morbidity and Mortality Weekly Report (86),and Technology and International Journal of Epidemiology (79). Minimum scores were obtained by: Archives Des Maladies ProfessionnellesEt De L Environment, (5) and Aerospace Medicine and Human Performance (4).

It is interesting to note the repeated higher score attained by MMWR-Morbidity and Mortality Weekly Report for the different indexes used in this research study. Other journals fluctuated within their quality levels for the different indicators tested.

Tables 3 and 4 cross-compare the first ten JIF-ranked public health journals with their respective ES and H5 rankings.

Table 3. Comparison of the top 10 JIF-Ranked Public Health Journals with their respective ES Rankings.

Journal	JIF Rank	ES Rank
Lancet Global Health	1	49
MMWR-Morbidity and Mortality Weekly Report	2	1
Annual Review of Public Health	3	54
Epidemiologic Reviews	4	106
Environmental Health Perspectives	5	4
International Journal of Epidemiology	6	8
European Journal of Epidemiology	7	29
Tobacco Control	8	23
Epidemiology	9	15
Journal of Toxicology and Environmental Health-Part B-Critical Reviews	10	142

Table 4. Comparison of the top 10 JIF-Ranked Public Health Journals with their Respective H5 Rankings.

Journal	JIF Rank	H5 Rank
Lancet Global Health	1	67
MMWR-Morbidity and Mortality Weekly Report	2	2
Annual Review of Public Health	3	38
Epidemiologic Reviews	4	248

Environmental Health Perspectives	5	1
International Journal of Epidemiology	6	3
European Journal of Epidemiology	7	35
Tobacco Control	8	18
Epidemiology	9	16
Journal of Toxicology and Environmental Health-Part B-Critical Reviews	10	248

Table 5 displays a bivariate correlation between the four indicators (JIF, ES, SJR and H5) for ranking of the selected public health journals. As shown in the table, there is a high Pearson's (r) statistical correlation between JIF and SJR indicators (r = 0.898) and a rather low statistical correlation between JIF and H5 indicators for journals in the selected category (r = 0.577). This correlation is lowest between JIF and ES values (r = 0.544).

With respect to Spearman's rho statistical correlation, a high correlation existed between JIF and each of SJR and ES indicators for journals in public health (coefficient values of 0.811 and 0.700, respectively) while a low correlation was recorded between JIF and H5 rankings (coefficient value = 0.642).

Table 5. Bivariate Correlation between three of the Indicators used for Ranking Public Health Journals

Correlation statistic	Coefficient value	Sig.
Pearson's r between JIF and ES values	0.544	.000
Pearson's r between JIF and SJR values	0.898	.000
Pearson's r between JIF and H5 values	0.577	.000
Spearman's rho between JIF and ES rankings	0.700	.000
Spearman's rho between JIF and SJR rankings	0.811	.000
Spearman's rho between JIF and H5 rankings	0.642	.000

Figure 2 represents a bump chart for the top ten JIF-ranked public health journals in comparison with their respective SJR ranking. The figure clearly describes the varying array of ranking of both indicators for the selected public health journals.

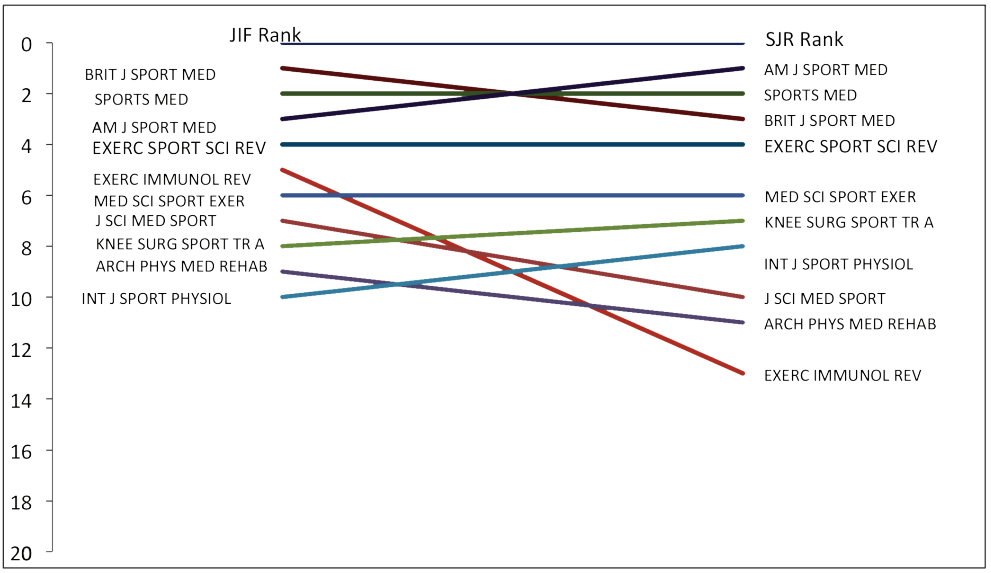
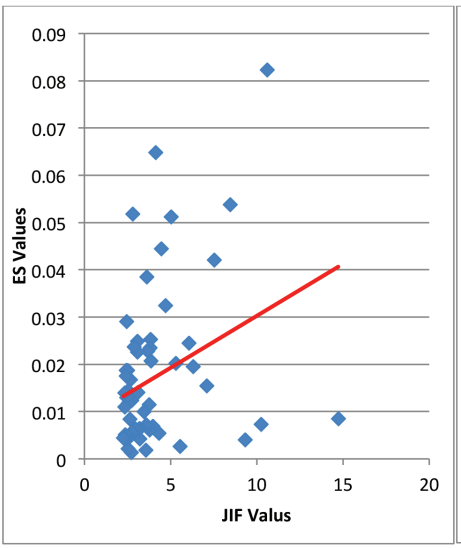
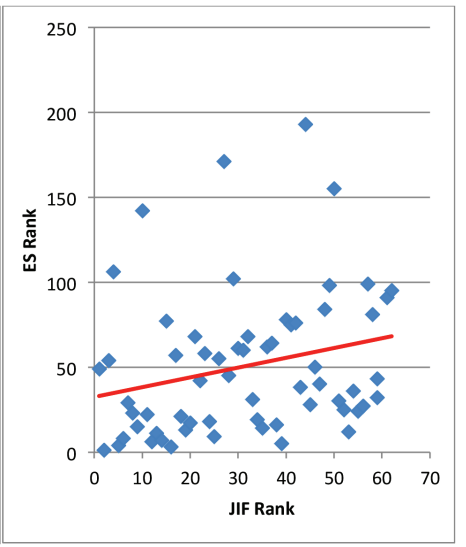


Figure 2. Bump chart for top 10 JIF ranked public health Journals in comparison with their respective SJR rankings.

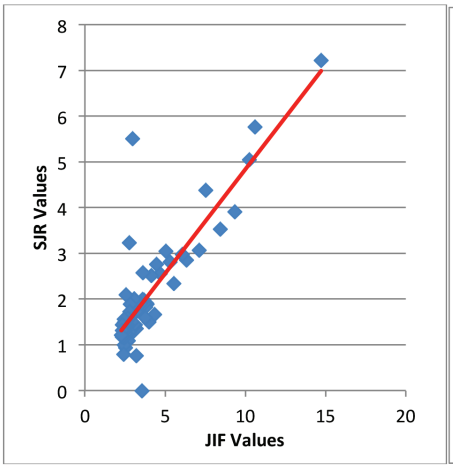
Figure 3 depicts six scatter plots showing the correlation between JIF, ES, SJR and H5(values and rankings) as well as their fit lines for the 260 public health journals incorporated in this study. Figures (3-a) and (3-b) shows a linear correlation between the values and ranks of JIF and ES indices. Figures (3-c) and (3-d) shows a stronger relationship between the values and ranks of JIF and SJR indices. Figures (3-e) and (3-f) shows the same for the correlation between the values and ranks of JIF and H5. A linear correlation between the different values of indices (ES versus JIF, and SJR versus JIF) is clearly revealed in the figures. Likewise, linearity of relationship is obvious between ranks of ES versus JIF, SJR versus JIF and H5 versus JIF.



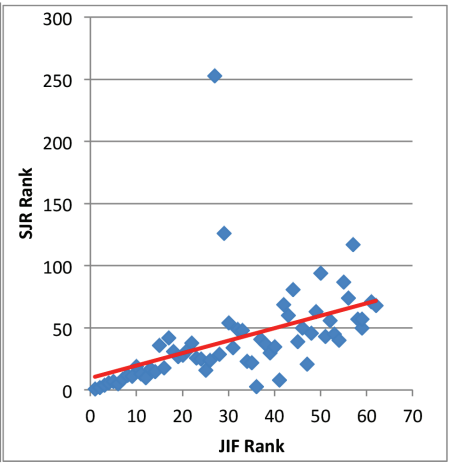
(*a*) *JIF versus ES values*



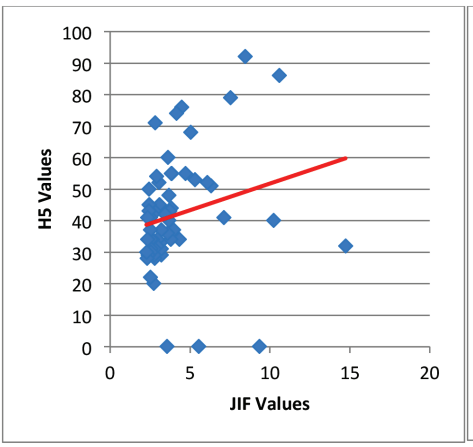
(*b*) *JIF versus ES ranks*



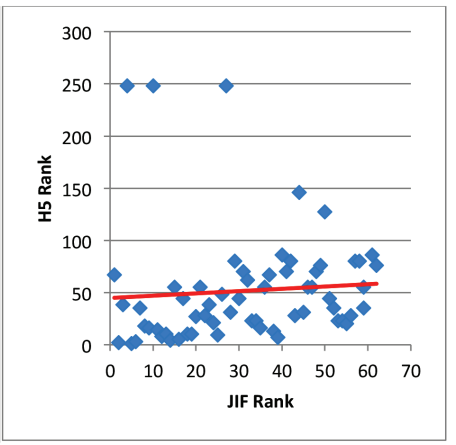
(*c*) *JIF versus SJR values*



(*d*) *JIF versus SJR ranks*



(*e*) *JIF versus H5 values*



(*f*) *JIF versus H5 ranks*

Figure 3. Scatter plots showing correlation between JIF, ES and SJR (*values and rankings*) *as well as their fit lines for 260 Public Health journals.*

Collected research statistics data and information disclosed that usage of the SJR index does not really adjust the system classification of public health journals compared to the JIF or its method of computation. Since Scimago Journal and Country Rank is free access, this suggests that SJR may be adopted as an alternative, or in addition, to the JIF for public health journals.

The H5 metric is a reliable tool for quality evaluation of public health journals. H5, JIF, ES and SJR indice sought to be used in combination to propose a more holistic and all-inclusive view of journal quality value and merit. This finding agrees with **Ahmad et al 2016; Ahmad, Abdel-Magid & Hussain, 2017**). An additional ben-

efit from using ES and/or SJR is the effect of journal prestige on journal citations. This means citations from more prestigious journals would have more influence on citations results **(Ramin & Shirazi, 2012)**.

CONCLUSION

From this research study for the four examined and judged public health bibliometric research quality indices (JIF, SJR, ES and H5) the following conclusions emerged:

- Journal Impact Factor (JIF) is the principal index used by researchers and academicians for ranking public health journals, bulletins and periodicals.
- While several shortcomings appear in only using JIF indicator, all SJR, ES and H5 could be more precise quality indices for public health journals. Consequently, it is recommended to use all four indices when determining quality of public health journals.

The 260 selected public health journals were recorded, and their associated information retrieved from their original sites in relating associated JIF, SJR, ES and H5 quality indexes for ranking and judging their quality.

All journals were considered to selected indices. Similarly, correlations between indicators were depicted using Pearson's and Spearman's statistical correlations of the SPSS software. All journals surveyed have the leading standard of quality as being indexed in prominent and esteemed databases such as: Web of Science (WOS) and Scopus.

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