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Mapping research on LGBT+ persons' health: a bibliometric analysis

Abstract

Background

LGBT+ individuals may have a greater risk of experiencing mental and physical health issues. In the past years, the predominant theme was HIV/AIDS and STDs. This study aimed to explore the most recent patterns in medical research concerning LGBT+ persons.

Methods

A bibliometric analysis using Biblioshiny was conducted. Based on previous studies, years of observation ranged between 2008 and 2021. Web of Science Core Collection was used.

Results

A total of 31039 articles was selected. Top journals centered around HIV/AIDS and STDs (n=6), followed by sexual behaviors/sexuality (n=2) and LGBT+ health (n=2). The USA led in research output (n=16249). Papers were categorized into three main clusters (which showed different evolution across time): one addressing HIV/AIDS, STDs, and sexual behaviors, another focusing on mental health, discrimination, and stigma, and a third, smaller cluster examining transgender, intersex, and gender-diverse health.

Conclusions

This paper highlighted a growth on LGBT+ health, uncovering research disparities among countries. While HIV/AIDS and STDs still dominated, a crucial theme concerning mental health, discrimination, and stigma has been rising. Declining interest in gender-diverse health, and disparities in research attention to different LGBT+ subgroups, underscored the need for more comprehensive and inclusive research to address complex health disparities.

Introduction

The acronym LGBT refers to people who identify as lesbian, gay, bisexual, or transgender. Further letters can be added to the acronym to consider the diversity of the community, including Q (queer, questioning), I (intersex) A (asexual), and the inclusion of the plus sign symbolizes the extensive range of individuals concerning sexual orientation, gender identity, gender expression, and sex characteristics.[1] Although members of the LGBT+ community face health problems similar to those of the general population, they may have a greater risk of experiencing mental and physical health difficulties compared with their heterosexual counterparts[2–4] and may they undergo unique challenges in accessing health services.[5] Members of the LGBT+ community may experience minority stress, inequalities, discrimination, and social exclusion, which can be influenced by various social determinants, such as social class, ethnicity, socioeconomic status, and geographical location, and which contribute to a deterioration in health status.[6,7] Additionally, data suggest that LGBT+ persons are more likely to have a negative outcome during diagnosis, treatment, or post-treatment due to a medical provider's limited training and lack of confidence regarding LGBT issues that may compromise their overall health,[8] making it necessary to promote the training of medical personnel to recognize the needs of LGBT+ community.

In recent years, the medical community has increasingly recognized the health needs of LGBT+ individuals. Considering the medical publications from 1950 to 2007, Snyder analyzed the trend of topics about LGBT+ persons in literature. While researchers between the early 1960s to the late 1970s considered homosexuality as a psychiatric disorder, later publications mostly focused on HIV/AIDS and other sexually transmitted diseases (STDs).[9] Similarly, Boehmer conducted a comparable study analyzing articles published between 1980 and 1999 focusing on LGBT+ individuals, with findings that echoed a parallel trend, indicating that the vast majority of articles centered around HIV/AIDS and STDs.[10]

Hence, this bibliometric analysis had the aim of delineating the patterns in medical research concerning the health of LGBT+ individuals, extending beyond latest available data until 2007 as investigated by Snyder.[9] The intention was to spotlight the key research themes that have been explored and pinpoint potential directions for further investigation, aimed at bridging the identified gaps in knowledge.

Methods

A bibliometric analysis using Biblioshiny was conducted to assess research developments and trends in LGBT+ literature. Biblioshiny is a software developed by Aria and Cuccurullo[11] that can perform

a bibliometric analysis and illustrate the most critical information of a research field.[12] Web of Science Core Collection was selected for this purpose as suggested by Biblioshiny developers since its dataset is considered the best choice in terms of data quality.[13] We selected search terms and criteria to collect the maximum number of relevant papers for a comprehensive review and in-depth analysis of the LGBT+ research field.

The search terms included any word related to the LGBT+ community contained in the title, abstract, author keywords, and Keyword Plus of an article. They were used to collect the initial paper set. The search string is available in the Supplementary File ("Supplementary Methods"). The query was executed on 14th March 2022. The Boolean operator NOT was used to exclude terms that do not refer to the human race (for example, the term "asexual" can also refer to plants, flowers, animals, parasites, and protozoa). We considered exclusively articles and reviews written in English and published between 2008 and 2021. The research was refined by introducing key areas (web of science Categories) relating to the medical field. We used R-Studio to clear the sample by removing duplicates, and we used Biblioshiny to remove early access articles that were published in 2022.

Through Biblioshiny, we described publication trends across the timespan, most relevant authors, most relevant sources, most productive countries and institutions, most cited documents, most frequent Author's Keywords, co-occurrence network, and thematic map evolution.[13] During the analysis of the Author's Keywords, to avoid undesirable redundancy, we carefully considered all the synonyms. For example, throughout the articles, the keywords "HIV", "HIV/AIDS", "AIDS", "Human Immunodeficiency Virus", "HIV-1", and "HIV infection" all indicated the same topic. As a result, the keyword "HIV" was chosen as it could represent similar keywords. At the same time, some Author's Keywords were removed because they were non-specific and could affect the analysis of main topics (e.g., terms like "qualitative", "prevalence", disclosure", and "systematic review").

Further details on each of the above-mentioned procedures are provided within the results.

Results

Number of publications

A total of 34625 articles were retrieved. After the selection process, we obtained a set of 31039 articles. The number of published articles per year increased from 1156 in 2008 to 4338 in 2021. The median annual growth rate of publication output was 10.71%, with the highest growth rate in 2021. The distribution of annual publications is shown in the Supplementary File (Table S1 and Figure S1).

Most relevant authors and citations

Considering 59662 authors, 38293 (64.2%) published a single paper LGBT+-related and can be considered occasional authors. A total of 8769 (14.7%) published two papers, 3847 (6.5%) three papers, and 8753 (14.7%) four or more papers. Table S2 summarizes the top 20 authors according to the number of publications. The total citations and h-index were also calculated to highlight their respective influence in this area.

Most relevant sources

The articles were published in 3180 different journals. A total of 6352 (20.4%) articles were published in the top 10 productive journals (Table 1). The journal that has the largest share of publications was "AIDS and Behavior" (n=1182), which also has the highest number of citations (n=30030) and the highest h-index (75). The most frequent central theme of the top journals was HIV/AIDS and STDs (n=6), followed by sexual behaviors or sexuality (n=2) and overall LGBT+ health (n=2).

Most productive countries and institutions

A total of 118 countries, considering the corresponding author's affiliation, were involved. Among them, the USA was the country with the greatest number of papers (n=16249), followed by the United Kingdom (n=1985), Canada (n=1828), Australia (n=1747), and China (n=1396) (Table S3). Figure 1 shows the number of documents per Country: the color intensity is proportional to the number of publications.

International collaborations of the top 20 most productive countries are shown in Table S3. The USA reported the lowest percentage of Multiple Countries Publications MCP (12.4%) (i.e. the number of documents in which there is at least one co-author from a different country). The countries with the highest percentages of MCP were Thailand (60.6%) and Switzerland (39.1%). The analysis of collaboration between countries is presented in Figure S2. While the USA has collaborated with countries around the world, there was a greater propensity for European countries to collaborate with each other.

Figure S3 shows the top 10 institutions that have affiliations with the authors involved. The University of California, San Francisco contributed the maximum number of publications (n=1819) and was followed by the University of California, Los Angeles (n=1462), the Columbia University (n=1280), the University of Washington (n=1280), and University of Michigan (n=1085). Nine of the top 10 institutions are located in the USA.

Most cited documents

Table S4 summarizes the top 10 articles according to the total number of citations. Across all articles, the total number of references was 593178, with 20.65 average citations per document. The work by Grant et al.[14] was the most cited paper with 3212 citations (247 citations per year) and addressed the topic of pre-exposure chemoprophylaxis (PrEP) for HIV prevention in men who have sex with men (MSM). The second most cited paper[15] was a guideline for sexually transmitted diseases treatment, and it has 2252 citations (282 citations per year). The third most cited paper,[16] with 1315 citations (120 citations per year), concerned the efficacy of PrEP among heterosexuals. Among the other articles of the top ten, the main themes were HIV (n=3), stigma (n=2), mental health (n=1), and youth risk behaviors (n=1).

Keywords

Author's keywords can be used to detect topics and directions in research.[13] The most frequent author's keywords were "HIV" (occurrences=5455), "Men who have sex with men" (occurrences=3675), and "Transgender" (occurrences=2422). In Table S5, the top 20 author's keywords based on the occurrences are presented. Overall, most of these terms referred to subgroups of the LGBT+ population (n=10) or HIV and STDs (n=4). Other keywords were about mental health (n=2), sexual behaviors and sexuality (n=2), gender dysphoria (n=1), and discrimination (n=1).

Co-Occurrence Network

The co-occurrence of two keywords reflects the number of publications where both keywords occur together and gives insights about the main research themes. The size of the nodes indicates the number of publications where the corresponding keywords occur. The size of each cluster represents the degree of recurrence, and the thickness of the line represents how often these keywords are used together.[13] Figure 2 shows the Author's Keyword co-occurrence network. The keywords are divided into 2 clusters. Overall, the first cluster was mainly focused on themes around HIV/AIDS, STDs, MSM, and sexual behaviors, while the second cluster analyzed topics around mental health, minority stress, discrimination, stigma, youth, and subpopulations of the LGBT+ group other than MSM.

Thematic map evolution

Figure 3 shows the thematic map evolution of the Author's Keywords considering three periods (2008-2012, 2013-2017, 2018-2021). By dividing the time span into different time slices, it is possible to explore the topic evolution.

The X-axis indicates the theme's relevance, and the Y-axis represents the density, a measure of the theme's development. The bubbles on the map symbolize network clusters, labeled by the keywords with the highest occurrences, and the bubble size reflects the occurrences. The location of the bubble is set based on the centrality and density of the cluster. The upper right quadrant contains the motor themes that are important and should be developed further, given their importance for future research. The upper left quadrant is associated with highly and rapidly developed and isolated themes. The lower left quadrant refers to emerging or declining themes. The lower right quadrant contains transversal and basic topics.[17] Table S6 reports all keywords considered in the bubbles.

Overall, we can see three main clusters. The greatest keywords' occurrences were shown by two clusters: the one about HIV/AIDS, STDs, and MSM, which was mostly a transversal theme, and the one about mental health, adolescents, stigma, and LGBT+ population other than MSM, which was a motor theme. The third cluster consisted of fewer occurrences and mainly was about transgender, intersex, and gender-diverse individuals' health, representing a declining theme. The evolution of the topics is further explored in the Discussion.

Discussion

Main finding of this study

The aim of this study was to undertake a comprehensive bibliometric analysis of scientific literature on LGBT+ persons' health during the 2008-2021 period.

Between 2008 and 2021, the total number of documents was 31039, showing a substantial growth considering that Snyder's work identified 21728 papers between 1950 and 2007.[9] Globally, there has been an increase in scientific production in the last years, indicating that there has been a rising recognition of the needs of sexual and gender minorities. However, based on the other analyses we performed, several considerations should be made.

First, the distribution of publications across countries suggests potential disparities. On the one hand, the overrepresentation of high-income countries is a common issue across many research fields.[18] On the other, it could reflect differences both in scientific interest and in health inequalities. While the former could point to varying priorities and agendas in research pursuits, the latter underscores the glaring reality of uneven access to healthcare and resources on a global scale. Consequently, the prevalent distribution pattern of research publications can be seen as an intricate interplay between the scientific landscape and the underlying health disparities that shape it. As the findings from studies

in high-income countries may not be representative of the global population, future research should focus on gaps in knowledge in other countries to provide information about potential lack of care.

Our results showed that six sources out of the top ten were journals mainly focused on HIV/AIDS and STDs, while the others were specifically on LGBT+ population's health or sexual behaviors. Although the sources are relevant and reflect the main topics of the scientific production, as discussed later, our findings highlighted that most papers were addressed to sectorial readership, indicating the need to broaden the audience by targeting a more comprehensive and multidisciplinary readership that should include public health researchers and professionals, whose curricula might be insufficient in this field although they can help in closing the gap in care.[19]

The description of the most cited papers, keywords, and co-occurrence networks confirmed the highest interest in HIV/AIDS and STDs, with particular attention to MSM and PrEP. The previous works by Snyder and Boehemer[9,10] revealed HIV/AIDS and STDs as the most frequent themes on LGBT+ health as well, with the exception of papers focusing on PrEP, as the first PrEP was approved by the Food and Drug Administration in 2012.[20] Interestingly, while it has been recognized that the MSM population has constituted the most vulnerable group concerning HIV for a considerable period,[21–23] the term MSM itself is a construct in the realm of public health, introduced in 1992.[21] The term's acceptance has recently surged, as evidenced by both our investigation and the research by Snyder.[9] Conversely, its usage was notably limited during the late nineties,[10] underscoring its subsequent extensive embrace within the scientific community.

The second main theme consisted of topics around mental health, minority stress, discrimination, stigma, youth, and subpopulations of the LGBT+ group other than MSM. This domain has notably surged in significance over the past years. Indeed, Boehemer et al. work reveals a marked contrast in the attention given to mental disorders compared with that given to HIV and STDs, primarily focusing on alcohol or drug addiction. Meanwhile, matters concerning youth health and the stress induced by minority status were scantily addressed, let alone the themes of stigma and discrimination.[10] Similarly, although Snyder and colleagues revealed a higher scientific production about adolescent health and addiction, their work still showed poor attention towards mood disorders and suicide, as well as stigma and discrimination.[9]

Furthermore, the thematic evolution illustrated that this second subject represented a motor theme, demonstrating increased significance and advancement. In contrast, in recent years, HIV and STDs have shown a decline in relevance, still remaining transversal themes, possibly in favor of mental health and stress-related topics. Last, it should be noted that the thematic map highlighted the relevance of the theme of transgender and gender-diverse health. While the health of intersex people

and people with disorders of sex development represented an independent, highly developed theme at the beginning of the time frame, it has been mixed with the health of transgender and gender-diverse individuals across the years. Interestingly, this subject showed a decline in interest. Nonetheless, recent publications have underscored the importance of not overlooking research concerning gender-diverse persons' health to establish a robust foundation of evidence to guide the practice and to improve medical education.[24–28] Hence, it is expected that this waning interest will hopefully undergo a transformation in the near future.

Interestingly, the frequency of keywords suggests a potential disparity in research towards the health of different LGBT+ subgroups. While MSM seem to represent the most investigated group, other subpopulations reported lower interest, potentially leading to an increase in inequalities and unmet needs. The issue of lack of research on other targets is not new.[29,30] On the one hand, it could be a problem of sampling;[31] on the other hand it could indicate a substantial lack and negligence that should be addressed in future research. Insufficient data on disease prevalence by sexual identity hinders identifying LGBT+ health issues. Standardizing sexual orientation data in public health surveillance could expose disparities and guide interventions.[8] Yet, researchers often overlook diversity within the LGBT+ community, hampering understanding of their unique healthcare needs.

We argue that, although the themes identified by the analysis are relevant, the health disparities that affect LGBT+ population extend beyond these topics. For example, LGBT+ people may be more likely to engage in unhealthy behaviors such as smoking, excessive alcohol use, and drug abuse that could lead to an increased risk of chronic diseases.[32] Recent studies suggested an elevated risk of specific cancer types and an overall diminished accessibility to oncological care.[28,33] Forthcoming research should embrace a more comprehensive domain of investigation that accounts for the intricate intersections of various factors impacting the health outcomes of the LGBT+ community.

What is Already Known

In recent times, there has been a growing awareness within the medical community regarding the healthcare needs of LGBT+ individuals. Snyder's analysis of medical publications from 1950 to 2007 sheds light on the evolving trends in literature related to LGBT+ persons. During the early 1960s to the late 1970s, researchers still classified homosexuality as a disorder. Subsequent publications shifted their focus primarily towards HIV/AIDS and STDs. Similarly, Boehmer's study, which examined articles published between 1980 and 1999, produced findings that mirrored this pattern. The predominant theme across most of these articles was the exploration of HIV/AIDS and STDs.[9,10]

What This Study Adds

This paper reveals a notable growth in attention to LGBT+ health. Research distribution across countries suggests potential disparities, highlighting the intricate connection between scientific exploration and underlying health inequalities. While the prominent focus on HIV/AIDS and STDs remains evident, a significant theme revolving around mental health, discrimination, and stigma emerges. Additionally, the decline in interest in transgender and gender-diverse health, alongside potential disparities in research attention towards various LGBT+ subgroups, highlights the need for broader and more inclusive research efforts to comprehensively address the complex health disparities faced by the LGBT+ population beyond the main identified themes.

Limitations

This study had some limitations. First, although Web of Science is a very wide source, the analysis was limited by the use of a single database. Furthermore, by performing a bibliometric analysis, we did not conduct studies' quality assessments. Moreover, institutions and countries were selected according to the author's affiliation. However, this bibliometric analysis sheds light on recent LGBT+ health research, assisting future researchers in identifying potential research directions and addressing knowledge gaps.

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Figure legends

Figure 1. Number of documents per country (the color intensity is proportional to the number of publications).

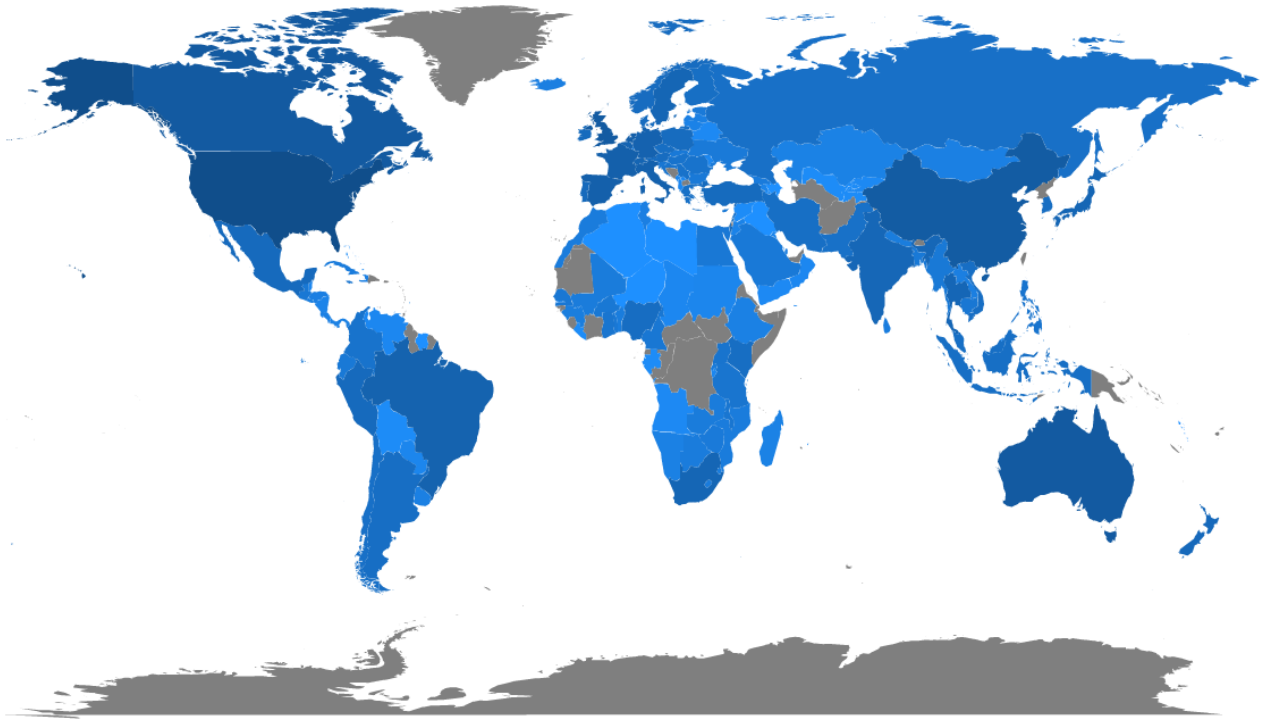

Figure 2. Co-occurrence of author's keywords network.

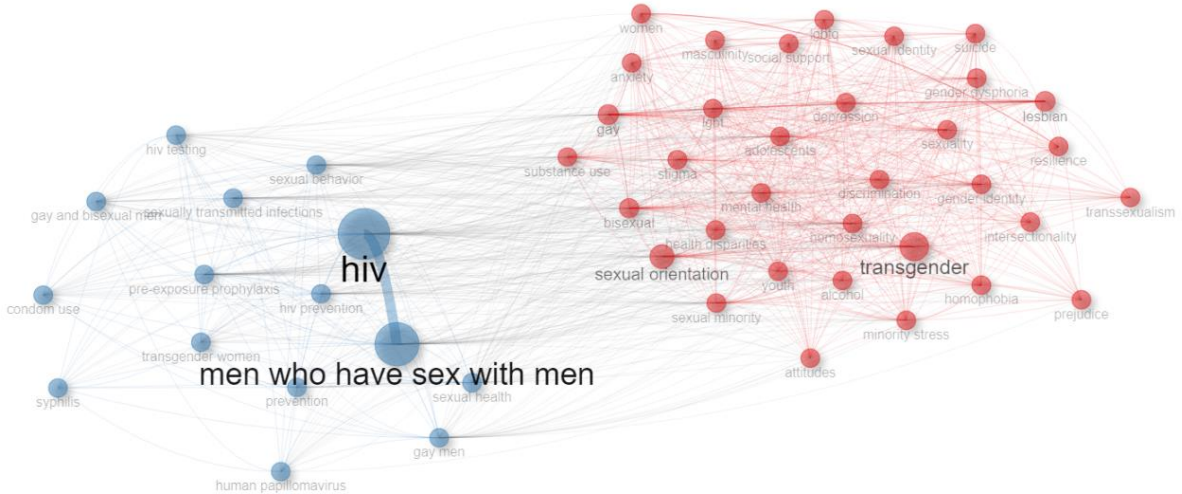

Figure 3. Thematic Map Evolution of Author's Keywords during the periods: 2008-2012 (A), 2013-2017 (B), and 2018-2021 (C).

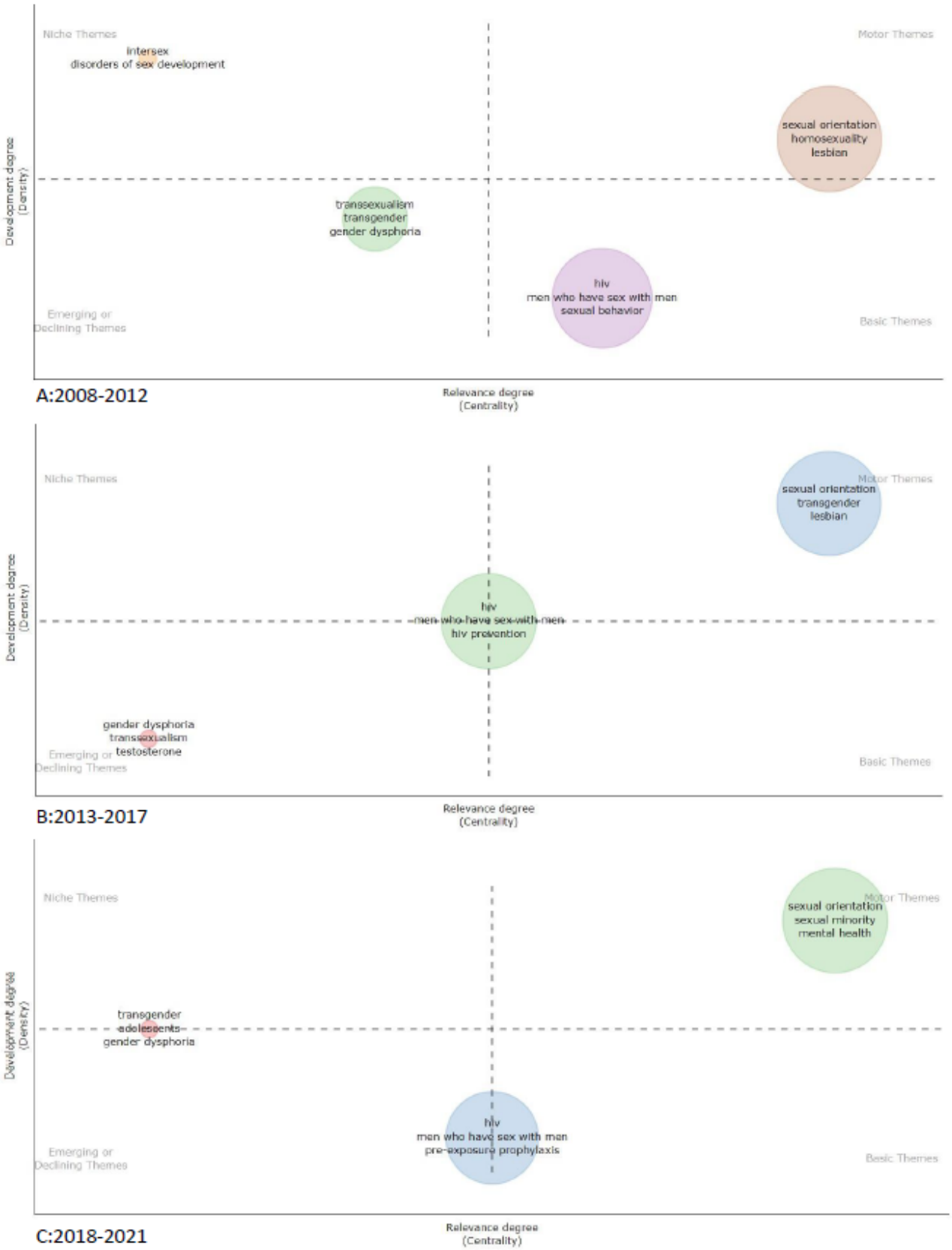

Table 1. Source impact of the top 10 journals publishing in this area

Journal	**Number of Publications**	**h_index**	**Total Citations**
AIDS and behavior	1182	75	30030
Journal of homosexuality	1021	52	15725
Archives of sexual behavior	964	66	21885
Sexually transmitted diseases	506	46	8937
J AIDS-journal of acquired immune deficiency syndromes	503	62	15810
Sexually transmitted infections	485	50	10583
Aids care-psychological and socio-medical aspects of AIDS/HIV	484	46	9010
International journal of STD & AIDS	426	29	3998
LGBT health	404	38	6601
Culture health & sexuality	377	39	6527