RESEARCH ARTICLE

A quantitative analysis of publication trends in Iranian medical ethics and a comparison with EMRO countries

MAHSHAD NOROOZI, POONEH SALARI, BAGHER LARIJANI

Abstract

Background: *Evaluating publication trends in a research area helps assess organised scientific efforts in the particular academic field. This study aims to evaluate and compare trends in medical ethics publications in the Eastern Mediterranean Region (EMRO) countries.*

Methods: *A scoping review was conducted to identify publication trends of Iranian and EMRO medical ethicists. Databases were searched, including Web of Sciences, Scopus, and PubMed for English language articles, which were published by countries in the World Health Organization EMRO regions. Iranian articles were searched in Persian and English language databases. The search strategy for the bioethics filter created by the Kennedy Institute of Ethics. Duplicate entries, tertiary publications and grey literature were excluded. All retrieved articles were categorised into ten main groups. Citavi software® was used for categorising and extracting articles' information.*

Results: *A total of 1835 English and Persian articles were obtained. Most (1211, 66%) Iranian publications in medical ethics were in Persian, and the rest (624, 34%) were in English. Most (306, 64.42%) of the published English articles in the EMRO region were authored by Iranian scholars, followed by those from Saudi Arabia (52, 10.95%), Oman (40, 8.42%), Pakistan (28, 5.89%), Lebanon (13, 2.74%), and Egypt (12, 2.53%).*

Conclusion: *The results of this study show that the trend of publication of EMRO countries, especially Iranian publications, is insufficient to respond to national demands in medical ethics. A concept map has been presented to determine research needs in medical ethics. Focusing on national and regional research potentials could synergistically affect medical ethics progress in the EMRO region.*

Keywords: *bibliometrics, Iran, publication trend, medical ethics, quantitative analysis*

Authors: **Mahshad Noroozi** (mahshad.noroozi@gmail.com, https://orcid.org/0000-0002-1476-6408), Assistant Professor, Department of Medical Ethics, School of Medicine, Iran University of Medical Sciences, Tehran, IRAN; **Pooneh Salari** (poonehsalari@gmail.com, https://orcid.org/0000-0001-5595-0087), Professor, Medical Ethics and History of Medicine Research Center, Tehran University of Medical Sciences, Tehran, IRAN; **Bagher Larijani** (corresponding author — larijanib1340@gmail.com, https://orcid.org/0000-0001-5386-7597), Professor, Endocrinology and Metabolism Research Center, Endocrinology and Metabolism Clinical Sciences Institute, Tehran University of Medical Sciences, Tehran, IRAN; Medical Ethics and History of Medicine Research Center, Tehran University of Medical Sciences, Tehran, IRAN.

Introduction

Bioethics and medical ethics share a synergistic connection; nevertheless, contemporary medical ethics defines itself as an autonomous field of study [1]. According to Beauchamp, ethicists employ philosophical theories to analyse moral problems in the medical profession; clinical ethics refers to the practical application of ethical principles within the context of the profession [2]. The active development of evidence-based medicine powerfully impressed the fundamental nature and practice of bioethics in medicine in the 1990s [1,2]. Over time, ethics moved beyond its merely philosophical roots, and interested clinicians entered the field, shaping and influencing empirical research in bioethics. Numerous bioethics principles have their origins in philosophical debate, empirical research is also required for the field to advance logically and knowledgeably. Philosophical and empirical research can proceed together, mutually shaping each other [3].

This is the context for the increase in qualitative and quantitative empirical research in recent years [4,5]. The use of empirical methods in biomedical ethics publications has increased from 8% in 1980-1984 to 16% in 2000-2005 [6]. Wangmo et al showed that this increase has continued in nine bioethical journals (representing 14.9% of all ethics research in 2004 to 17.8% in 2015). Studies have shown that integrating empirical and normative methods is required for the gradual progression of bioethics [6].

Like bioethics, research in medical ethics has shifted from normative philosophical analysis to the use of empirical methods [7], and there has been a growth in medical ethics research. Today, medical ethics has a critical role to play in monitoring and regulating medical practice. For this, empirical research is necessary to identify the ethical challenges of modern medicine in a given sociocultural context. Kern identifies six factors that influence research

productivity: "funding, investigator quality, institutional efficiency, the research mix of novelty, analytic accuracy, and passion" [8].

As a bibliometric performance indicator, quantitative evaluation of publications provides an adequate assessment of research output [9]. The number of published articles in medical ethics can be a measure of organised and scientific efforts in the discipline [8]. Such an evaluation can also enable a better understanding of current ethical challenges. Publications can be counted based on a specific characteristic like the particular author's affiliation or subject [10]. Publication trends can serve as indicators of research trends. By examining these trends and comparing them with social and cultural contexts, researchers can direct their attention toward the ethical questions relevant to their specific setting and devote resources for effective bioethical research. Although Iranian academicians have dedicated considerable energy to research in medical ethics in the last decade [11,12], there are no data about publication trends in Iranian medical ethics; such information is necessary in order to conceptualise future directions of research in this subject in Iran.

There has been significant expansion and greater investment in research in the Eastern Mediterranean Region (EMRO) countries in recent years [13]. Differences in the law and religious and cultural practices in each country may have an influence on the ethical norms in health research there; standards considered ethical in one society may not be considered ethical in another society [13]. Several countries in the EMRO region have prepared their national guidelines for ethics in health research and practice. Still, it is important to have regional policies for externally-supported research and collaborative health research and activities. For synergistic activities in medical ethics research, the importance of regional guidelines for externally-supported research becomes evident [13].

The Medical Ethics and History of Medicine Research Center of Tehran University of Medical Sciences was recently designated the World Health Organization (WHO) collaborating center in medical ethics studies in the EMRO region. A comprehensive collaboration and support for medical ethics activities in the EMRO region requires investigation of the current situation. Given the similarities in religious and cultural practices across EMRO countries, comparing Iranian publication trends with those in EMRO countries facilitates synergistic movements in bioethical research. We, therefore, conducted an evaluation of publications by Iranian and other scientists in the field of medical ethics in the EMRO region.

Method

A scoping review was conducted to identify publication trends of Iranian and EMRO medical ethicists. First, three English language databases, ie, Web of Sciences, Scopus, and PubMed, were searched for English language articles, which were published by countries in the WHO EMRO regions (Afghanistan, Bahrain, Djibouti, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen). The search strategy for the bioethics filter created by the Kennedy Institute of Ethics (https://www.nlm.nih.gov/bsd/pubmed_subsets/bioethics_strategy.html) accompanied by the names of the countries was used. The search period was from July 2015 to the end of June 2018.

Second, Iranian articles were searched in Persian and English language databases. The search strategy for the bioethics filter created by the Kennedy Institute of Ethics was translated to Persian for searching without time restriction in Iranian databases, including Scientific Information Database (SID), Magiran, and Noor Specialized Magazines Website (Noormag). One hundred and fifty-three Iranian journals published in Persian that had been registered on the official website of the Ministry of Health (http://journals.research.ac.ir/) were searched manually.

English language databases, namely Web of Science, Scopus, and PubMed, were searched as explained above to locate English papers by Iranian academics. A similar search strategy accompanied by the word "IRAN" was used. Iranian journals published in English (262 journals), which have been registered on the Ministry of Health website (http://journals.research.ac.ir/), were searched manually. We restricted the search period for Iranian scholars' Persian and English papers from January 1981 to the end of June 2018.

Duplicate entries, tertiary publications (textbooks, handbooks, manuals, trade articles, and encyclopaedias) and grey literature (conference proceedings, posters, abstracts; government reports, for-profit, and nonprofit organisation reports, online forums, blogs, microblogs, tweet chats, and other social media) [14] were excluded.

Citavi software® was used for categorising and extracting information of each article. This included the title, type, the author's name, the number of authors, year of publication, journal name, country of origin of the first author, journal rank based on the CiteScore Quartile, and the number of citations based on Google Scholar report. Scopus classifies journals according to their topic areas; a single journal may appear in multiple categories. Each category is rated based on its CiteScore (metrics). This indicator (Q) shows a journal's position in its best-performing category. Quartile 1, or Q1, shows 25% of journals with the highest CiteScores, followed by Q2, Q3 and Q4 showing 25%-50% of journals with the middle CiteScores, 50%-75% of journals with middle downwards CiteScores, and 25% of journals with lowest CiteScores, respectively. The academic Lapeña classification was adopted for determining primary or original research articles, secondary or review articles, and special articles (letters/correspondence, short communications, editorials/opinions, commentaries, pictorial essays, and other special categories) for paper classification [14]. The abstracts or full texts were used for categorisation.

All retrieved articles were categorised into ten main groups — professionalism, ethics education, ethical issues of the end of life, ethical issues of the beginning of life, public health ethics, ethics in research, ethical issues of vulnerable groups, the theoretical underpinning of medical ethics, ethics in biotechnology, and ethical issues of the environment and subgroups based on our previous Delphi study in which the essential topics in medical ethics for further research were prioritised [15]. After reading each article independently, two medical ethicists categorised the articles according to the topics they covered. Disagreements if any were discussed and settled between the two. Excel software (version 2019) was used for drawing charts and tables.

Ethics Committee Approval

This study was part of a PhD dissertation in medical ethics. The study was approved by the Ethics Committee of Tehran University of Medical Sciences, Tehran, Iran (IR.TUMS.VCR.REC. 1394.2236).

Results

Iranian publications

A total of 1835 articles (English and Persian) were retrieved.

Time-trend of publications

The highest number of Iranian articles (224 articles, both in Persian and English language) was published in 2016.

Type and language of publication

Of 1835 articles, 1670 (91%) were original and review articles. The number of original articles was approximately twice than that of review articles.

The highest number of Iranian articles were published in Persian (1211, 66%) and the rest (624, 34%) were published in English. It is not possible to accurately evaluate the CiteScore Quartile in Persian articles as most of the Persian language journals are not indexed in Scopus. However, 386 (62%) of all Iranian English articles were published in Q1 and Q2 journals. Empirical research articles were typically categorised into three groups: qualitative, quantitative, and mixed methods (utilising both qualitative and quantitative methods). Of the 1002 empirical research articles, 297 (29.6%) were qualitative, 696 (69.5%) were quantitative, and 9 (0.9%) were mixed-method studies. The proportion of empirical research articles increased over the years.

Subject coverage

The subjects of 1266 Iranian articles were covered under four main categories from our previous study. Based on Figure 1 (available online only), the most (549, 30%) of all published articles are in the professionalism group, which consists of 13 subgroups, of which ethical decision making, physician-patient relationship, professionalism evaluation, and privacy and confidentiality had the most significant number of articles.

Public health is the second most common category in the published articles (323, 18%), with the subject of "healthcare management" having the highest number of publications, followed by policy-making. The category of "theoretical underpinning of medical ethics" was the third most common (216, 12%), with religious medical ethics, principled-based ethics, and ethics or moral philosophy having the most articles in this group. The most articles in the category of ethics education were on "teaching medical ethics" [Figure 1, available online only]. The remaining main subject groups had only 30% of published articles [Figure 1, available online only].

Citation

Bibliographic information of the Iranian publications in English and Persian, in each subject category, including the number of published articles, the citation information, and the number of original and review articles, is presented in Table 1. A few published papers that do not fit into a subject category were categorised as general. English articles on ethics in biotechnology, professionalism, the theoretical underpinning of medical ethics, and ethical issues of end of life were cited most often.

Bibliographic information of the top ten Iranian English papers with the highest citation scores are presented in Table 2. Five of these ten articles have been published in specialised journals in medical ethics. The list includes seven original articles, most belonging to Q1 journals.

EMRO Region publications (by time limitation: 2015-2018)

Based on the PRISMA flowchart [Figure 2, available online only], a total of 475 English articles were published by EMRO countries. Of these 475 articles, 306 (64.42%) were authored by Iranian scholars, followed by authors from Saudi Arabia (52, 10.95%), Oman (40, 8.42%), Pakistan (28, 5.89%), Lebanon (13, 2.74%), and Egypt (12, 2.53%). The other EMRO countries made only minor contributions. In Figure 3 (available online only), the publication trends of Saudi Arabia, Oman and Pakistan are presented; these have the greatest number of medical ethics publications after Iran. A total of 120 (25.26%) of all published English articles in the EMRO region are from Saudi Arabia, Oman, and Pakistan. Articles published by Iranian scholars covered subjects such as professionalism (106, 35%), public health ethics (64, 21%), and ethics education (46, 15%); there was limited research on the ethical issues of end of life, the theoretical underpinning of medical ethics, ethics in research, and ethical issues of beginning of life.

Saudi Arabian scholars published many articles on professionalism (14, 27%), the theoretical underpinning of medical ethics (11, 21%), religious medical ethics issues, and

Table 1. The bibliographic information of Iranian publications in English and Persian language

Main groups	English papers / Persian Paper	% of total	Original article	Review article	Citation=0	Citation=1	Citation>1	Mean citation
Professionalism	166	26.5	150	11	24	11	131	18
	379	31.3	288	71	102	25	252	7
Public health	119	19	97	11	11	4	104	15
	203	16.8	134	60	57	19	128	6
Theoretical underpinning of medical ethics	59	9.4	23	25	5	1	53	18
	152	12.5	34	108	88	14	50	4
Education	75	11.9	62	6	16	6	53	8
	105	8.6	64	32	33	8	64	5
Ethics in research	62	9.9	21	18	10	6	46	16
	109	9	26	65	65	8	36	2
Biotechnology	54	8.6	19	28	1	3	50	26
	71	5.8	5	61	50	10	11	1
End of life	43	6.8	30	9	3	1	39	18
	69	5.7	33	33	28	8	33	4
Beginning of life	21	3.3	9	7	3	3	15	11
	70	5.8	16	52	32	8	30	3
Vulnerable group	17	2.7	9	4	3	1	13	8
	32	2.6	18	10	13	1	18	4
General issues in medical ethics	10	1.6	0	5	1	0	9	28
	10	0.82	2	3	7	1	2	4
Environmental issues in medical ethics	1	0.15	1	0	1	0	0	0
	9	0.74	0	8	6	3	0	0
Total	626							
	1209							

ethics in research (8, 15%). Ethical issues on end of life received little attention (3, 6%). There were no articles on ethical issues on the beginning of life.

Omani scholars gave much attention to public health ethics, professionalism, and ethics in vulnerable groups. Unlike Saudi Arabia, Oman scholars showed interest in the ethical issues of beginning of life (4, 10%) and end of life (1, 3%).

Pakistan had the highest number of publications in ethics in research (8, 29%) and professionalism (7, 25%); while ethical issues of end of life (2, 7%) and beginning of life (1, 3%) did not receive considerable attention.

Discussion

We believe that ours is the first comprehensive study that presents a clear schema of publications from EMRO countries in medical ethics, and their contribution to research, through a quantitative analysis. This schema assists ethicists in recognising current potentials, weaknesses, and future requirements. Iranian publications in the Persian language have been accessible on the internet since the 1990s. Initially, there were a few articles on medical ethics issues, but the number gradually increased in the 2000s. Our results show that Iranian scholars started publishing in the late twentieth century (1994) with the highest number of

Table 2. The top ten Iranian papers in English language with the highest citation scores

	Title	First author	No. times cited	Year	Article type	Journal (IF)
1.	Ethical challenges of researchers in qualitative studies the necessity to develop a specific guideline	Sanjari, M	418	2014	Review	Journal of Medical Ethics and History of Medicine (Q1)
2.	Iranian Model of Paid and Regulated Living-Unrelated Kidney Donation	Ghods, AJ	334	2006	Review	Clinical Journal of The American Society of Nephrology (Q1)
3.	Iranian intensive care unit nurses' moral distress: a content analysis	Atashzadeh Shorideh, F	121	2012	Original	Nursing Ethics (Q1)
4.	Relationship between ICU nurses' moral distress with burnout and anticipated turnover	Atashzadeh Shorideh, F	118	2015	Original	Nursing Ethics (Q1)
5.	An Iranian perspective on patients' rights	Joolaee, S	111	2006	Original	Nursing Ethics (Q1)
6.	Issues in Islamic Biomedical Ethics: A Primer for the Pediatrician	Kamyar M	107	2001	Review	Pediatrics (Q1)
7.	Patients' privacy and satisfaction in the emergency department: a descriptive analytical study	Dehghan Nayeri, N	104	2005	Original	Nursing Ethics (Q1)
8.	Ethical and legal aspects of organ transplantation in Iran	Larijan, B	95	2004	Original	Transplantation Proceedings (Q3)
9.	Disclosure of cancer diagnosis and quality of life in cancer patients should it be the same everywhere	Montazeri, A	94	2009	Original	BMC Cancer (Q2)
10.	Patient advocacy: Barriers and facilitators	Negarandeh, R	93	2006	Original	BMC Nursing (Q1)

publications in the early 21st century (2015-2017). This trend agrees with the Aramesh study that shows a gradual growth in publication [16]. Our study finds that Saudi Arabia, Oman, and Pakistan contributed a quarter of publications in the EMRO region. The majority of publications from Iranian scholars were original articles, similar to other countries (58% of publications from all other EMRO countries are original articles). However, the impact of the number and type of published articles on scholars' academics based on the Iranian regulations for faculty members' promotion status should not be ignored, which is effective in the superiority of the number of original articles.

Our findings show that empirical research in medical ethics, especially studies using quantitative methods, has progressively increased in the late 2000s. In contrast, the theoretical approach has been neglected. An analysis by Jin and Hakkarinen of the 100 most relevant journals in bioethics found that the empirical approach was applied in about 16% of the articles studied, with the rate increasing from 1975 to 2014 [17]. Our findings show that quantitative methods are used approximately twice as often as qualitative ones. These findings agree with the analysis by Borry et al [18]. Wangmo et al reported an equal use of qualitative and quantitative methods from 2004 to 2015 [5]. The finding signifies a remarkable shift towards an increased publication of qualitative papers, which contrasts with the earlier study conducted by Borry et al.

The Citation index is an important bibliometric characteristic because it is one of the practical factors for appraising scientific activities and research management [19] and is used to assess the scientific impact of published research [20]; likewise, highly cited papers reflect greater scientific interest in a particular issue [21]. Yaminfirooz and Ardali reported a significant positive correlation between a paper's citation index and the journal subject quartile in medicine [19]. The language in which an article is published is a contributory factor affecting citation frequency, and English articles have a higher chance of being cited [22,23]. Accordingly, we observed a lower citation frequency of Persian articles versus English ones, and among Persian articles, only the articles accompanied by English abstracts received citations. English publications play a pivotal role in shaping international relationships, so more English publications are needed.

Most of the highly cited papers (80%) were published in peer-reviewed Q1 journals. We observed that publications in the subjects of ethics in biotechnology (mean citation score: 26), professionalism (mean citation score: 18), the theoretical underpinning of medical ethics (mean citation score: 18), and ethical issues of end of life (mean citation score: 18) had received more citations than other subjects of ethics (Table 1). Ethics in biotechnology and ethical issues of end of life were most frequently cited.

The number of peer-reviewed publications on a specific subject reflects researchers' interest in the subject [24]. Borry et al showed that "prolongation of life and euthanasia", "theoretical perspectives on ethics", and "informed consent and patient participation in decision making," had the highest number of published articles in the nine well-known bioethics journals between 1990 and 2003 [18]. Wangmo et al conducted a qualitative analysis of empirical research publications from 2004 to 2015 in the same journals as in Borry's study. Wangmo's study found that "informed consent" had the highest number of publications, followed by "palliative care, euthanasia, assisted Suicide", and "theoretical perspectives on ethical behaviors" [5]. These two studies indicate that the trend of bioethics publication has shifted in 26 years, though informed consent has stayed in the first rank. Jin and Hakkarinen conducted a quantitative study on 100 peer-reviewed journals between 1975 and 2014 and categorised the retrieved articles into 10 fields. They found that of 800 articles, 44.6% were on clinical ethics, 12% on research ethics, 9% each on law and bioethics, and public health ethics [17], which are similar to our results.

The results of our previous study show that investigation in the field of professionalism gained most in importance [15]. The data of all countries indicate professionalism as the most significant favourable topic, especially in Iran, Saudi Arabia, Oman, and Pakistan.

Iranian scholars' publications on ethics education, comprising 182 (10%) of all published articles, do not align with our national research priorities on medical ethics [15]. Therefore, allocating more attention and conducting further research on ethics education is imperative.

Ethical issues of end of life and beginning of life were not favourably considered in Iranian publications, similar to the other EMRO countries, while the ethical issues of end of life gained the third rank of priority and importance in previous Delphi study [15]. This means that these critical issues have been missed in medical ethics. Interestingly, most Iranian articles on the ethical issues of end of life were dedicated to euthanasia, which is in contrast to the Iranian law and Islamic jurisprudence prohibiting euthanasia. It seems that this gap is due to the researchers' attention to the world publication trend. Based on the Delphi study, withholding or withdrawing treatment and do-not-resuscitate orders were the most prioritised issues in the subject group of end of life [15]. Because of cultural, religious, and social differences, Iranian researchers should devote more studies to ethical issues of end of life. The subject of the ethical issues of beginning of life showed the same problem.

The contribution of public health ethics in Iranian publication was 17%, while the issues of "hospital or clinical ethics committees" and "population policies" need a more academic approach. Our findings show that despite significant advancement in research ethics, some ethical issues, including informed consent, confidentiality, risk-benefit assessment, conflict of interest, and therapeutic research, have been ignored and need more investigations. Although the publication trend shows the tendency toward publication in the theoretical underpinning of medical ethics, another study for priority setting for research in the Iranian medical ethics area revealed that this subject was not a priority for medical ethicists [15].

Comparing our bibliometric study's comprehensive presentation with our Delphi study figured out a concept map that shows the apparent gap between our research priorities and the current publication trend or between theory and practice. It is assumed that most researchers in the field of medical ethics are clinicians who design their studies based on the ethical challenges of practice rather than national ethical necessities.

Apart from Iran, in the EMRO region, Saudi Arabia has the highest number of published articles, while the other countries had a few research activities and a few publications. The study indicates that professionalism is the favourite topic, especially in Iran, Saudi Arabia, Oman, and Pakistan. The ethical issues of end of life and the beginning of life were not favoured research subjects for EMRO countries, especially Saudi Arabian and Omani scholars. It is assumed that these issues need more joint research projects to identify common concerns and provide practical solutions. Meaningful comparison between the four EMRO countries shows that Saudi Arabian and Iranian scholars' contributions in investigating theoretical underpinning issues could be of great help. Omani and Iranian scholars express similar interests in public health ethics, and collaborate on joint research projects on these issues. Similarities are observed in ethics in research topics between Iranian and Pakistani publications. Therefore, collaborating research activities between them may be helpful.

Published articles in ethics education represented a similar schema in the EMRO region. Ethical issues of education (medical ethics education and ethics in teaching medicine) may require joint research programs. Concentrating on our national and regional potentials and efforts to overcome deficiencies and have a synergistic impact in the EMRO region is recommended.

For comparing EMRO publications, our search was limited to English articles which precludes generalisation. The collection of all articles in native and English languages is necessary for a comprehensive analysis of EMRO publications. The official languages of EMRO countries are Arabic, English, and French, while other national languages such as Farsi, Urdu, Dari, Pashto and Somali are also important in health communication. English is the most commonly used language in medical sciences publications. However, because Persian is our national language in Iran, papers published in Persian were considered for analysis. Therefore, considering papers in only English and Persian for

analysis could be our limitation. The second and more significant limitation of this study is the problem of comprehensiveness of the searched databases. We gathered data from only three main databases. Therefore, some publications may have been missed. Another limitation in the data extraction of this study was in searching Persian articles. Because some scientific journals lacked electronic versions, especially in the 1980s and '90s, that could have limited data searching. Likewise, it was impossible to thematically analyse Iranian publications and provide comprehensive details of each article (both Persian and English articles) due to articles' multiplicity.

Our study presents the gap between our research priorities and the researchers' focus and interests in the field of medical ethics. Our publication trend does not reflect our national and regional demands in medical ethics in the EMRO region. This gap probably comes from the researchers' clinical background and not having collaborative activities with other EMRO countries with common cultural and religious backgrounds. Establishing three WHO collaborating centres in Iran, Pakistan, and Lebanon could be considered for better communication and academic cooperation in medical ethics. It may bring in a convergence between our studies and priorities at the national and regional levels. By evaluating other capacities, including educational, institutional, regulatory, and financial support, EMRO countries can develop scientific productivity and collaboration in the region's medical ethics. Because of the cultural and religious similarities, synergistic activities, especially in medical ethics research, could prompt the development of medical ethics by transnational research.

Supplementary files

1) EMRO Country Details from 2015 to 2018

2) Iranian English and Persian published articles until 2018

Conflict of interest: *None to be declared.*

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