A bibliometric study of the publication type and citation count of *Medical Journal of Malaysia* for the period 1980-2016

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Abstract

Objectives: To evaluate study designs and citation counts of original research published in the *Medical Journal of Malaysia (MJM)*.

Methods: The bibliographic data of the *MJM* for the period 1980-2016 were retrieved from PubMed and analysed using Endnote bibliographic software. Study designs of original journal articles were analysed according to whether the articles were diagnostic study, prognostic study or clinical trial (collectively known as "evidence papers"). The citation counts of the original articles and case reports for the period 2012-2016 were compared in a sub-study using a case-control design.

Results: A total of 3952 *MJM* journal items were retrieved from PubMed for the period 1980-2016; of these, 58.9% were original articles and 29.5% were case reports. Among the original articles, 14.6% were "evidence papers"; 2.3% were diagnostic studies, 7.7% were prognostic studies, 4.6% were clinical trials. In the study period 2012-2016, "other types of original articles" had statistically significantly more citations than case reports. However, there is no difference between "evidence papers" and case reports.

Conclusion: Our analysis shows the distribution of the types of articles appearing in the *MJM* for the period of study and serves as a reference for improving citations counts in the local context.

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Keywords: Bibliometrics; Citation count; Medical Journal of Malaysia; Study design

Introduction

The *Medical Journal of Malaysia (MJM)* is the official publication of the Malaysian Medical Association. It is one of the oldest medical journals in South East Asia since its inception in 1946.[1] A citation analysis of *MJM* for the years 2004-2008 by Sanni et al estimated its impact factor to range between 0.378 to 0.616.[2] In this study, 76.8% of original articles have been cited at least once over the 5-year period and the ratio of total publications to citations was 1:2.6.[2]

To date, there is no analysis of study designs of original articles in *MJM* articles, an issue that is of considerable interest in the era of evidence-based medicine. The proponents of evidence-based medicine have asserted that higher hierarchy study design should be the basis for clinical decision making.[3] We are aware of dissenting views in that some researchers highlighted the limitation of deciding study quality based solely on research design.[4]

Measuring the impact of scientific research is important for various stakeholders such as the research funding agencies, policy makers, publishers, researchers and journal editors. The frequency of the citations received by a journal article is currently the preferred way to measure scientific impact of a journal. The journal impact factor produced by the Clarivate Analytics (previously known as Thomson Reuter) is highly influential in academia. However, *MJM* is not currently indexed in the Journal Citation Report and therefore it does not have an impact factor. (The list of journals included in the Journal Citation Report is searchable at the Clarivate Analytics website[5]). The availability of alternative sources of citation data from

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Google Scholar and Scopus provide an opportunity to examine the "impact" of non-ISI journals such as *MJM*.[6]

This bibliometric study is conducted to assess the potential impact of *MJM* by evaluating the study design and citation count of journal articles published in the recent decades.

Methods

Study design

Bibliometric study with sub-study using a case-control design.

Journal and study period

All publications in *MJM* for the period 1980-2016.

Citation data

Citation data of *MJM* as indexed in PubMed is the primary data source. Full text *MJM* were retrieved from the journal website: http://www.e-mjm.org/past_issues.html).

Data retrieval and editing

Citation data of *MJM* for the study period were downloaded from PubMed into the bibliographic manager Endnote X7. Study designs of all articles were checked individually by one experienced researcher (CLT). A sample of 20 journal articles were checked independently by two other experienced researchers (KGL and EMK) and were found to show complete agreement.

Data extraction

We only extracted data on clinical research (where humans were the study participants). We excluded commentary, conference abstract, editorial, letter and review from our analyses as they provided minimal or no original data. We classified study designs of original research articles and case reports using the definitions as shown below.

Definition of terms

1. Case report. A description of diagnosis and/or management of ten or less study participants.
2. Diagnostic study. An original research evaluating the utility of diagnostic test.
3. Prognostic study. An original research providing follow up data of a group of study participants either prospectively or retrospectively.
4. Clinical trial. A prospective study evaluating an intervention. The assignment of the intervention may be randomized or non-randomized.
5. Other original articles: Research article which are not classified as items 1-4 above.

Additionally, we have classified study designs 2-4 as "evidence papers", since they provide data relevant for evidence-based practice. We have excluded publications types which were small in number from our analyses, including case-control study, validation study, and qualitative research.

The full list of journal articles by study designs is available on request from the corresponding author.

Citation count

Citation count of all *MJM* articles were retrieved from two sources:

1. Scopus, a database produced by Elsevier, reputedly "the largest abstract and citation database of peer-reviewed literature: scientific journals, books and

conference proceedings". The citation data were accessed on 17th July 2018 from the subscription-based website: https://www.scopus.com/.

2. Google Scholar, an open-access web-based search engine that indexes scholarly literature across a broad range of published formats and disciplines. The citation data were accessed on 21st July 2018 from the website: https://scholar.google.com/

Selection of "cases" and "controls" for comparison of citation count

We regarded "evidence papers" published in the period 2012-2016 as "cases". For each "evidence paper", we identified two "controls" – one was "other original article" (not previously selected as "evidence paper") and another a case report from the same issue that published the evidence papers. The citation counts of all "cases" and "controls" were recorded as mentioned above. In two issues of *MJM*, we could not match two "evidence papers" to "other type of original articles" as controls because there were too few original articles. In these two instances, we imputed the median citation count for the missing data.[7]

Data analysis

The journal articles that fell into categories 2-4 (under "Data extraction") were grouped as "evidence papers". The citation counts of study designs were compared by 5-year interval (except for the last group which is seven years). The citation count of "evidence papers", "other type of original articles" and case reports for the period 2012-2016 were compared using Mann-Whitney U test. The citation counts generated by Google Scholar and Scopus were compared using Spearman correlation. We used logistic regression to generate the odds ratio (with 95% confidence interval) of "any citation" of journal article by publication type using case reports as the reference group. Statistical analysis was conducted using IBM SPSS Statistical Software version 25. Statistical significance was set at $p<0.05$.

Results

***MJM* 1980-2016**

From 1980-2016 (37 years), *MJM* published a total of 165 regular issues, excluding supplements. The number of journal articles published in regular and supplement issues indexed in PubMed for that period were 3952 items, of which 2329 (58.9%) were original articles and 1164 (29.5%) were case reports (see Table 1). Other publication types were not reported in detail (e.g. qualitative research, conference abstracts, commentaries, editorials, letters and reviews).

Original articles

The majority of the original articles were retrospective or cross-sectional studies. A total of 340 articles (14.6% of all original articles) were classified as "evidence papers" since they contained data on clinical evidence, 313 (92.1%) of their authors have Malaysian affiliations. Out of 107 clinical trial papers, 53 articles (49.5%) were randomized controlled trial. See Table 1.

Table 1: Number and study design of articles in Medical Journal of Malaysia by year-group

	Total number of articles	Number of original articles	Diagnostic study*	Prognostic study*	Clinical trial*	Evidence papers*	Case report**
1980 – 1984	368	239	1 (0.4%)	3 (1.3%)	7 (2.9%)	11 (4.6%)	106 (28.8%)
1985 – 1989	347	197	2 (1.0%)	5 (2.5%)	3 (1.5%)	10 (5.1%)	115 (33.1%)
1990 – 1994	375	204	6 (2.9%)	6 (2.9%)	16 (7.8%)	28 (13.7%)	122 (32.5%)
1995 – 1999	450	272	3 (1.1%)	21 (7.7%)	12 (4.4%)	36 (13.2%)	110 (24.4%)
2000 – 2004	770	505	9 (1.8%)	38 (7.5%)	21 (4.2%)	68 (13.5%)	163 (21.2%)
2005 – 2009	813	485	16 (3.3%)	60 (12.4%)	29 (6.0%)	105 (21.6%)	238 (29.3%)
2010 – 2016	829	427	16 (3.3%)	47 (11.0%)	19 (4.4%)	82 (19.2%)	310 (37.4%)
	3952	2329	53 (2.3%)	180 (7.7%)	107 (4.6%)	340 (14.6%)	1164 (29.5%)

**denominator is number of original articles; **denominator is total number of articles*

Case reports

In the study period 1980-2016, *MJM* published 1164 case reports, 29.5% of all articles. This proportion is fairly consistent over the past 37 years.

Citation counts

The median citation count for "evidence papers" in 1980-2011 and 2012-2016 were 7 and 4 (based on Google Scholar) and 4 and 2 (based on Scopus), respectively. For the period 2012-2016, the overall percentage of uncited article was 18.1% (Google Scholar) and 32.7% (Scopus). In general, Google Scholar produced higher citation counts than Scopus but these two citation counts were highly linearly correlated (Spearman rho = 0.88, p<0.001). Basing on citation data from Google Scholar and Scopus, we found that "evidence papers" and "other types of original articles" showed significantly more citations than case reports (p<0.05 for all analyses). Surprisingly we failed to find any significant difference in the citation count between "evidence papers" versus "other types of original articles". However, all the top five most cited publications in *MJM* are in the category of "evidence papers";[8-12] the citation counts in Google Scholar in descending orders were as follows: 53, 37, 33, 32, 29. Based on Scopus citation data, the odds ratios of "any citation" of evidence papers and other original articles (versus case reports) were 1.84 (95%CI 0.85-3.98, p=0.122) and 2.40 (95%CI 1.08-5.33, p=0.032), respectively (see Table 2).

Table 2: Citation counts by publication type in MJM 2012-2016

	N	Scopus Citation Data	% uncited	Google Scholar Citation Data	% uncited
Evidence papers	57	344 (range, 0-35, median=2)	29.8	416 (range, 0-40, median=4)	14.0
Other original articles	57	241 (range 0-25, median=2)	24.6	288 (range 0-29, median=4)	12.3
Case reports	57	102 (range 0-14, median=1)	43.9	143 (range 0-16, median=1)	28.1

Discussion

The proportion of "evidence papers" in *MJM*, i.e. clinical research articles that provide diagnostic, prognostic or trial data, is approximately 15%. As shown in Table 3, the proportion of diagnostic and prognostic research published in *MJM* appear to be similar to journals in China and India, but the proportion of clinical trials is possibly lower.[13-15] It is notable that the proportion of clinical trial in *JAMA, Lancet* and *NEJM* had reached 35% of all journal articles by 1991.[16]

In a search of PubMed for the period 1980-2016, we found 645 randomized controlled trial publications with "Malaysia" in the authors' affiliations, but only 27 of these were published in *MJM*. [search string: malaysia[ad] AND randomized controlled trial[pt] AND 1980[pdat]:2016[pdat], limit to *MJM* by including "AND Med J Malaysia[ta]" in the search string] (search date: 19th July 2018). This shows that Malaysian authors possibly were more likely to submit clinical trial publications to other journals, mostly to higher impact journals.

Almost one-third of journal articles in *MJM* were case reports. This high proportion has been consistent over the years. The relative ease of writing case reports means that many medical journals receive large number of such submissions. The high proportion of case reports is not unique to *MJM*; review of other journals in China, India and Pakistan show similar situations too.[13,15,17] In view of the low evidence hierarchy of clinical data contain in case reports, some general medical journals have set very high threshold for publishing case reports and have an editorial policy of not publishing case reports on therapeutic intervention, e.g. Lancet actively discourages submissions of case reports in their "Information for Authors".[18]

Patsopoulos *et al* had demonstrated a relative citation impact of health sciences journal articles where meta-analyses and randomized controlled trials received much more citations than other lower hierarchy research articles.[19] In this study, we found a similar trend as well where original research articles received twice as many citations as case reports. We also found a statistically significantly higher percentage of uncited case reports compared to evidence papers and other original articles. Thus, it is probably timely for *MJM* to review its editorial policy regarding the publication of case reports.

Although we found the total citations of "evidence papers" was higher than "other types of original articles", their proportion of uncited articles were comparable. It

is noteworthy that a substantial proportion of "evidence papers" in *MJM* were uncited (Scopus 29.8%, Google Scholar 14.0%). We have not investigated the reasons for the citation frequency of *MJM* articles. Nevertheless, possible reasons may include: a lack of wider appeal of scientific issues addressed by *MJM* articles, or a lack of applicability of research published by *MJM* (e.g. small sample size, lack of methodology rigour, single centre research, etc). This is in keeping with the study by Tahamtan *et al* who concluded that citation counts were mainly influenced by study quality, journal impact factor, number of authors, visibility and international collaboration.[20] We noted visibility or ease of access should not be a hindrance for citation of *MJM* articles since free access to full text was available electronically (since 2010) or via PubMed full text link (since 2013).

In this study, we used citation count generated from both Google Scholar and Scopus as the article-level metric. As shown by Harzing,[6] Google Scholar generated a larger citation count due to a broader range of citing sources beyond the conventional journal articles. Despite the large number of article-level metric, citation count is still regarded as the most practical means to estimate the quality of a journal article.[20]

Table 3: Study designs reported in selected medical journals

Studies	Study description and year	Case report	Diagnostic studies	Prognostic studies	Clinical trials
1970s					
McDermott 1995 *(ref 16)*	Lancet, NEJM, JAMA, year 1971				17%
Fletcher 1979 *(ref 21)*	Lancet, NEJM, JAMA, year 1976		8%	34%	21%
1980s					
Wang 1998 *(ref 14)*	5 Chinese medical journals 1985	14.8%		3.9%	5.6%
1990s					
McDermott 1995 *(ref 16)*	Lancet, NEJM, JAMA, year 1991				35%
Fukui 2002 *(ref 22)*	Two American medical journals, year 1990-1999			21.6%	27.9%
Fukui 2002 *(ref 22)*	Two Japanese medical journals, year 1990-1999			6.2%	14.3%
Wang 1998 *(ref 14)*	5 Chinese medical journals, year 1995	7.6%		6.0%	11.3%
Jin 2010 *(ref 13)*	10 Chinese medical journals, year 1998	28.7%	4.7%	4.4%	11.7%
Rao 2010 *(ref 17)*	6 Pakistani medical journals, year 1998	20.5%			7.9%
2000s					
Hassan 2015 *(ref 15)*	10 Indian medical journals, year 2003	35.5%	6.1%	2.0%	11.9%
Jin 2010 *(ref 13)*	10 Chinese medical journals, year 2008	30.2%	4.8%	5.5%	7.7%
Rao 2010 *(ref 17)*	6 Pakistani medical journals, year 2008	27.1%			18.8%
2010s					
Hassan 2015 *(ref 15)*	10 Indian medical journals, year 2013	26.5%	2.3%	6.5%	12.3%

Conclusion

This bibliometric study of *MJM* for the period 1980-2016 has identified about 30% were case reports and low proportion of articles contributing to clinical evidence. The data in this study may serve as a reference for improving citations counts in the local context. It is probably timely for the *MJM* to set the editorial policy to stimulate submission of journal articles containing clinical research that have greater impact on clinical decision making.

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