Research Article

The Most Cited Research Institutes on the Topic of Opioid Use Disorders in PubMed Central Since 2000

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Abstract

Background: Many regions are experiencing an epidemic of drug overdose (poisoning) deaths involving opioids (opioid pain relievers and heroin) in the past. A total of 47,055 drug overdose deaths occurred in the United States, representing a 1-year increase of 6.5%, from 13.8 per 100,000 persons in 2013 to 14.7 per 100,000 persons in 2014. Numerous authors have published articles regarding Opioid Use Disorders (OUD). Which research teams with the most citations is unknown.

Methods: By searching the PubMed Central (PMC), we used the keyword "opioid use disorders" and downloaded 371 articles published since 2000. A total of 1,868 articles were cited in PMC. The Authorship-Weighted Scheme (AWS) was used for quantifying coauthor contributions in an article byline when computing the credits allocated to the institutes. A visual dashboard for the most-cited countries was shown using the choropleth map on Google Maps. The x-index was applied to measure the Individual Research Achievements (IRA).

Results: We observed that the most cited countries and their corresponding x-indexes are from the United States (16.77), the United Kingdom (3.91), and Demmak (3.31). The author Rose A Rudd (the US) ranks the highest (i.e., x=12.69) with one paper (PMID: 26720857, 2016) cited 250 times. The most cited research institute is Department of Medicine, Massachusetts (US) with the x-index=4.37.

Conclusion: There has a rapid increase of scientific research productivity on OUD The US has special contributions to the body of opioid use disorders. The AWS used for quantifying the IRAs for countries and institutes is recommended to scientific disciplines in the future.

Keywords: Pubmed central; Authorship-weighted scheme; Research team; X-index; Google maps; Opioid use disorders

Abbreviations

AWS: Authorship-Weighted Scheme; IRA: Individual Research Achievements; OUD: Opioid Use Disorders; PMC: PubMed Central; VBA: Visual Basic for Application

Introduction

The United States is experiencing an epidemic of drug overdose (poisoning) deaths with the rate of deaths increased 137% since 2000, including a 200% increase involving Opioid Use Disorder (OUD) [1,2] (e.g., fentanyl, heroin, oxycodone) that leads to clinically significant impairment [3]. A total of 47,055 drug overdose deaths occurred in the US with a 1-year increase of 6.5%, from 13.8 per 100,000 persons in 2013 to 14.7 per 100,000 persons in 2014 [1].

The OUD diagnoses have risen substantially over the past decade. The treatment services have struggled and strived to meet the OUD demand [3]. Treatment for OUD is important, but adherence to treatment can be a challenge [4].

Meanwhile, fatal drug poisonings have already surpassed firearm injuries as the leading cause of injury deaths. Mortality from drug overdoses and opioid poisonings in the US were 50 and 70 % higher compared to national rates in 2012–2014, respectively [5]. Despite a total of 1711 articles have been searched by the keyword "opioid use disorder [All Fields] as for November 17, 2019 in PubMed Central (PMC) library, which countries (or research institutes) contributed most to the academics remain unknown. We are motivated to investigate the most cited institutes and countries on OUD.

The main changes encountered to us are those two: (1) which Author-Weighted Scheme (AWS) is appropriate for quantifying author credits in the article byline; (2) which metric can be truly reflected Individual Research Achievements (IRA). In the past, many articles [6-8] addressed the issues about quantifying author contributions. Only the one AWS [8] has incorporated with the x-index [9] to the disciplines [10-12] before. We are thus interested in using the two methods (i.e., the AWA and the x-index) for reporting the most cited institutes on the OUD in the past.

In this study, we attempt to identify the most cited countries and research institutes on the OUD topic.

Methods

Data source

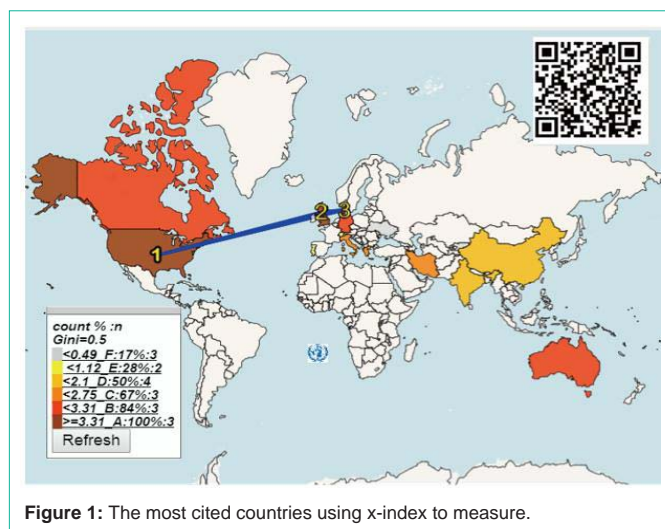By searching the PubMed database (Pubmed.org) based on

Figure 1: The most cited countries using x-index to measure.

Figure 2: The most cited authors shown on Google Maps.

PMC, we used the keywords "opioid use disorders" on October 7, 2018, and downloaded 371 articles published since 2000. An author-made Microsoft Excel visual basic for application module was used to analyze the data. All the downloaded abstracts were based on the type of journal article. All the data used in this study were downloaded from PMC, which means that the study required no ethical approval according to the regulation promulgated by the Taiwan Ministry of Health and Welfare.

Two approaches for displaying research results

(1) Author-based perspective: The AWS was proposed for quantifying the author's contributions [8,10-12]. The sum of authorships equals 1 for each paper referred. More importance is given to the first (primary) and the last (corresponding or supervisory) authors [13], whereas the others (middle authors) are assumed to have made smaller contributions [14,15]. Similarly, the smallest portion) is assigned to the last second author with the odds = 1 as the basic reference [8,10-12].

(2) Bibliometric perspective: The x [9] was calculated and defined as x = , where all the number of cited papers (denoted by ci) in descending order are based on cited publications at i.

The most highly-cited countries/areas can be plotted using the choropleth map [10] on Google Maps. The most cited research institutes with x-indexes can be highlighted using the contingency table to display. The most cited authors were displayed on a dashboard using Google Maps to display.

The most cited articles

The most cited articles on the OUD topic were retrieved from the PMC. The first authors' institutes were displayed in a contingency table.

Results

Task 1: The most productive countries and journals on the OUD

The x-indexes for countries on the opioid use disorders in (Table 1), we can see that the most cited countries with x-index 16.77, 3.91, and 3.31 are the US, the UK, and Denmark, respectively. The number

of publications might yield high citations and x-indexes (i.e., a high correlation of 0.98 between x-indexes and outputs). The U.S. (195, 83.69%) and Canada (8, 3.43%) rank as the top two published papers on the OUD topic since 2000. The affiliated countries/areas are dispersed on Google Maps, (Figure 1).

Task 2: The most productive journals

(Table 2) displays the top ten journals published articles on the OUD topic in the past years. The journals of Drug Alcohol Depend, Subst Abus, and J Subst Abuse Treat rank as the top three with the most publications.

Task 3: The most cited authors

The author Rose A Rudd (the US) ranks the highest (i.e., x=12.69) with one paper (PMID: 26720857, 2016 [1]) cited 250 times. Another author Holly C Wilcox (the US) gained a total citation of 111 times on a single article (PMID: 15555812, 2004 [16]). Interested authors are suggested to scan the QR-code in (Figure 1) to examine the author's publication outputs in PMC by clicking the specific author bobble (Figure 2).

Discussion

Principal findings

We observed that the most cited countries and their corresponding x-indexes are from the United States (16.77), the United Kingdom (3.91), and Denmark (3.31). The author Rose A Rudd (the US) ranks the highest (i.e., x=12.69) with one paper (PMID: 26720857, 2016) cited 250 times. The most cited research institute is Department of Medicine, Massachusetts (US) with the x-index=4.37 [17-19].

Study features

The first feature of this study is the AWS used for quantifying the contributions of authors (or their affiliated countries) in an article byline. Otherwise, the fair IRAs could not be achieved, (Figures 1,2).

The second is to apply the x-index to compute the IRA for countries and research institutes. Without the appropriate metric used in this study, we cannot objectively observe the IRAs compared to their counterparts.

Table 1: Author affiliation areas via outputs on OUD distributed over the years.

Region (since 2002)	<-2009	2010	2011	2012	2013	2014	2015	2016	2017	Total	%	x-index
AFRICA								1		1	0.43	
Egypt								1		1	0.43	
ASIA	1			1		1	3	3	4	13	5.58	
India	1			1			1		2	5	2.15	1.6
Iran						1	1	1	1	4	1.72	2.25
Lebanon								1		1	0.43	1.12
China							1			1	0.43	1.12
Israel									1	1	0.43	
Saudi Arabia								1		1	0.43	
EUROPE	2		4					2	4	12	5.15	
U.K.	1		1						2	4	1.72	3.91
Denmark			1							1	0.43	3.31
Bulgaria								1		1	0.43	
Cyprus								1		1	0.43	1.59
Germany			1							1	0.43	3.28
Greece	1									1	0.43	2.1
Italy			1							1	0.43	2.39
Spain									1	1	0.43	
Ukraine									1	1	0.43	0.03
N. AMERICA	9	5	7	9	9	16	30	47	71	203	87.12	
U.S.	9	5	7	9	9	15	28	45	68	195	83.69	16.77
Canada						1	2	2	3	8	3.43	2.75
OCEANIA		1			1		2			4	1.72	
Australia		1			1		2			4	1.72	3.09
Total	12	6	11	10	10	17	35	53	79	233	100	17.26

Note: Correlation coefficients between counts and x-indexes is 0.98.

Table 2: The top ten journals published articles on OUD in the past years.

Journal	<-2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total	%
Drug Alcohol Depend	1		2	1	3	2	7	3	11	5	35	9.43
Subst Abus	0				1	1	3	8	8	9	30	8.09
J Subst Abuse Treat	0						3	7	4	7	21	5.66
Addict Behav	2		1		1	2	1		1	9	17	4.58
Am J Addict	0			1	1		1	3	5	5	16	4.31
J Addict Med	0		2	1			2	3	4	4	16	4.31
Addiction	1	1	1					2	2	1	8	2.16
Am J Drug Alcohol Abuse	0		1		1	1				2	5	1.35
Contemp Clin Trials	0				1		1	2		1	5	1.35
Front Psychiatry	0							1		4	5	1.35
Others	10	6	4	7	2	14	22	28	59	61	213	57.41
Total	14	7	11	10	10	20	40	57	94	108	371	100

The third feature is the demonstration of the results on dashboards using Google Maps to display; such demonstration is rarely seen in the literature.

The fourth feature is the PMC citations used in this study. In tradition, over 100 papers were found with the search of "most-cited articles" [Title] in the PubMed library on October 10, 2018. Most of them applied academic databases, such as the Scientific Citation Index (Thomson Reuters, New York, NY, the United States), Scopus (Elsevier, Amsterdam, the Netherlands), and Google Scholar [20,21], to investigate the most cited research institutes in a specific discipline,

Table 3: The top 10 of the most cited institutes on opioid use disorders.

No	Institute	CI	i	x
1	Department of Medicine, Massachusetts(US)	19.09	1	4.37
2	Medical University of South Carolina(US)	17.96	1	4.24
3	Malaysia; Yale School of Medicine(US)	13.28	1	3.64
4	Department of Medicine(US)	12.23	1	3.5
5	RAND CorporationUniversity of Pittsburgh School of Medicine()	11.38	1	3.37
6	Johns Hopkins Bloomberg School ofPublic Health(US)	9.5	1	3.08
7	Yale University (US)	7.98	1	2.83
8	University of New Mexico Health Sciences Center(US)	7.02	1	2.65
9	McGill University(Canada)	6.65	1	2.58
10	The University of Montana(US)	5.69	1	2.39

such as the OUD in this study. None was found using the PubMed library to retrieve the cited articles on the OUD and calculating individual research achievements (Figure 1,2).

Limitations

Although the findings are based on the above analysis, several potential limitations may still encourage further research efforts. First, this study only focuses on one target topic and PMC database which cannot be generalized to other fields or databases, particularly with different characteristics and science categories in academics.

Second, biases may occur in the author identification given the presence of several authors with the same name or abbreviation and who are affiliated to different institutions.

Third, although our cluster analysis and the AWS formula are useful approaches for verifying the affiliated countries or research institutes, the results may be affected by the accuracy of the real author contributions instead of the last author's name as the true corresponding author.

Finally, we used a variety of methods to clean and identify the data in this research, but typos and errors still exist, which will affect the cluster results to a certain extent.

Conclusion

There was a rapid increase in scientific research productivity on OUD The US has special contributions to the body of opioid use disorders. The AWS used for quantifying the IRAs for countries and institutes is recommended to scientific disciplines in the future.

Declarations

Ethics approval and consent to participate

Not applicable.

All data were downloaded from MEDLINE database at pubmed. com.

Consent to Publish

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

TWC conceived and designed the study, JC and CH performed the statistical analyses and were in charge of dealing with data. WC and TWC helped design the study, collected information and interpreted data. WC monitored the research. All authors read and approved the final article.

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