ORIGINAL ARTICLE

JOURNEY OF A SCIENTIFIC ARTICLE IN MALAYSIA JOURNAL OF PUBLIC HEALTH MEDICINE FROM 2012-2023: A SCIENTOMETRIC ANALYSIS

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ABSTRACT

Scientometric is a technique for calculating articles' performance, impact, and distribution. This study aimed to determine the most highly cited papers in the Malaysian Journal of Public Health Medicine (MJPHM) between 2012 and 2023 and conduct a detailed analysis of their key features. A search of the Scopus database yielded the most cited papers between 2012 and 2023. The following parameters were examined for the top-cited papers: article title, type, year, nation, number of citations, and average per year. Microsoft Excel was used to do the descriptive scientometric analysis. Out of the 824 MJPHM's papers in the Scopus database, the study showed that the publication increases significantly by year (correlation coefficient of 0.778, p<0.001); more than 95% of papers were authored by more than one author with a collaboration coefficient of 0.7177. Most papers are from authors in Malaysia, and public institutions are the primary funding sources. Ten highly cited papers from Journal Citation Reports have between 9 and 35 citations. Malaysia was the origin of most articles (618, 63.6%). Keyword analysis showed diverse domains of focuses: studies topics of "Factors, Surveillance, and Burden of Food Borne Disease Outbreak in Malaysia", "Occupational Stress and Its Associated Factors Among Academician in A Research University in Malaysia", "Regional Disparities of Health Canter Utilization in Rural Indonesia" are the top-three cited articles. This scientometric analysis illustrates the progress and trend of research in MJPHM. The results may also offer a reference for recognizing the hot issues with the most citations in MJPHM.

Keywords: *Scientometric, Public Health, Citation, Collaboration coefficient, MJPHM.*

INTRODUCTION

The Malaysian Journal of Public Health Medicine (MJPHM) is the official Journal of the Malaysian Public Health Physicians' Association. It was established in 2001 and is an Open-Access, peer-reviewed journal with the primary goal of offering a venue for the publication of scholarly works in the field of public health sub-disciplines, such as epidemiology, biostatistics, nutrition, family health, infectious diseases, health services research, gerontology, child and adolescent health, behavioural medicine, rural health, chronic diseases, health promotion, public health policy and management, health economics, occupational health, and environmental health, Initially, the journal is published in one or two volumes every year[1]. After 2019, the MJPHM published three volumes per year due to the higher volume of papers submitted to the journal. The journal was indexed in the Scopus database in 2012, the MyJurnal database in 2021, the Western Pacific Region Index Medicus, and the SCImago Journal Rank (SJR) of the Malaysian Journal of Public Health Medicine is 0.167[2]. with an H-index of 14. With a cite-score of 0.5 currently, it is ranked at Q4 (Public Health, Environmental, and Occupational Health)[3]. This journal is one of the leading public health medicine journals in Malaysia, where many public health scholars send manuscripts to be published in this journal to disseminate their research findings. With the double-blind peer-review process practiced by this journal, its publication is of the same quality as other scientific papers. Despite this, there is no study on the publication of scientific papers about the scope of the study, the productivity of scientific documents, authors who contribute to the article, citations received, etc. Research on published articles will allow the researcher to know about the focus of research that can be carried out in the future, prominent authors in this field[4,5], and so on since it is one of the leading public health articles in this country. The analysis of citations may represent the quantification and impact of the publication,

author, country, or speciality. However, there are no scientometric findings related to public health. Given the beneficial effect of scientometrics and its contribution to the body of knowledge, therefore, we intended to carry out the scientometric analysis on MJPHM, which will allow the results of the study to be a guide for future studies and to know the expert in the field of public health in Malaysia. Therefore, this scientometric study was performed to analyze the scientific effect of the published articles in MJPHM by the Scopus database.

The scientometric analysis is a popular systematic technique for assessing research output and analyzing relevant literature using mathematical and statistical methods. Numerous scientific disciplines have used scientometric analyses to map the literature, show how research fields have historically developed, and assess how productive scientists, organizations, nations, and publications have been in their scientific endeavours[6,7]. A journal's scientific metric study is significant since it offers information beyond the journal's purview. The journal benefits from scientometric studies since they give readers a brief overview of numerous papers published over time and details on how the journal has changed regarding themes, content, impact factors, etc. Researchers frequently submit data on the number of publications, types of documents, years of publication, pages, citations, etc., in journal scientometric analyses[8]. However, other scholars have analyzed and visualized their scientometric findings[8-10]. Several circumstances led to the research and publication: first, the MJPHM Journal is a good quality journal that publishes the best science within its purview and evaluation; second, no analysis should have been done for this journal.

Several scientometric analyses have been carried out in particular journals. Mokhtari et al. (2020) carried out a scientometric study on 2,056 papers published in the Journal of Documentation (JDOC); they reported an increasing trend in published papers and received citations. Widespread keywords and keyword co-occurrence patterns showed that the journal considered most LIS-related topics, including newly emerged ones. The authors and sources (generally journals) JDOC cited are prolific and influential. In addition, Özdemir, M. and Selçuk, M. (2021)[10] carried out a scientometric analysis of the International Journal of Islamic and Middle Eastern Finance and Management (IMEFM) and found that the proportion of empirical studies in all articles published each year has been increasing. Malaysia is the nation most frequently studied in the articles; papers about Islamic banking are the most common; they also reported that technology-based projects like cryptocurrency and crowdsourcing are the gap that needs to be addressed. In Malaysia, there are also some studies on specific journals, such as Bakri and Wallet (2011)[11], who surveyed the Journal of Malaysia Science Computer. In addition, Tiew et al.[12] also conducted a scientometric on the scientific publication of the Malaysian Library and Information science publication from 1996-2000. However, there are no scientometric findings related to public health. Given the beneficial effect of Scientometric and its contribution to the body of knowledge, therefore we intended to carry out the scientometric analysis on MJPHM, which will allow the results of the study to be a guide for future studies and to know the expert in the field of public health in Malaysia.

METHODS

We utilised the Scopus database to retrieve data online for MJPHM from 2012 to 2023. We used this database as it is one of the most carefully managed abstract and citation databases. Strict content selection and re-evaluation by an independent Content Selection and Advisory Board ensure that the search engine contains the best quality data. Additionally, the database encompasses a broad range of books, conference proceedings, and scientific journals. Furthermore, every data item in Scopus is constantly being monitored and improved by rigorous quality assurance procedures. And therefore, it is a credible source of scientometric data[13]. We used the International Standard Serial Number (ISSN-1675-0306) and the Journal's full name, Malaysian Journal of Public Health Medicine, to search the articles in MJPHM from 2012-2023. The relevant data were extracted from the Scopus (https:// www.scopus.com/) webpages provided by the Malaysia National Institute of Health, Ministry of Health Malaysia. Two researchers (A and B) performed data search and extraction independently. The extracted information included the number of published documents in each database, most productive institutions, authors and countries, citation frequency scores, funding agencies and subject categories.

The data in the .csv file was exported to Microsoft Excel. To guarantee the study's validity and dependability, Authors C and D, the co-authors, screened the papers several times before analysing them. A third author's view was sought to reach a consensus if there was a disagreement. Eight hundred twenty-four scientific publications published between 2012 and 2023 were included in the final databases.

Data were analyzed using SPSS software to identify the annual trends of publications, top productive authors, citation frequency. We present productivity and impact in the form of an *h*-index[14] and an e-index[15]. Broadly, *h*-index is measured as *h* number of publications with at least *h* citations, e-index (a complementary value to the h index), accounted of excess citations of

papers used in the evaluation of the h index, of the author: institutions and countries contributions, and hot topics from top frequent keywords. The cooperation coefficient was determined using the formula suggested by Ajiferuke et al. (1988)[16]. In addition, VOSviewer (v.1.6.15) was used to show the network visualization, bibliographic coupling, co-citation, or co-authorship relations. We also applied text processing using terms such as title and author keywords. Pearson's correlation coefficient (r) was also used to study correlations between specific variables. All statistical analyses were performed using SPSS v. 22.0 (IBM SPSS Software Inc., Chicago, Illinois, USA). p-value <0.05 was considered to be statistically significant.

RESULTS

Table 1 shows that the overall number of scientific articles was 824, with a mean of 68.66 yearly. More than 95% of articles are research papers, followed by review papers (4.5%) and only one letter to the editor—more than 60% of articles cited at least one with an average of 2.30 citations per paper. Figure 1(a) shows a significant increase in publications in 2016, which shows a 3.3-fold increase in scientific papers (from 31 in 2015 to 103 in 2016). The scientific production of 2016-2018 and 2020-2023 was above the mean value—the positive correlation of 0.778 showed an increasing trend of several publications by year (Figure 1(a)). The Pearson correlation revealed a strong positive relationship between the year and the number of publications, indicating an upward trend in the number of publications over the years.

Table 1: Metadata of MJPHM publication from 2012-2023

Description	Scopus database
Period	2012-2023
Documents	824
Average years from publication	68.66
Citation	1893
Average citations per document	2.30
Number of papers cited at least once	494/824(60.3%)
Document types, n (%) Article	786 (95.4%)
Review	37(4.5%)
Letter to Editor	1(0.1%)
Author's Keywords	2237
Authors	1955
single-authored documents	19(2.3%)
multi-authored documents	805(97.7%)
Authors per Document	2.37
Collaboration Coefficient (CC)	0.7177

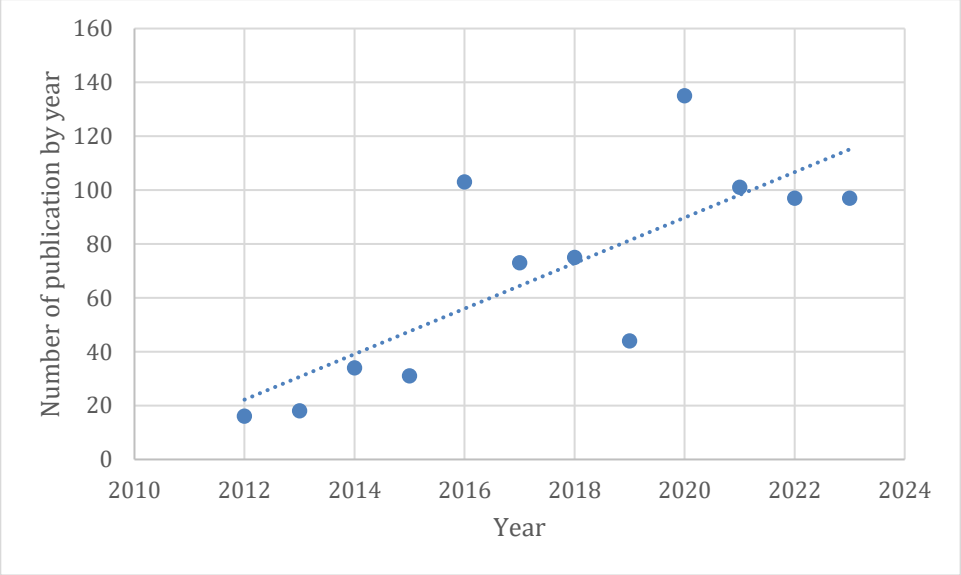

Figure 1(a): Number of scientific publications in MJPHM by year and Pearson Correlation p=0.778, p<0.001

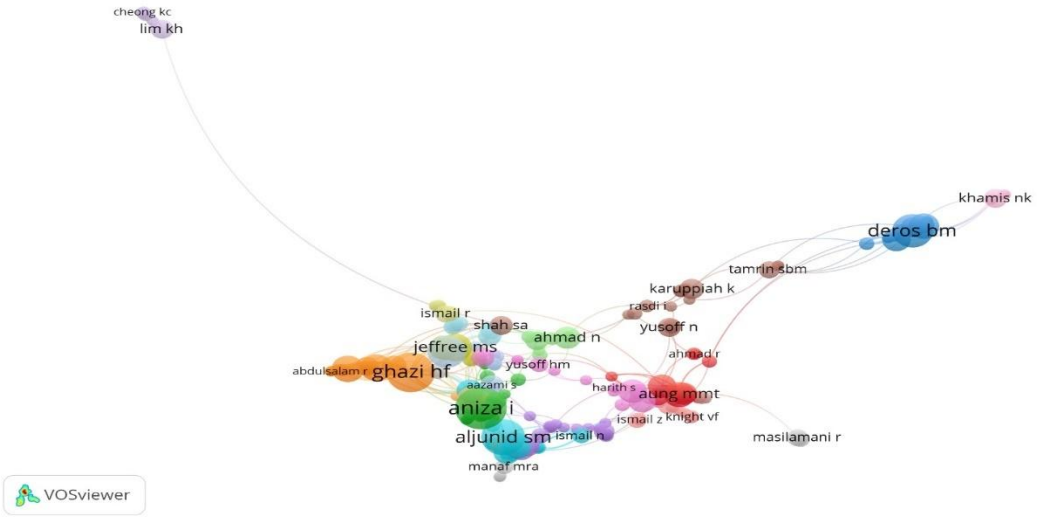

Figure 1(b): Author network collaboration by VOSviewer

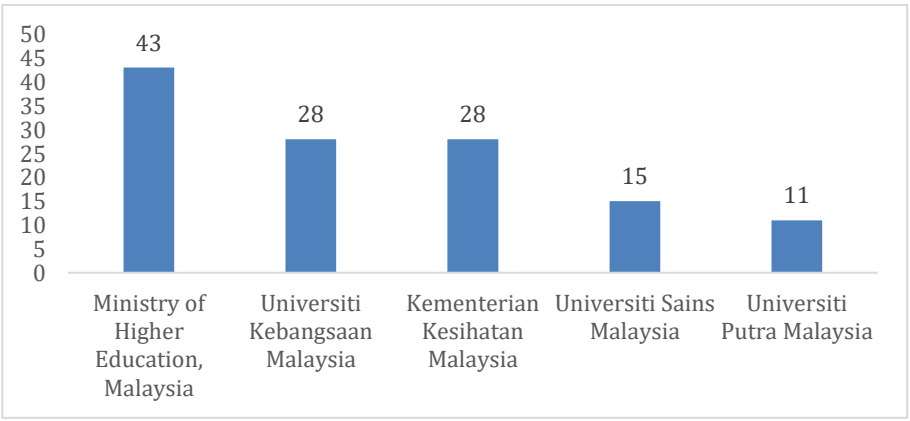

Figure 1(c): The top five funding agencies for papers published in MJPHM from 2012-2023

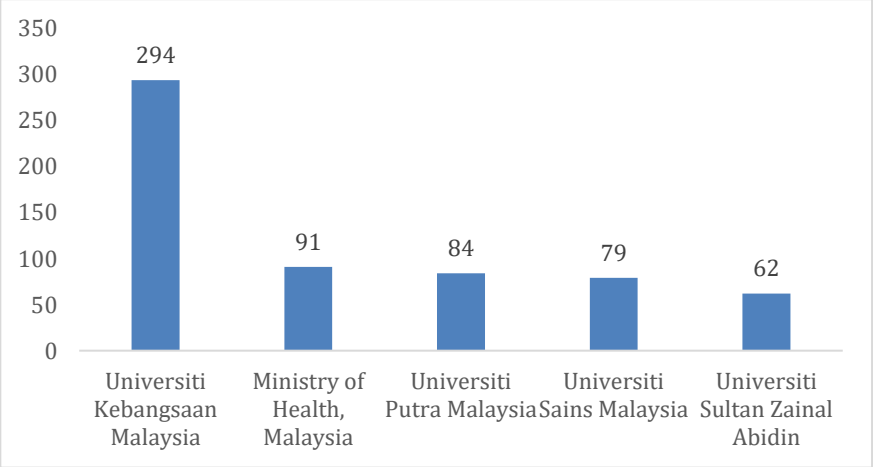

Figure 1(d): Number of publications in MJPHM 2012-2023 by Institution

In this study, a total of 1915 authors contributed to the publications indexed in the Scopus databases. The nine most prolific authors (published more than ten scientific articles) that published documents in MJPHM are listed in (Table 2). The most productive and cited author for MJPHM was Aniza Ismail from Universiti Kebangsaan Malaysia (Malaysia National University), who published 29 articles, followed by Ghazi and Hasanain Faiz from Al-Bayan University, Iraq. Regarding authors' citations in Scopus databases, Al-Junid Syed Mokhtar showed the highest H-index of 60, the most significant number of documents published and the e-index of 246.8. which indicates he is the most prominent figure who contributed scientific articles to MJPHM. The study also found that all top authors are from the academic setting (University), and 4 of them are from the University Kebangsaan Malaysia (Table 2).

Author collaboration

The collaboration coefficient (CC) of the authors was 0.7177. For the top productive authors, the figure showed several clusters among the authors, in which Aniza I collaborated closely with Aazami. Ghazi HS, Abdul Salam Deros S.M., and closely cooperating with a small cluster, Yusof M, Karuppiah, Aunt MMT etc. In addition, several small clusters (such as Masilamani and Lim KH) were also observed in the Figure 1(b). The results showed collaboration between the authors to publish the scientific paper.

Most productive institutions and funding agency

The study found financial support or research grants from public agencies (universities and research institutes under the Ministry of Health, Malaysia). A small portion is from international funding Europe Commission and other agencies. The top 5 funding agencies are shown in Figure 1(c). Among documents indexed in Scopus, most of the funding was from Universiti Kebangsaan Malaysia and another university in Malaysia; besides the Ministry of Health (Figure 1(d)). The study found a significant association between the funding agency and several publications in MJPHM.

Publication of scientific authors by country in MJPHM

Figures 2(a) and 2(b) showed that the bulk of publications were mainly from Malaysia, which made up almost two-thirds of authors (63.6%) and Indonesia (12.7%). Figure 2(b) shows that most authors collaborate to publish scientific articles, shown by the number and percentage of single authors, who only comprised 2.3% (n=19) of the overall publication in MJPHM.

Keyword analysis

Keyword analysis revealed several clusters used by the authors who published the paper in MJPHM from 2012-2023. Namely, (a) occupational health with the keywords of worker, exposure, discomfort, etc.; (b) validation of instrument used in public health; (c) Knowledge, attitude and practice studies related to public health; (d) non-communicable risk factors such as smoking, obese; (e) Covid 19 and vaccination; (f) mental health. In addition, the keywords analysis showed that the study population such as worker, parents, nurse, school going adolescents and etc. The diversity of topics published in MJPHM from 2012-2023 was in line with the objectives of the journals (Figure 2(c)).

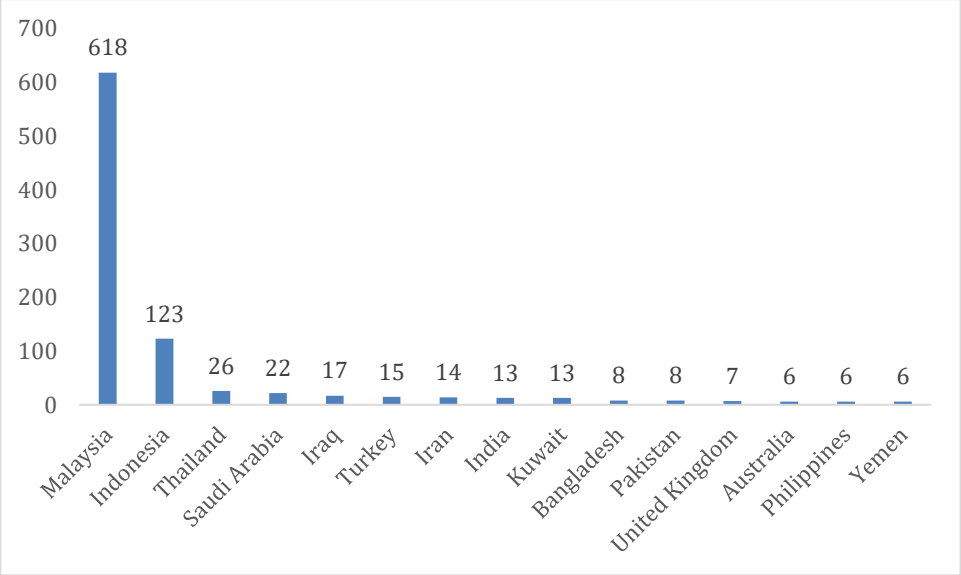

Figure 2(a): Publication by country of author origin in MJPHM from 2012-2023

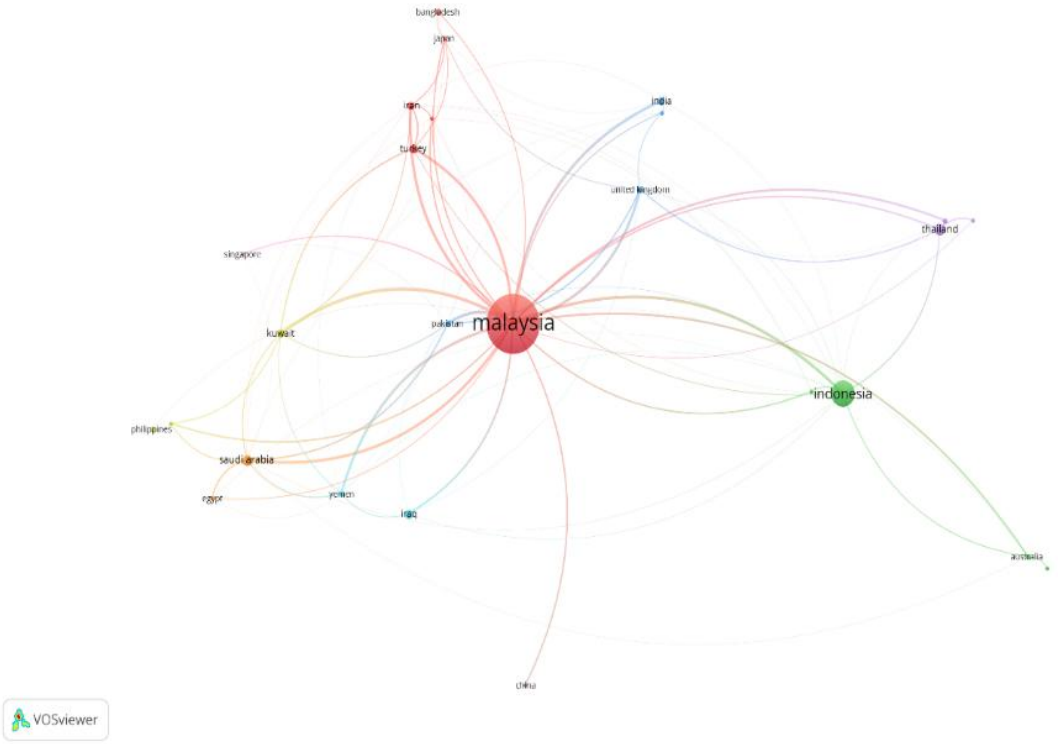

Figure 2(b): Visualization of collaboration between the author collaboration by country

DISCUSSION

Our scientometric analysis thoroughly examined the MJPHM journal during the past 12 years, elucidating scientific publication trends, including research focus, prolific authors, institutions, and nations, based on Scopus databases. The quantity of MJPHM documents in Scopus databases has progressively risen, indicating a substantial scientific research output. An analogous rising tendency has also been documented in scientometric analyses of other journals, such as Donthu and colleagues, who conducted a scientometric analysis in the Journal of Business from 19 in 1973 to 316 in 2017. With a correlation coefficient of 0.753, $p<0.001$[5]. Similarly, Vosner et al.[8] in their scientometric study in the Journal of Computer on Human Behaviour from 1991-2015, revealed a collaboration coefficient of 0.795, $p<0.001$. The study indicated that the publication trend in MJPHM closely followed that of other renowned journals. The analysis revealed that over 95% of scientific articles were authored by two or more individuals, and the cooperation coefficient exhibited an upward trend over time.

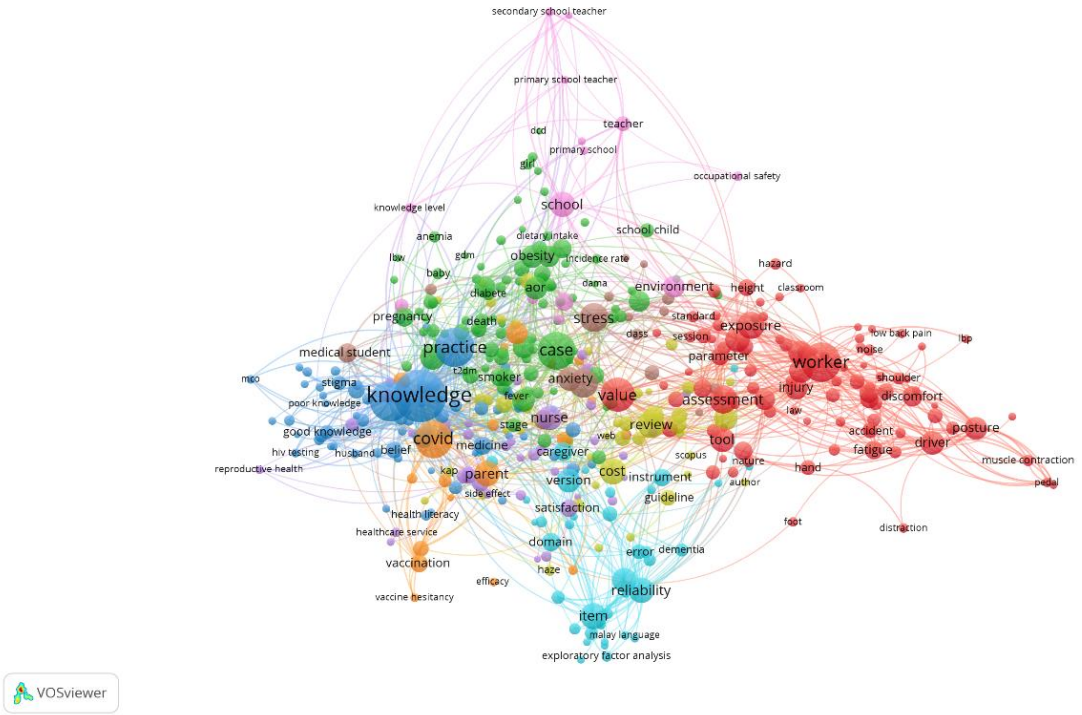

Figure 2(c): Authors' keyword of publication in MJPHM from 2012-2023

Numerous contributors wrote the top 10 highly cited papers in MJPHM. This finding aligns with the research undertaken by Adam et al., which examined the trend of collaboration among researchers in the USA, utilizing a panel of 12 principal sciences among the top 110 U.S. colleges. Consequently, the observations pertain to university disciplines throughout temporal intervals. The degree of collaboration escalates, and papers co-authored by numerous writers' garner higher citation counts[17]. Wuchty et al.[17] conducted a study analyzing 19.9 million scientific papers and 2.1 million patents over the past five decades, beginning in 1950. They reported increased scientific papers across science and engineering, social science, art, and humanities since 1950. For instance, social scientists authored 17.5% of their documents collaboratively in 1955, which rose to 51.5% by 2000, indicating a significant increase in collaboration. This increase may result from the continuous expansion of knowledge, which has likely encouraged researchers to pursue greater specialization, forming more extensive and diversified teams. Furthermore, reduced communication expenses associated with teamwork may render collaboration more economical. Changes in authorship rules may have impacted co-authorship patterns in domains with substantial output, and this advantage has been progressively rising over time. Teams now generate exceptionally high-impact research, a realm previously dominated by individual authors who garnered significant citations. Furthermore, information and communication technology advancements have facilitated collaboration among geographically dispersed research groups, thereby enhancing the potential for more productive research[18].

Most scientific publication authors are affiliated with research universities (UKM) and research institutes under the purview of the Ministry of Health, Malaysia. The findings might be due to the Ministry of Higher Education's policy, which encourages researchers and their postgraduate students to share their findings with peers for career development and graduation, as scientific publication is one of the criteria of the University ranking, which might be another plausible factor in our findings[19,20]. in addition to the ease with which research grants may be obtained, could be among the factors that influenced the results of this investigation. Furthermore, the research institute under MOH carried out the frequency national survey (e.g. National Health and Morbidity Survey on the interval of 4 years). It provided the bulk of data for researchers under MOH to disseminate the findings and offered input to MOH for formulating the policies based on the findings of the studies.

Nine of the most prolific authors published ten or more articles in MJPHM from public universities in Malaysia, especially the University of Kebangsaan Malaysia, and one from the University of Iraq. The findings showed that the researchers/academia in public universities were actively involved in the research and disseminated their findings, which several documents published by each author substantiate. In addition, their publications are widely cited, indicating their usefulness in public

health. Al-Junid Syed Mohamed showed the highest e-index, comparable to top global researchers (e.g. Thomass W Scott)[21].

The research identified the attributes of the ten most referenced papers from MJPHM listed in Scopus. The most-cited documents addressed several critical health concerns pertinent to the Southeast Asia population, encompassing the recent pandemic Covid-10 and other infectious diseases, occupational health, mental well-being, risk factors of non-communicable diseases, tools suitable used to measure specific behaviour, KAP regarding various public health issues. The most cited article by year is the paper by Loksono et al. (2019), who investigated regional disparities of health centre utilization in rural Indonesia, followed by Beckstein et al., who studied the COVID-19 pandemic and mental health in Malaysia: current treatment and future recommendations; the paper was a collaboration between the Fort Lewis College, USA University of Wales Trinity Saint David, United Kingdom and University Malaysia Sabah. The third most cited paper is the work of Dhesi et al. (2019) on the Artificial Intelligence (A. I.) model as a predictor for dengue outbreaks. Other extensively referenced MJPHM articles examined occupational stress, food insecurity in Malaysia, surveillance and burden of foodborne diseases, eating disorders, senior health and physician attitudes towards artificial intelligence from the 11 most papers per year. The A. I. has gained substantial citations, and it might indicate the integration of technology in the field of public health researchers in Malaysia and the focus of future research in public health in this country.

The H-index of MJPHM (14) is almost similar to the Malaysian Journal of Medical and Health Sciences (MJMHS), the H-index of 12[22]. In addition, both journals cite scores are identical (0.5)[23]. A similar index showed that MJPHM is one of the more referenced journals, although it is indexed in the Scopus database. Still, it is only in the Scopus database five years later than MJMHS, which is in the Scopus database. However, this finding must be interpreted cautiously, considering the frequency of publications and different focus on content in each journal.

Most of the funding for articles published in MJPHM comes mainly from the Malaysian government's public funds, which indicates the government's commitment to advocating research and publication in Malaysia. This finding contrasts with the publication by the African Health Journal[24], which comes mainly from foreign funds. The findings might be because the Malaysian government tends to increase research and development to enable the country to become a nation that contributes significantly to the body of knowledge.

Our research examined the evolving annual trends in co-authorship over the history of MJPHM, revealing the most prolific authors and their publication timelines within MJPHM during the study period. Prior research indicates that author citation analysis is an effective metric for assessing the influence and applicability of a researcher's work. Our investigation revealed that authors from Malaysia and Southeast Asia predominated the list based on the number of papers and citation scores. The findings may indicate the applicability and significance of the MJPHM publication to the public health community in Malaysia and neighbouring countries.

Examining the most prolific nations in MJPHM articles identified Malaysia as the foremost country in single-country papers, succeeded by Indonesia and Saudi Arabia. Nonetheless, Thailand, Singapore, the USA, among are the principal participants in international collaboration within the scientific research network. Significantly, most of the leading contributing nations are developing countries, in conjunction with certain industrialized nations; Malaysia countries accounted for 618 out of 824 (63.6%) articles. These findings signify that MJPHM is dedicated to publishing, promoting, and advancing public health research in Malaysia.

The keyword analysis indicated that MJPHM research encompassed critical health dimensions, including the prevalence, risk factors, outcomes, and management of significant endemic diseases, along with affected vulnerable populations such as children and women. The term 'infection' is prominently identified as the keyword with the most co-occurrence in the MJPHM journal, reflecting the range of public health issues pertinent to the region and the array of research topics appealing to the MJPHM readership.

The comprehensive analysis of the most cited articles, keywords, and the most productive countries and institutions is a crucial reflection of the MJPHM journal's scope, objectives, and focus. It champions and fosters the advancement of scientific research in Malaysia and enhances health in Southeast Asia.

Consequences of research results

The findings of this study indicate that MJPHM prudently supports and fosters research advancement in Malaysia and Southeast Asia. The journal offers high-quality services and consistently disseminates publications pertinent to health topics of concern from Malaysia and globally to the scientific community. The journal is dedicated to enhancing the health of Malaysian populations through its focus on prevalent issues such as A. I. usage in public health, non-communicable diseases and health policies.

Table 2: Author published ten papers and above in MJPHM, H-Index, Number of documents and E-Index

R*	Author name	Institution	NA** in MJPHM	H-Index	TNC***	NAP****	e-index
1	Aniza Ismail	University Kebangsaaan Malaysia	29	14	954	101	27.5
2	Ghazi, Hasanain Faisal.	Al-Bayan University, Iraq	24	13	643	78	21.8
3	Al Junid, Syed Mohamed	University Kebangsaaan Malaysia	19	60	64,517	232	246.8
4	Md Deros, Baba Md	University Kebangsaaan Malaysia	16	21	1445	173	31.7
5	Hassan, Mohd Rohaizat	University Kebangsaaan Malaysia	16	14	930	134	27.1
6	Jeffree, Mohammad Safree	University Malaysia Sabah, Malaysia	12	15	1092	151	29.4
7	Baobaid, Mohammed Faez	Management and Science University, Malaysia	11	7	173	27	11.1
8	Aung, Myat Moe Thwe	Universiti Sultan Zainal Abidin, Malaysia	10	7	213	37	12.8
9	Daruis, Dian Darina Indah	National Defense University of Malaysia, Malaysia	10	10	288	65	13.7

R* - Ranking NA** - Number of articles TNC***- Total Number of citation NAP****-Number of articles published

Table 3: The 11 most cited by year scientific article published in MJPHM from 2012-2023

Rank	Title	Year published	Author	Number of citations	Citation density
1	Regional disparities of health centre utilization in rural Indonesia	2019	Indonesia	28	5.60
2	The COVID-19 pandemic and mental health in Malaysia: current treatment and future recommendations	2021	USA	15	5.00
3	Artificial intelligence model as a predictor for dengue outbreaks	2019	Malaysia	24	4.80
4	Occupational stress and its associated factors among academician in a research university in Malaysia	2016	Malaysia	30	3.75
5	Food insecurity situation in Malaysia: Findings from Malaysian Adult Nutrition Survey (MANS) 2014	2020	Malaysia	15	3.75
6	The importance of high index of suspicion and immediate containment of suspected COVID-19 cases in institutes of higher education Sabah, Malaysia Borneo	2020	Malaysia	14	3.50
7	Paper review of factors, surveillance and burden of foodborne disease outbreak in Malaysia	2013	Malaysia	35	3.18
8	Visual reaction time and visual anticipation time between athletes and non-athletes	2018	Malaysia	19	3.17
9	Prevalence and associated factors of eating disorders among students in Taiba University, Saudi Arabia: A cross-sectional study	2019	Saudi Arabia	15	3.00
10	The economic burden of frailty among older adults: a review of the current literature	2020	Malaysia	12	3.00
11	Physicians' attitude towards artificial intelligence in medicine, their expectations and concerns: an online mobile survey	2021	Malaysia	9	3.00

Limitations of the research
While we utilized Scopus databases to evaluate scientific output and monitor the citation history of MJPHM-published documents, other databases like Google Scholar were excluded from the search due to the inability to ascertain the annual citation count of the published works. Consequently, the findings of our investigation need more comprehensiveness. **Ethics approval**
Ethical approval protocol from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia was followed (Approval number: NMRR-22-01011-KTB).

Competing interests
The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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