



Global trend of research and publications in endocrinology, diabetes, and metabolism: 1996–2021

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Abstract

Background & Aims Diabetes and related metabolic syndromes represent a significant global health challenge, with the global burden of diabetes increasing considerably since 1990. In this article, we examined the trend of publications in Endocrinology, Diabetes and Metabolism between 1996 and 2021, focusing on Asian countries.

Methods We obtained and used the data from the Scopus database from the SCImago website (<https://www.scimagojr.com/>), on 1 April 2023, related to the subspecialty of Endocrinology, Diabetes and Metabolism for country rankings between 1996 and 2021. We did not include any data related to other medical specialties or other fields.

Results There has been a steady rise in global publications on these subspecialties over the past decade, with the number of publications from Asian countries increasing significantly. Western Europe recorded the highest number of publications, followed by North America and Asia. The COVID-19 pandemic also contributed to a surge in publications in this field. In Asian countries, China and India have notably increased their global contribution to publications, with China emerging as the top Asian nation in 2021.

Conclusion Our findings provide valuable insights into the research output from various countries and the productivity trends in Diabetes, Endocrinology and Metabolism-related research.

Keywords Diabetes · Endocrinology · Metabolism · Publications · Asian countries

Introduction

Diabetes and related metabolic syndromes represent a significant global health challenge in recent times. The global burden of diabetes has increased considerably since 1990, with substantial variations observed across regions and countries [1]. According to the World Health Organization (WHO), the prevalence of diabetes has risen almost fourfold, from 108 million in 1980 to 422 million in 2014, with an associated 3% increase in diabetes-related deaths between 2000 and 2019 [2]. The International Diabetes Federation (IDF) estimated that the global prevalence of diabetes was 9.3%

in 2019, projected to increase to 10.2% in 2030 and 10.9% in 2045. Diabetes is more prevalent in high-income countries (HIC) (10.4%) than in low-and-middle-income (LMIC) countries (4.0%) and in urban areas than in rural areas [3]. It is concerning that the prevalence of diabetes is rising more rapidly in LMIC countries than in HIC countries, necessitating urgent public health and clinical preventive measures [1, 2, 4]. In particular, China and India have the largest number of people with diabetes globally, and occupy number one and number two positions, respectively [5, 6]

To contribute to understanding the global research publication trend in Endocrinology, Diabetes and Metabolism, we aimed to investigate the trend of publications between 1996 and 2021 using Scopus data on the SCImago Journal and Country Rank (SJR) website. Specifically, we sought to compare the trend of global publications by Asian countries.

Highlights

- Global publications on diabetes and associated diseases have steadily risen
- Asian countries, particularly China and India, have shown a good growth
- COVID-19 pandemic led to a surge in publications, with highest from Western Europe

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Materials and methods

The data for this study were obtained from the SCImago website (<https://www.scimagojr.com/>), on 1 April 2023, by the lead author (RV) of this study. Specifically, we searched for data related to the subspecialty of Endocrinology, Diabetes and Metabolism for country rankings between 1996 and 2021. The following search strategy was used: SCImago website >> Country Ranking >> All subject areas >> Endocrinology, Diabetes and Metabolism >> All regions > Asian regions >> 1996–2021. For this review, we only included the data related to the specialty of Endocrinology, Diabetes and Metabolism and did not include any data related to other medical specialties or other fields. The data were downloaded and recorded in Excel spreadsheets for further analysis. We evaluated the data of all countries, focusing on Asian countries.

The SCImago Journal & Country Rank (SJCR) provides a publicly available and freely accessible platform for determining the ranking of scientific journals and countries. SJCR utilizes scientific indicators developed from the Scopus database, managed by international publisher Elsevier B.V. and updated annually. The rankings of journals, countries and regions can be analysed and compared using these indicators. Additionally, journals can be grouped according to the subject area and category or by country. As such, SJCR provides researchers with a valuable tool for drawing important metrics on journals [7].

Results

Over the past 25 years (1996–2021), 576,722 publications were recorded in Endocrinology, Diabetes and Metabolism, originating from 216 countries. The number of publications in 2021 was 43,960, representing an increase from the yearly

average of the previous 25 years, which was 23,068.9. Notably, the number of publications in these subspecialties has steadily risen globally over the past decade, increasing from 26,328 in 2012 to 43,960 in 2021 (Fig. 1).

A total of 89,312 articles related to the subspecialty of Endocrinology, Diabetes and Metabolism were published by 32 Asian countries between 1996 and 2021, with an average of 3572.5 articles per year. Notably, publications from Asian countries increased significantly in 2021, with 10,541 articles published. In recent years, there has been a substantial rise in publications from Asian countries, with an increase from 4070 publications in 2012 to 10,541 publications in 2021 (Fig. 2).

The percentage of global publications originating from Asian countries has demonstrated a consistently increasing trend over the past decade. From 2012 to 2021, the percentage of publications increased from 15.49% to 23.98%. Notably, several Asian countries have improved their ranking in 2021, except Japan, which experienced a decline in rank from 5 to 6 (Supplement 1).

China has demonstrated significant improvement in its global ranking, emerging as the top Asian nation in 2021 with a global rank of 2 compared to an average yearly rank of 6 over the past 25 years. Furthermore, China's rank amongst Asian countries reached number 1 in 2021 and is way ahead of its other regional neighbours with regard to the quantum of publications. The country's contribution to global publications has increased substantially in the past decade, rising from 4.47% in 2012 to 11.85% in 2021, representing a 165.1% increase. Similarly, India has notably increased its global contribution from 1.55% in 2012 to 2.59% in 2021, signifying a 67% rise (Fig. 3).

India has demonstrated a notable positive trend in publications related to Endocrinology, Diabetes and Metabolism. India's global ranking in this field improved significantly in 2021, with a rank of 10, in contrast to an average yearly rank of 16 over the past 25 years. Amongst Asian countries, India currently ranks third, following China and Japan (Table 1).

Fig. 1 Global trends of publications in Endocrinology, Diabetes and Metabolism, 2011–2021

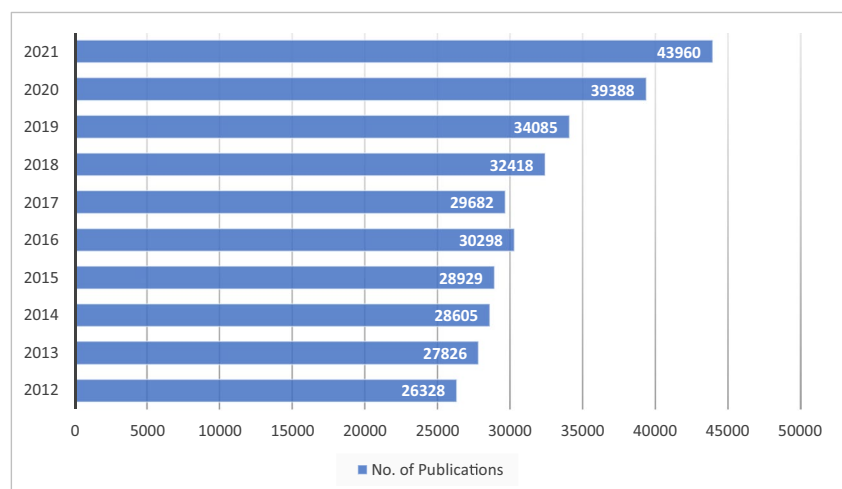


Fig. 2 Trend of publications in Endocrinology, Diabetes and Metabolism amongst Asian countries between 2012 and 2021, showing 158.75% growth

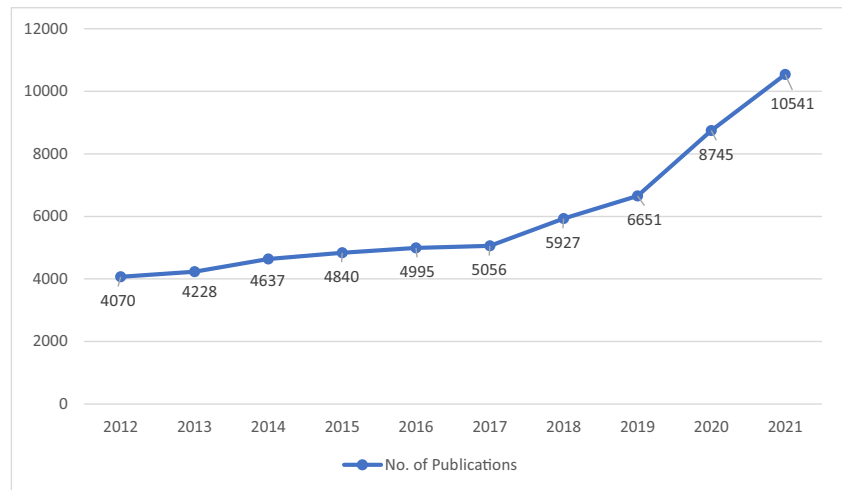


Table 1 provides various metrics related to publications by the 30 listed Asian countries between 1996 and 2021 [7]. It is interesting to note that between the cumulative period from 1996 to 2021 (Table 2), Japan had the maximum number of publications (28,609), followed by China (27,103) and India (9531). However, in 2021 (Table 1), China led the publication list significantly, with 5703 yearly publications, followed by Japan (1490) and India (1097).

Global countries with the highest volume of publications, and their trends in Endocrinology, Diabetes and Metabolism over the past three years, are presented in Fig. 4. Developed countries are prominent in this list, except India, a developing nation that made the list of top 10 countries in 2021 but is still considerably behind the USA and European countries. The United States remained the leading country, followed by China and the United Kingdom (Supplement 2).

The highest number of publications related to Endocrinology, Diabetes and Metabolism between 1996 and 2021 (see Fig. 4) was reported from Western Europe, with 227,560 publications, followed by North America, with

153,436 publications, and Asia, with 89,312 publications. Conversely, Africa was the least productive region, with only 6179 publications in this field. Table 2 lists the top three countries in each of these regions.

Endocrinology, Diabetes and Metabolism witnessed a significant increase in global publications during the initial phase of the COVID-19 pandemic from 2020 to 2021. This trend was also observed in other medical specialties. Kambhampati et al. attributed the surge in publications during the pandemic to various factors, such as increased availability of time for authors to publish, ease of publishing as most journals actively sought COVID-19-related articles, and the fast-tracking of the editorial and publishing processes [8].

Discussion

In this study, we present valuable insights into the trends of publications related to Endocrinology, Diabetes and Metabolism over the past 25 years globally. The study had several strengths,

Fig. 3 Percentage contribution of all Asian countries, China and India to the Global research publications on Endocrinology, Diabetes and Metabolism during 2012–2021

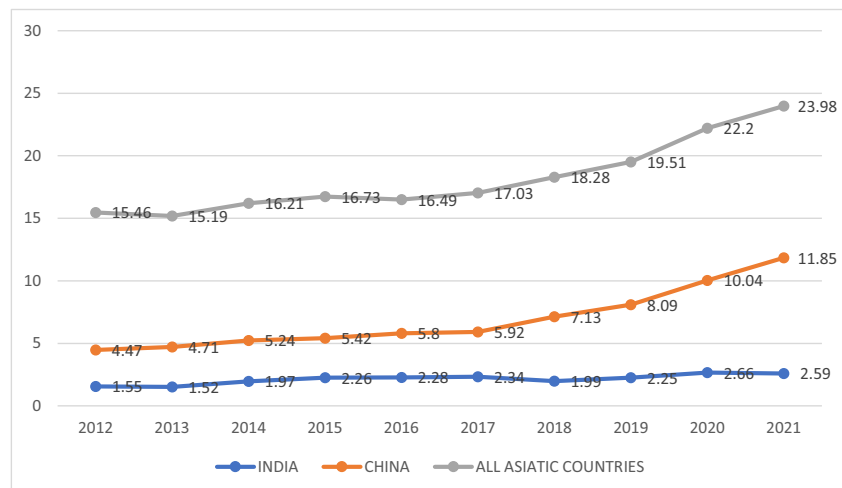


Table 1 Publication metrics of Asian countries in 2021, with China ranking at number 1 (Source: SCImago [7])

Rank	Country	Documents	Citations	Citations per document	H Index
1	China	5703	22183	3.89	187
2	Japan	1490	5891	3.95	252
3	India	1097	5587	5.09	153
4	South Korea	843	3756	4.46	166
5	Taiwan	371	1844	4.97	123
6	Singapore	254	1549	6.1	122
7	Hong Kong	211	1411	6.69	121
8	Malaysia	179	652	3.64	66
9	Thailand	168	701	4.17	74
10	Indonesia	142	820	5.77	48
11	Pakistan	132	687	5.2	70
12	Bangladesh	81	323	3.99	48
13	Viet Nam	61	288	4.72	35
14	Philippines	53	287	5.42	42
15	Sri Lanka	41	132	3.22	36
16	Nepal	30	154	5.13	25
17	Kazakhstan	21	93	4.43	17
18	Macao	7	61	8.71	25
19	Kyrgyzstan	7	79	11.29	9
20	Tajikistan	6	70	11.67	7
21	Turkmenistan	6	70	11.67	6
22	Afghanistan	4	13	3.25	7
23	Brunei Darussalam	3	3	1	9
24	Laos	2	7	3.5	6
25	Myanmar	2	1	0.5	6
26	Bhutan	1	1	1	1
27	Uzbekistan	1	10	10	8
28	Cambodia	1	0	0	8
29	Mongolia	1	2	2	13
30	Maldives	1	0	0	6

such as using a robust data source (Scopus) and using the SJCR platform to determine the ranking of scientific journals and countries. The study focused on Asian countries, which highlighted the growing role of these countries in contributing to the global knowledge base of diabetes research. Such an analysis has not been previously done, to the best of our knowledge.

Overall, the global burden of diabetes has increased significantly since 1990, and it varies substantially across regions and countries [1, 3, 9]. The trend of the global prevalence of type 2 diabetes (T2D) is similar to that of the total burden of diabetes, including people with both T2D and type 1 diabetes (T1D). While the global age-standardized mortality rate and disability-adjusted life years (DALYs) for T1D have declined, an increase in the incidence of T1D is expected by 2040, with

Table 2 Regional contribution of publications and the top three prolific countries in each region during 1996–2021

Region	Country	Publications number
1 Western Europe	United Kingdom	43,136
	Italy	35,132
	Germany	31,000
2 North America	United States of America	153,436
	Canada	21,225
3 Asian Countries	Japan	28,609
	China	27,103
	India	9531
4 Eastern Europe	Poland	10,246
	Russian Federation	5075
	Czech Republic	4097
5 Middle East	Turkey	8500
	Iran	6545
	Israel	5241
6 Latin America	Brazil	12,079
	Argentina	3322
	Mexico	2782
7 Pacific	Australia	17,523
	New Zealand	2808
	Fiji	36
8 Africa	South Africa	1807
	Nigeria	687
	Tunisia	626

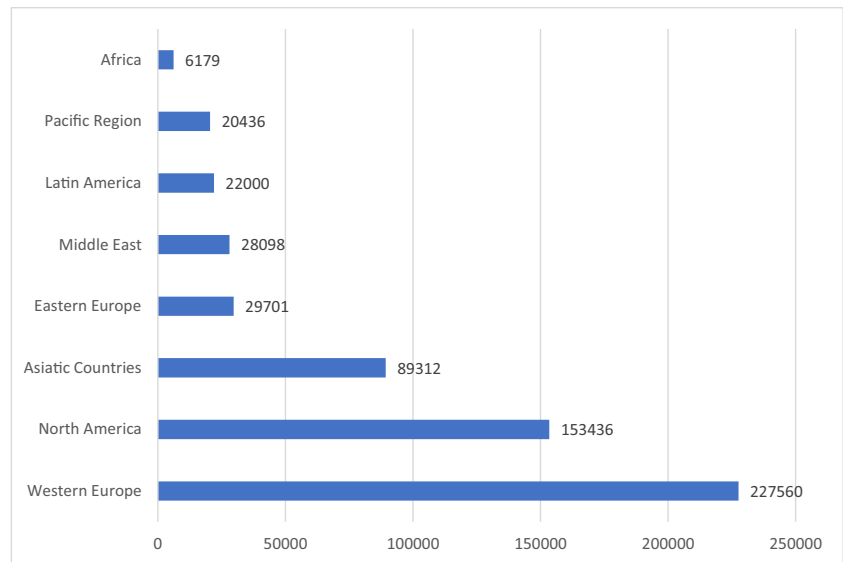
Egypt (publication number 2051) was included in both Middle East and African countries, and hence it was removed from the list of Africa to avoid duplicity)

the largest relative increase projected to occur in LMIC [4]. An increase in risk factors, including excess BMI, inappropriate diet, low physical activity and smoking, contribute to most attributable deaths and DALYs related to T2D [1].

The IDF Diabetes Atlas (10th edition) reported a continued global increase in diabetes prevalence, confirming it to be a significant global health challenge. In 2021, there were 537 million adults living with diabetes, and this figure is predicted to rise substantially to 643 million by 2030 and 783 million by 2045. Furthermore, it is disturbing that over 3 in 4 adults with diabetes live in LMIC. In addition, diabetes was also responsible for 6.7 million deaths in 2021 [9].

Numerous research studies have been conducted on diabetes in various countries and regions, with differing output and quality levels. For instance, a scientometric analysis of Indian authors using Web of Science (WOS) data from 1989 to 2021 reported that India ranked ninth globally in terms of diabetes research output in 2019, with only 2.23% of the publications being highly cited [10]. Similarly, a bibliometric

Fig. 4 Number of publications in different world regions from 1996 to 2021 (The X-axis shows the number of publications, and the Y-axis denotes the region)



study analysing T2D-related research from the Scopus database between 1982 and 2019 found that the productivity of diabetes research in India lags behind, highlighting the need for increasing internal funding for research, national and international collaborations, active involvement of national and international funding agencies, and prioritizing research on youth with T2D [11]. Data from other regions also show encouraging trends. A scientometric analysis conducted in the Middle East shows an overall increasing trend of publications on diabetes from the region [12–14].

We believe that the probable reasons for the growth of publications from China and India are the increasing numbers of people with diabetes in these regions, more awareness amongst researchers to address their local problem of diabetes, and its relationship with changing diet and lifestyle [15, 16], COVID-19 [17] and tuberculosis syndemic [18]; in addition to the establishment of more high-end academic medical institutions in several cities of India, better research funding available, etc. [19].

This study has several strengths. Firstly, we used a robust data source (Scopus) to investigate the global trend in publications, which is the world's largest abstract and citation database of peer-reviewed literature. Using such a comprehensive database enabled us to draw more reliable conclusions. Secondly, the study was focused on Asian countries and other geographical regions, and with the help of data, it is possible to uncover important regional patterns and nuances, which could inform targeted interventions and policymaking. Lastly, we utilized the SJCR platform to determine the ranking of scientific journals and countries, enabling researchers to draw important metrics on journals and countries. This provided a comprehensive

way to compare the productivity of different countries and journals, allowing researchers to identify areas of excellence and opportunities for improvement.

While this study has many strengths, there are also some limitations. Firstly, we investigated the trend of publications without examining the quality or impact of the publications. Without evaluating the quality of the publications, the study's findings may not accurately reflect the usefulness of the research. Secondly, the study was limited to the data available on Scopus and SJCR, which may not be comprehensive. For example, publications in non-English languages or non-indexed journals could not be included. This may have led to a potential underrepresentation of research output in some countries and regions. Lastly, we did not analyse the factors contributing to the increase in publications or the differences in diabetes research output between countries, which could limit the generalizability of the findings.

This study highlights the need for continued research and development in the field of diabetes and related metabolic syndromes, particularly in LMIC countries, where the prevalence of diabetes is rising more rapidly than in HIC countries. Since there has been an increasing trend of Diabetes and Metabolic disorders in the LMICs such as India, more research is needed [15] from these areas to address their unique problems and their remedies, as the research outputs from HIC may not be appropriate to apply in the management of problems in LMIC populations. All associated risk factors and consequences of diabetes need more investigation [15]. Therefore, more international collaboration and research funding are required for the researchers of LMIC [20, 21].

Conclusion

This study provides valuable insights into the global trend of publications and demonstrates a significant increase in the specialty of Endocrinology, Diabetes and Metabolism over the past decade, with Asian countries showing a substantial rise in productivity. China and India, in particular, have exhibited notable improvement in their global contribution and ranking, signifying the growing importance of these countries in the field. Overall, this study contributes to understanding the global landscape of Endocrinology, Diabetes and Metabolism research, providing valuable information for researchers, practitioners and policymakers alike.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s13410-023-01221-4>.

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Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Data availability All the raw data is available from the authors and can be provided, if need be.

Ethical approval Not required.

Use of LLMs/AI technology None

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