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Article Processing Charge for Open Access Articles in Iran

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ABSTRACT

The present research aimed to investigate the Open Access (OA) and non-OA publishing models and the Article Processing Charge (APC) in Iranian researchers' articles. The study population included all researchers' articles from Shahid Beheshti University of Medical Sciences (SBMU), Tehran, Iran, indexed in the Scopus database from 2017-2019. The publication model of the articles was determined by referring to the original article, the type of journal, and their APC rate through the journal website, and the country of the journals' publishers using the Scimago database. The data were analysed using descriptive statistics and SPSS software. Five thousand ninety-seven articles (54.5 %) were published as OA and 4255 articles (45.5 %) as a non-OA. 57.1 % of OA articles were published in APC OA journals, 20.3 % in non-APC OA journals, and 11.7 % in hybrid journals. $ 4,899,027.15 was spent on publishing 3,506 OA articles; the average cost per article was $1,397.32. Publication costs for Iranian researchers are obstacles to publishing OA articles in APC journals. It is necessary to provide sufficient support to researchers by universities and the Ministry of Health and Medical Education of Iran. Considering the low economic capacity of Iranian researchers, international journals should also consider discounts for them.

Keywords: Publishing model; Open access articles; Open access journals; Article processing charge; Iran

1. INTRODUCTION

After the formation of the Open Access (OA) movement in the early 1990s[1], many scientific journals considered OA as a model in scientific publishing. OA journals are electronic journals available to the audience for free, permanently, and without any legal restrictions due to intellectual property[2]. Therefore, scientific journals follow two main models for publication: OA or subscription-based (non-OA): OA or non-OA. Non-OA journals are traditional or subscription-based journals. Various OA models have also appeared throughout the years based on the access type of articles, including gold, green, diamond, etc. In gold OA, the articles publish in the OA format immediately upon by the publisher. Diamond OA refers to the form of gold OA model, in which there is no author publication fees. In green OA model, the publisher allows the authors to make freely available a version of the manuscript in a repository[3-4].

Despite the various models of OA and opportunities such as visibility, receiving more citations, speeding up publication, and increasing cooperation opportunities between researchers, which OA has provided[5–10], the authors' tendency to publish in the form of OA or non-OA is influenced by various factors such as the publication fee[9-10]. On the other side, financing the publication cost is one of the fundamental challenges of scientific journals[5,9–11]. In the subscription or non-OA model, the publishing fee of the journal is covered by the subscription and the readers, but in the OA model, no fees are charged from the reader. Therefore, many OA journals have made the receipt of Article Processing Charges (APC) from the author as a condition for publishing an article in the journal, while some of them do not charge any fees from the author, and the parent organization usually provides their fees[11-12]. In addition, some journals publish articles as OA only if the authors pay an APC, and other articles are published by subscription model. These journals are known as hybrid journals[11,13-14]. In this regard, the OpenAPC is a project which is aggregating, normalising and disseminating data on APC paid by universities, funders and research institutions under an open database license. However, the data is not yet sufficiently widespread for many countries, especially developing countries and we need to the studies about APC in the countries[15]. In recent years, due to the devaluation of Iran's national currency the payment of publishing fees for Iranian authors has created new challenges in OA publishing. This issue doubles the necessity of planning and policy-making in this regard. It should be noted that Iran has no policy of requiring the publication in OA journals

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when the research uses public funding, or a policy for supporting the authors for OA publishing. The universities only cover the cost of accessing some journals. For this purpose, knowing the tendency of researchers to publish OA or non-OA articles and the amount of expenses paid can open the way for research policies. Therefore, the current study aims to investigate OA and non-OA (subscription) publishing models of the articles of Shahid Beheshti University of Medical Sciences (SBMU), as one of the top universities of medical sciences in Iran during 2017 to 2019.

2. OBJECTIVES

The objectives of this research are to determine the following points:

- Trend of publishing OA and non-OA articles
- Publishing model of the journals (OA, subscription, or hybrid)
- Frequency of APC or non-APC OA published articles
- Amount and average of APC paid for publishing OA articles separately for all articles and corresponding authors' articles
- Countries that publish the largest number of OA articles with APC

3. LITERATURE REVIEW

Studies have been conducted regarding the investigation of publishing fees in different countries. For example, Soloman and Bjork[16] investigated the APC fees in publishing four research universities in the USA and Canada and found that the average APC fee for OA journals is slightly less than $2000, while this cost is about $3000 for hybrid journals.

Jahn and Tullney[17] investigated the fees paid to authors by German institutions and found that the publication fees increased during 2005-2015. They found that German universities and research institutes financially support articles published in OA journals. While, in Austria and the UK, hybrid journals are more supported. Meanwhile, the APC fees in hybrid journals are usually higher than in OA journals.

Pavan and Barbosa[18] investigated the usage rate of APC OA journals in Brazil. The results showed that between 2012 and 2016, 63,847 OA articles were published by authors with Brazilian affiliation in 930 journals indexed on the Web of Science (WoS). About 59 % of these articles were published in paid journals. In these five years, the number of articles published in APC journals has increased. The total fee for the five years is approximately 36 million dollars, and the average fee per document is $957.75. Observingly, Brazilian authors prefer the golden path of APC for OA journals.

Nabyonga-Orem[19], *et al.* stated that the APC has become a challenge in low- and even middle-income countries such as Africa. Considering the low income of African universities, if the amount of APC in a journal is about 2600 dollars, a researcher in some countries will have to spend about 6 months of his income to cover the cost of the publication. Even if 50 % of the APC is waived, they still have to spend about 3 months of income to publish the article as open access. Therefore, the limitation caused by the payment of article publication fees limits the volume of African researchers' publications, especially in high-impact open access journals.

Krauskopf[20] investigated publication fees in Chile. The results showed that in 2019, Chilean authors published 6779 OA articles in journals indexed in WoS, 65.4 % of which received fees. More than nine million dollars have been spent on publishing these articles, and medical science articles account for about a third of this cost. They stated that the publishing fees in some journals are so high that they detrimentally affect the research capacity of researchers who lack financial resources because most universities do not have a budget to support researchers eager to publish their work in OA journals.

Neves Alencar and Barbosa[21] (2021) investigated the status of publishing OA articles among Brazilian researchers. The findings indicated that the Brazilian scientific community moved towards OA international journals. The average cost of APC increased from $531.39 in 2012 to $1,131.35 in 2019, a 79 % increase. The percentage increase in fees for all articles was 117 %. In all these years, about 40 million dollars have been paid for publishing articles.

Halevi and Walsh[22] investigated the opinion of the researchers of the Icahn School of Medicine at Mount Sinai about open access articles and the amount of APC. The results showed that most researchers believed that the amount of APC received, especially in medical and biomedical journals, was unfair and expensive, and most of them used financial aid to pay for the article processing fee.

Abdul Baki and Alhaj Hussein[23] stated that due to the high costs of journal APCs compared to the salary of medical researchers in Syria, researchers tend to use government and institutional grants to pay for article processing costs, or rely on the APC exemptions granted by many journals to articles whose authors are based in countries classified as low-income economies by the World Bank.

Tosar[24] found that the costs of APCs for Uruguay researchers have multiplied by four between 2016 and 2019. These costs amounted to approximately $ 200,000 annually, with an upward trend.

Sheikh[25], *et al.* reviewed OA journals in the medical area. The findings revealed that most medical journals (n=1874 or 51.7 %) do not receive any APC from authors. Elsevier is the leading publisher with 236 OA journal titles. Although many of these journals do not charge APC fees, it should be noted that medicine is the discipline in which the APCs rank highest.

Kampa[26], *et al.* showed that Indian researchers published 26,127 gold open access articles in WoS indexed journals in 2020. Researchers in health and medical sciences paid the highest APC at $7 million.

The study also revealed that Indian researchers paid about $17 million as APC in 2020.

In general, it can be said that due to the increase in publishing fees in recent years and the researchers' tendency to publish OA articles, the review of the publishing fees of these articles in different countries has been considered and studies have been conducted in this regard. However, in the case of Iran, no research was found in this field.

4. METHODOLOGY

The current research was cross-sectional study. The research population included all the Shahid Beheshti University of Medical Sciences (SBMU) affiliated articles from the years 2017 to 2019 in the Scopus database. SBMU is one of the largest universities of medical sciences in Iran. "Shahid Beheshti University of Medical Sciences" was searched in the affiliation search section of the Scopus. With this search method, different written forms of SBMU were also retrieved. The retrieved results were then limited to 2017 to 2019, and the data was saved in an Excel file. No limitation was used for the type of the published articles. 9352 documents were retrieved in this section.

Individual articles and journals that published them were reviewed one by one to determine the publication model and APC. We defined the publication models of the articles by referring to the articles in the journal websites. OA articles are those which are permanently available to the readers for free. The OA or non-OA access model of the article is usually mentioned in front of the article title, in the table of contents of the journals. We investigated the type of the journals (OA, non-OA (subscription), or hybrid), and the amount of APC by referring to the websites of the journals. This information is usually mentioned in the sections of 'about the journal', 'author guideline', 'open access policy' or 'publication fee' of the journal websites. The publishing country of the journals was determined through the Scimago website (https://www.scimagojr.com/index.php).

The amount of APC was calculated in US dollars without calculating their taxes (according to the explanations mentioned on the journals' website, an amount may be added as local-and value-added taxes to the original amount based on the author's country for publication). If the amount of APC was not mentioned in US dollars on the journals' website, we converted it to US dollars to compare the data. Besides, in the journals published by Kawsar Medical Company, the amount of APC depended on the number of words in the articles, and the average number of acceptable words for articles was mentioned as 3000 to 3500 words[27]. Therefore, the length of 500 articles with such conditions was considered 3500 words, and the APC was calculated based on it. Twenty journals also considered different fees for their members and non-members; in this study, all non-member costs were considered.

It is worth mentioning, some publishers use the "Read-and-Publish model". In this model, all corresponding authors of subscribed institutions publish their accepted articles with publishers on an OA basis without any individual APCs. However, in Iran, all journals are centrally purchased by the Ministry of Health, Treatment and Medical Education, and it is not common to use this model. Therefore, this model has not been investigated in the present study.

In this study, the data related to publishing models and APC of all articles and journals have directly been obtained through the journals' websites. Hence, the reliability and completeness of the utilised data sources are deemed satisfactory. To ensure the accuracy of the data, an analysis was conducted on a sample of 100 articles by two individuals to examine the publication models and the APCs. Based on the consistency of the data collected, it can be deduced that it possesses adequate reliability.

In addition, we can obtain the publication model and APC of open access journals through DOAJ (https://doaj.org/). Our investigation revealed that the data in DOAJ is consistent with the websites of the journals. However, this database not sufficiently covers all open access journals and also hybrid journals. Therefore, in the present study, the websites of journals were used to collect data.

Data analysis was done by calculating descriptive statistics (frequency, percentage, mean, standard deviation) using SPSS software.

5. RESULTS

5.1 Trend of Publishing OA and Non-OA Articles

The findings revealed that in the years under review, 5097 articles (54.5 %) in OA and 4255 articles (45.5 %) in non-OA were published by SBMU-affiliated researchers. Figure 1 shows the increased trend of non-OA articles from 2017 to 2019. However, the number of OA articles in 2018 showed a slight increase compared to the previous year and then a decrease in 2019. Although in 2017 and 2018, the number of OA articles was more than non-OA articles, this number was almost equal to each other in 2019.

5.2 Publishing Model of the Journals

Most of the articles of SBMU-affiliated researchers (45.3 %) were published in hybrid journals, and the frequencies of articles in OA journals with paying an APC, OA without paying an APC, and subscription (non-OA) journals were 31.1 %, 11.1 %, and 6.2 %, respectively. Figure 2 shows the most of the articles of SBMU-affiliated researchers were published in hybrid journals, and the least in subscription (non-OA) journals. There was an increase in publishing articles in the APC-OA journals in 2018 compared to 2017 but a decrease in 2019 compared to 2018. In the hybrid journals, the number of articles published in 2017 was the lowest, and no significant change was found in 2019 compared to 2018.

The total number of articles in hybrid journals were 4236 articles, including 595 OA (14.0 %) and 3641 non-OA (86.0 %).

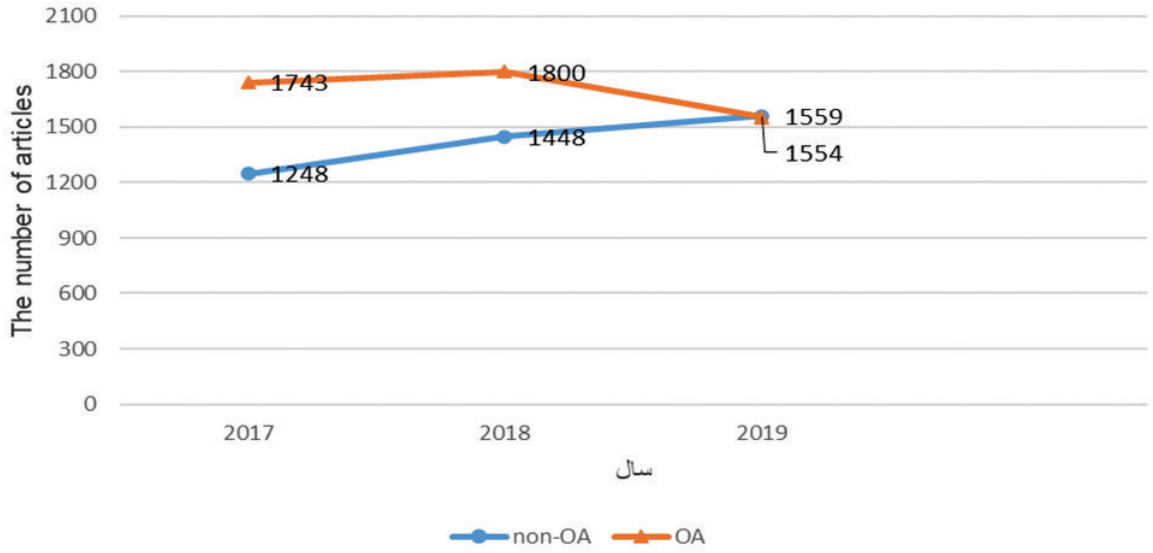

Figure 1. Publication trend of OA and non-OA articles in the scientific publications of SBMU-affiliated researchers in the years 2017 to 2019.

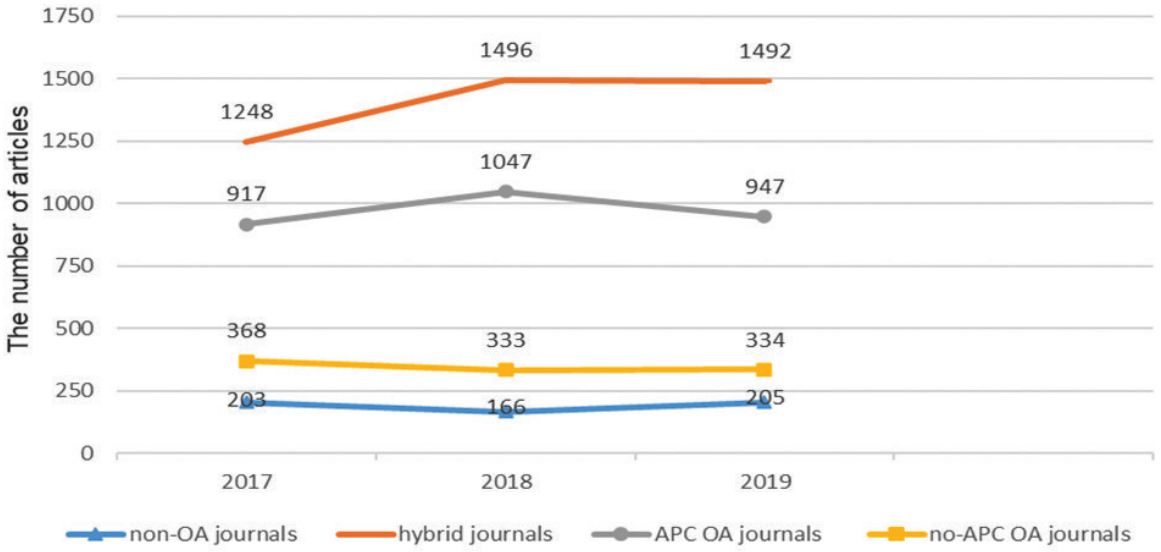

Figure 2. Number of articles published by SBMU-affiliated researchers in 2017-2019, according to the publication model of the journal.

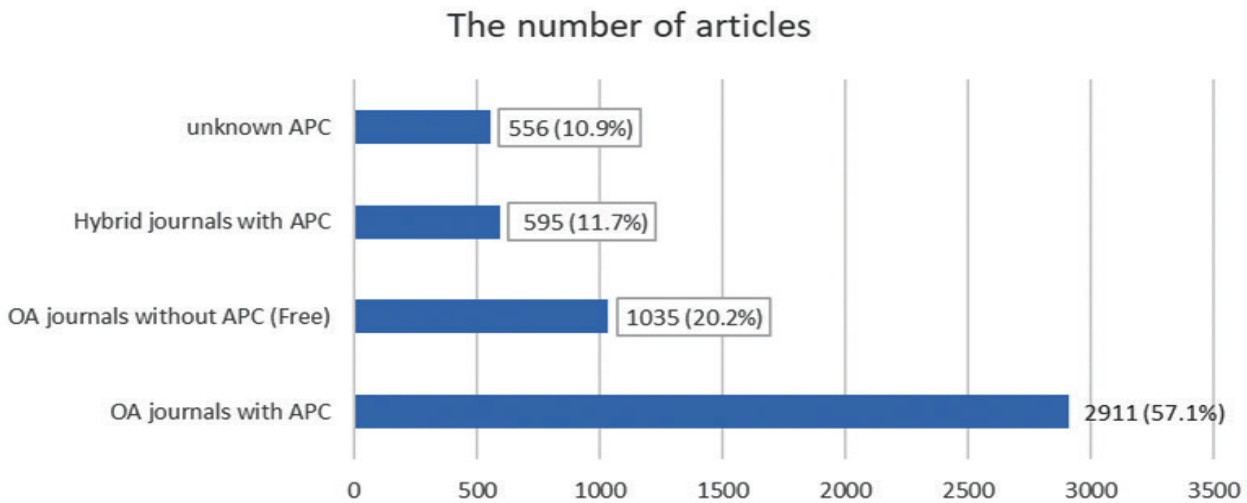

Figure 3. Contribution of different publishing models of journals in publishing SBMU's OA articles.

The data revealed that 3641 non-OA articles (86.4 %) were published in hybrid journals, and only 574 (13.6 %) were published in fully subscribed journals.

Also, Figure 3 shows the different publishing models of journals in publishing OA articles. It indicates that APC OA journals had the largest share in publishing OA articles (57.1 %). Non-APC OA journals (20.3 %) and hybrid journals (11.7 %) were in the second and third places. Notably, the status of APC in some of the reviewed journals was unclear (10.9 %).

5.3. Frequency of OA Articles with or without Paying an APC

Figure 4 shows that most of OA articles of the SBMU-affiliated researchers between 2017 and 2019, were published by paying an APC (3506 articles equal to 77.2 %). 1035 (22.8 %) OA articles were published without any associated APCs. The number of APC and non-APC OA articles in the year 2019 was less than two preceding years.

5.4 Amount and Average of APC Paid for Publishing OA Articles Separately for All Articles and Corresponding Authors' Articles

Table 1 demonstrates that in the years under review, $4,899,027.15 was spent on publishing 3506 OA articles in OA and hybrid journals, and the average cost per article was $1,397.32.

The authors of the SBMU were the corresponding authors in 1,685 articles out of 3,506 (48.06 %) OA articles with paying an APC, and a total of $1,909,490.68 was spent on publishing these articles; the average cost per article was $1,133.05.

Figure 5 shows that the fee paid by authors in 2018 was higher than those of other years. However, in articles whose corresponding authors were from Iran, in 2019, the lowest payment amount was observed in comparison to the previous two years.

The data revealed that the average APC paid for publishing the articles showed a growing trend in the years under review, reaching $1,449.40 in 2019 from $1,291.49 in 2017.

5.5 Countries Publishing the Largest Number of Open Access Articles with APC

Table 2 indicates that after Iran with 1,304 articles, England with 538 has published the most significant number of OA articles with APC by SBMU-affiliated researchers and has received the highest fee for publication ($1,427,080). Also, the USA and the Netherlands are in the second and third places regarding the received fees. In terms of the average fee received per article, Germany received $3,006.35 per article and England, and France received $2,652.56 and $2,645.82 and ranked second and third respectively.

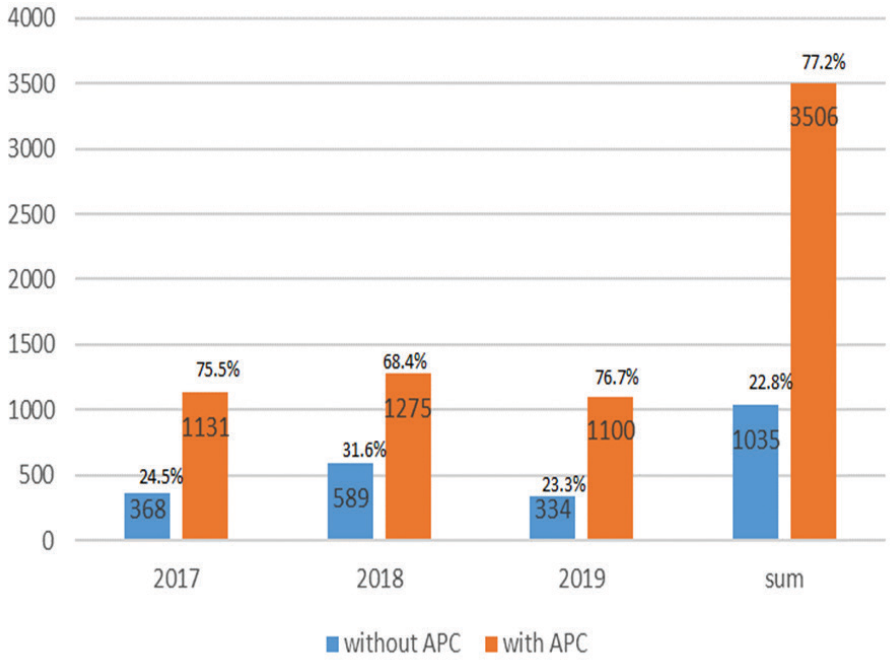

Figure 4. Frequency of SBMU's OA articles published with or without APC.

Table 1. APC paid by researchers for publishing articles as OA

	Number of articles	Total APC	Mean APC	Standard deviation	Middle
Total SBMU's articles	3,506	$ 4,899,027.15	$ 1,397.32	3,387.24	605.91
Articles with SBMU's corresponding author	1,685	$ 1,909,490.68	$ 1,133.05	2,739.27	484.73

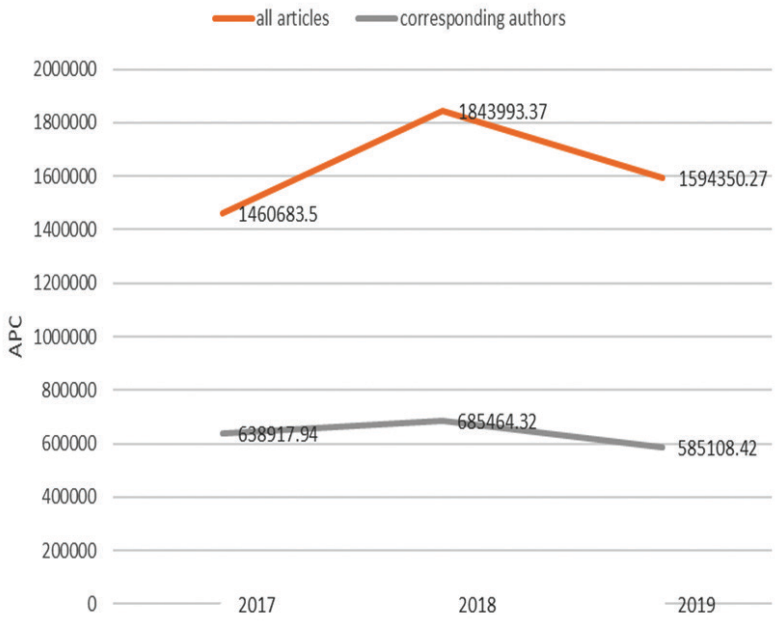

Figure 5. APC paid for publishing OA articles by all articles and corresponding authors' articles.

Table 2. Countries receiving the highest total APC for publishing articles from the SBMU-affiliated researchers

Country	N	Sum	Mean	Std. deviation	Minimum	Maximum
UK	538	1427080.95	2652.56	1232.85	375	9500
US	313	710553.00	2270.77	1196.60	49	6000
Netherlands	430	421790.07	980.90	775.56	100	5000
Iran	1304	354082.93	271.53	294.64	23.75	4153
Switzerland	105	258241.19	2459.43	758.96	360	3860
New Zealand	118	226215.34	1917.07	833.87	500	2750
India	185	121470.00	656.59	851.42	190	3300
Germany	40	120254.38	3006.35	917.51	605.91	4200
France	29	76728.87	2645.82	401.79	908.87	3860
Italy	36	44525.41	1236.81	1040.47	298.57	3500

6. DISCUSSION

In general, the SBMU-affiliated researchers have published most of their articles as OA. This result is contrary to the research of Ranjbar-pirmousa and Zarei[28] that indicated the most of the articles in the fields of "clinical medicine" and "pharmacology and toxicology" of SBMU were published in subscription journals between 2004 and 2014. This difference in findings can be due to the time and subject area under investigation.

The findings revealed that from 2017 to 2019, publishing non-OA articles had an upward trend, but publishing OA articles in 2019 decreased compared to the previous two years. This result is inconsistent with Sotudeh, *et al.* study regarding Iranian researchers' growing trend of publishing articles in the form of OA[29]. Most OA articles were published in APC-OA journals during 2017 to 2019. This shows that unlike a study by Sheikh, which raised the cost of publication as an obstacle[10]. However, due to the decrease in the number of OA articles published in 2019 compared to 2018, it can be said that the problems in the process of paying the publication fee for Iranian researchers and currency fluctuations have been influential in this decrease.

The findings indicated that 68.8 % of the OA articles of SBMU-affiliated researchers in the three years under review were published in journals with paying an APC, and 20.3 % of them in OA journals without paying an APC. These findings indicate that Iranian authors prefer the path of OA with paying an APC, which is consistent with the study results of Pavan and Barbosa[18] in Brazil and Krauskopf[20] in Chile about OA publishing fees. As the other studies[18,21,25], it seems that, the tendency of researchers to publish in OA journals with APC payment has been increasing in the past years. However, the decrease in

this number among Iranian researchers in 2019 could be due to the country's economic problems in recent years and the decrease in the ability of researchers to pay for the publication fees. Therefore, by examining it in the years after 2019, more accurate data can be obtained in this regard. In addition, there is no support in Iran for paying publication fees for OA articles, and in this respect, based on what was mentioned in Krauskopf[20] it is similar to Chile. While developed countries such as Germany, England, and Austria, authors are supported to publish in OA journals with APC payment[17].

The amount paid for OA articles by SBMU-affiliated researchers during 2017-2019 was about five million dollars, and the average publication fee per article was estimated at 1,397.32 dollars. This cost, compared to that of publishing OA articles for Brazilian authors[18,21], and for Chilean authors[20], was much less. Conversely, this issue shows Iranian researchers' lower willingness or financial ability to pay for publishing articles.

In less than half of the articles, the corresponding author was affiliated to SBMU. If we pay attention to the average fee paid in these articles, we will notice that the average APC paid in these articles is lower than in other articles (roughly $1,140 vs. $1,400). This issue is another confirmation of SBMU's researchers' inability to pay. Considering that in the current research, all the articles in which at least one of the authors affiliated to SBMU were examined, the above result is not far from expected. These articles may have been published in collaboration with authors from other countries, and the fees paid by authors outside Iran with higher financial ability. We need more investigation to find who has paid the publication fee.

According to the investigations conducted in 2017, the dollar price fluctuated between 37,000 and 42,000 Rials. In 2018 and 2019, its price increased from 42,000 to 140,000 Rials, which has more than tripled compared to 2017. Currently, the price of the dollar has reached more than 50,000 Rials. Due to this, researchers have faced more problems in the years after 2019 with paying the publication fee. In addition, Ph.D. students who need to publish an article to get permission to defend their thesis and faculty members to improve their academic rank face more problems. This doubles the importance of supporting researchers by universities. In this way, universities can maintain academic inclusivity and diversity, ensuring equitable access to publishing opportunities for researchers from diverse backgrounds.

Iran, England, the Netherlands, and the USA have published the most significant number of OA articles related to Iran's APC payment. Considering the average APC paid per an article in Iranian Journals, which is about $260, the total APC paid to Iranian Journals is not high. Regarding the total amount paid, journals from England, the USA, and the Netherlands are at the top. The average fee paid per article to these countries shows that Iranian journals receive the lowest fees for publishing OA articles. However, journals from Germany, England, the USA, Sweden, and France charge more than $2,000 per article. This amount is equal to several months' salary of an assistant professor at a university in Iran and is an obstacle for publishing articles in the APC payment journals, which can strongly influence the tendency of researchers to publish articles in these journals. In this regard, it seems that offering a discount or not charging Iranian researchers can greatly help remove this obstacle. This could potentially alleviate the constraints associated with OA publishing for researchers in Iran, as well as address the ethical considerations related to OA publishing. These include concerns about the affordability of APCs and the equitable access for researchers from low-income countries and resource-constrained settings.

7. CONCLUSION

The tendency of Iranian researchers to publish OA articles is increasing. However, the cost of publication is an obstacle for publishing these articles in journals with paying an APC. The lower average fees paid by the SBMU's authors compared to other countries indicate the lower ability of Iranian authors, particularly in the medical and related sciences areas, and the lack of support from Iranian universities in paying the publishing fee of the OA articles. As the Iranian currency has lost its value and the economic power of researchers has decreased in recent years, it is suggested that universities, research institutes, and the 'Ministry of Health and Medical Education of Iran' should consider adequate support for researchers.

Considering the low financial ability of Iranian researchers, international journals should consider discounts for them. Given that the present study examined a part of the population of Iranian researchers, examining this issue in a broader population can provide more accurate data for policy making.

8. RESEARCH LIMITATIONS

Some journals that charge a fee for publication consider a partial or full APC discount informally and after the author's correspondence and request. Notably, such mentioned cases can influence the research results, but due to their informality and the lack of information on this matter, it was impossible to calculate and apply them in the current research.

REFERENCES

1. Cold Spring Harbor Laboratory. Open access: History & policies. https://cshl.libguides.com/open_access/history_policy (accessed on 19 April 2023).
2. Suber, P. Nine questions for hybrid journal programs. *SPARC open access Newsletter*, 2006, **101**, https://dash.harvard.edu/bitstream/handle/1/4552044/suber_hybrid questions.htm?sequence=1 (accessed on 19 April 2023).
3. Allahar, H. & Sookram, R. The adoption of open access journals for publishing management research:

A review of the literature and the experience of The University of the West Indies. *Int. J. Educ. Dev. Using Inf. Commun. Technol*., 2020, **16** (1), 126–146. http://ijedict.dec.uwi.edu/include/getdoc.php?id=8605&article=2727&mode=pdf (accessed on 5 May 2024).

4. LibGuides at IFIS. Guide to Getting Published in Journals.https://ifis.libguides.com/journal-publishing-guide/open-access-models (accessed on 5 May 2024)
5. Sohani, F.; Shekofteh, M.; Shahbodaghi, A. & Jambarsang, S. Journals on the Road: Open access or non-open access? *Libr. Philos. Pract*. (e-journal), 2021, 6276. https://digitalcommons.unl.edu/libphilprac/6276/ (accessed on 12 Feb 2023).
6. Atchison, A. & Bull, J. Will open access get me cited? An analysis of the efficacy of open access publishing in political science. *PS: Polit. Sci. Polit.* 2014, **48**(1), 129–137. doi: 10.1017/S1049096514001668
7. Saberi, M. karim. Open access journals with a view of journals covered in ISI. *Inf. Sci. Technol*., 2009, **24**(2), 105–122. https://jipm.irandoc.ac.ir/article_698548.html?lang=en (accessed on 25 March 2023).
8. Kousha, K. & Abdoli, M. The citation impact of open access agricultural research: A comparison between OA and non-OA publications. *Online Inf. Rev.*, 2010, **34**(5), 772–785. doi: 10.1108/14684521011084618
9. Khalili, L. Barriers to publish in open access journals according to medical researchers. *Heal. Inf. Manag.*, 2015, **12**(4), 435–444. https://him.mui.ac.ir/article_11430.html?lang=en (accessed on 13 Feb 2023).
10. Sheikh, A. Faculty awareness, use and attitudes towards scholarly open access: A Pakistani perspective. *J. Librariansh. Inf. Sci*., 2017, **51**(3), 612–628. doi:10.1177/0961000617742455
11. Björk, B.C. & Solomon, D. Open access versus subscription journals: A comparison of scientific impact. *BMC Med*., 2012, **10**(1), 73. doi: 10.1186/1741-7015-10-73
12. Langham-Putrow, A; Bakker, C. & Riegelman, A. Is the open access citation advantage real? A systematic review of the citation of open access and subscription-based articles. *PLoS One*, 2021, **16**(6), e0253129. doi: 10.1371/JOURNAL.PONE.0253129
13. Bjork, B. A Comparison of subscription and open access journals in construction management and related fields. *Australas. J. Constr. Econ. Build*, 2012, **12**(2), 27–42. https://search.informit.org/doi/abs/10.3316/INFORMIT.660416642509393 (accessed on 15 Jun 2023).
14. Abbasi, Z.; Shekofteh, M.; Shahbodaghi, A. & Kazemi, E. Citation indicators' comparison of lis open access and subscription publications based on scopus. *Glob. Knowledge, Mem. Commun*., 2019, **68**(4-5), 288–299. doi: 10.1108/GKMC-02-2018-0016
15. Pieper, D. & Broschinski, C. OpenAPC: A contribution to a transparent and reproducible monitoring of fee-based open access publishing across institutions and nations. *Insights*, 2018, **31**(3), 1–18.https://pub.uni-bielefeld.de/record/2932530 (accessed on 16 Jun 2023).
16. Solomon, D. & Björk, B.C. Article processing charges for open access publication-the situation for research intensive universities in the USA and Canada. *PeerJ*., 2016, **4**, e2264. doi: 10.7717/PEERJ.2264/SUPP-1
17. Jahn, N. & Tullney, M. A study of institutional spending on open access publication fees in Germany. *PeerJ*., 2016, **4**, e2323. doi: 10.7717/PEERJ.2323/TABLE-4
18. Pavan, C. & Barbosa, M.C. Article processing charge (APC) for publishing open access articles: the Brazilian scenario. *Scientometrics*, 2018, **117**(2), 805–823. doi: 10.1007/s11192-018-2896-2
19. Nabyonga-Orem, J; Asamani, J.A.; Nyirenda, T. & Abimbola, S. Article processing charges are stalling the progress of African researchers: A call for urgent reforms. *BMJ Glob. Heal*., 2020, **5**, e003650. doi: 10.1136/bmjgh-2020-003650
20. Krauskopf, E. Article processing charge expenditure in Chile: The current situation. *Learn. Publ*., 2021, **34**(4), 637–646. doi: 10.1002/LEAP.1413
21. Neves Alencar, B. & Barbosa, M.C. Open Access Publications with Article Processing Charge (APC) Payment: A Brazilian Scenario Analysis. *An Acad Bras Cienc.*, 2021, **93**(4), 20201984. doi: 10.1590/0001-3765202120201984
22. Halevi, G. & Walsh, S. Faculty attitudes towards article processing charges for open access articles. *Publ. Res. Q*., 2021, **37**, 384–398. doi: 10.1007/s12109-021-09820-x
23. Abdul Baki, M.N. & Alhaj Hussein, M. The impact of article processing charge waiver on conducting research in low-income countries. *Confl. Health*, 2021, **15**, 75. doi:10.1186/s13031-021-00413-1
24. Tosar, J.P. The cost of article processing charges (APC) for Uruguay: The price of open access is high. *Infor*., 2022, **27** (1), 221–252. doi: 10.35643/info.27.1.1
25. Sheikh, A.; Zahra, A.Q. & Richardson, J. Scholarly open access journals in medicine: A bibliometric study of DOAJ. *J. Acad. Librariansh*, 2022, **48**(3), 102516. doi: 10.1177/0961000617742455
26. Kampa, R.K.; Kumar Sa, M. & Dora, M. Evidence from Indian scholarly output. *Curr. Sci*., 2023, **125** (10), 1057-1062. doi: 10.18520/cs/v125/i10/1057-1062

27. Kowsarmedical Publishing Company. Instructions: Word count policy in Briefland journals. https://sites.kowsarpub.com/kowsar/knowledgebase/category/tree.html#word_count_limits.html. (accessed on 15 Jun 2023).
28. Ranjbar-pirmousa, Z. & Zarei, H. Situation of articles published and their citations of Tehran and Shahid Beheshti Universities of Medical Sciences in Web of Science database. *Res. Med. Educ*., 2016, **8**(3), 24–33. https://rme.gums.ac.ir/browse.php?a_code=A-10-454-1&slc_lang=en&sid=1 (accessed on 15 Jun 2023) [In Persian]
29. Sotudeh, H.; Changiz, N. & HashemNia, S. Iranian scientists' approach to publishing in and referencing to open access journals. *Heal. Inf. Manag.*, 2010, **7**(1), 34–46.
doi: 10.1007/s11192-015-1607-5

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