



Mapping the Landscape: A Bibliometric Analysis of Transgender Health Research (2010-2024)

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ABSTRACT:

Introduction: The field of transgender health research has significantly expanded in recent years, highlighting the growing recognition of the unique health needs and challenges faced by transgender individuals. Historically marginalized, transgender people have faced numerous adversities, including violence and inadequate healthcare. This bibliometric analysis aims to provide a comprehensive overview of the research landscape on transgender health from 2010 to 2024, focusing on trends, key contributors, and research gaps.

Materials and Methods: This study employed R programming and R Studio to conduct a bibliometric analysis of transgender health research indexed in the PubMed Core Collection from 2010 to 2024. The search strategy included terms such as "Transgender Health," "Gender Identity," and "Mental Health," among others. Data extraction covered publication details, authorship, institutional affiliations, and citation counts. Microsoft Excel and Citexs AI were used for data management and analysis, while R Studio facilitated visualization of trends and connections.

Results: The analysis identified 351 documents across 221 sources, with a notable annual growth rate of 29.91%. Key journals include LGBT Health and the Journal of Affective Disorders. Prominent authors such as S. Reisner and T. Poteat have made substantial contributions. The research trend shows a growing focus on psychological aspects, gender identity, and the impact of COVID-19 on transgender health. However, the average citation rate is low, indicating that while research output is increasing, its impact and visibility are still developing.

Conclusion: This bibliometric analysis highlights the significant growth and evolving focus of transgender health research. Despite progress, there are gaps in citation data and a need for more longitudinal studies. The findings underscore the importance of addressing health disparities through informed policies and practices. By identifying key contributors and research trends, this study provides valuable insights for enhancing healthcare and support for the transgender community.

Introduction

The landscape of health research has expanded significantly over the past few decades, encompassing a wider array of topics and populations. Among these, transgender health has emerged as a crucial and increasingly recognized area of study. (1) Transgender is a broad term for individuals whose gender identities or

roles differ from those assigned at birth. Historically, transgender people were often called 'eunuchs'—a term derived from Greek. (2,3) In India, they are known as 'hijras,' representing the third gender and one of the most marginalized communities. (4) Hijras often face violence, including physical and sexual abuse, and have limited means of survival, such as begging or sex work.



The Indian legal system has struggled to protect their rights adequately, despite international human rights obligations emphasizing equality and non-discrimination.(2,5) Affirmative measures are needed to eliminate discriminatory practices, as mere legal access through the judiciary is insufficient for true justice. Hijras live in discreet communities called "Gharanas," led by a Guru. Many are biological males identifying as women and may not undergo gender-affirming surgeries.(6–9) The Transgender Persons (Protection of Rights) Bill 2019 defines a transgender person as someone whose gender does not align with their assigned sex at birth, including transmen, transwomen, intersex individuals, genderqueer persons, and those with socio-cultural identities like Kinner, Hijra, Aravani, and Jogta.(10) Over time, there has been growing acceptance of LGBTQ+ identities, including transgender people. This progress is due to increased visibility, legal recognition, education, and advocacy. Non-binary identities are now acknowledged, and laws protecting against discrimination and allowing legal gender recognition have advanced. Educational initiatives and advocacy have been crucial in fostering understanding and support. Despite ongoing challenges, there has been significant progress toward equality and respect for transgender rights. In 2016, the Williams Institute at UCLA reported that about 1.4 million people, or 0.6% of US adults, identify as transgender.(11) In India, the 2011 census recorded 487,803 individuals under the 'others' category, which includes transgender people and others who identify as 'others'.(12) Transgender individuals face numerous challenges, such as family ostracization, societal mockery, lack of social support, limited economic opportunities, inadequate social welfare programs, and discrimination in healthcare facilities.(13) These issues stem from the social stigma associated with being transgender. (14)They also experience high levels of unemployment, homelessness, depression, anxiety, family rejection, physical and mental abuse, suicide risk, and substance abuse.(15) They engage in risky sexual behaviours and are more vulnerable to diseases like HIV.(16) Accessing healthcare is difficult due to discrimination. These challenges often start early in life, leading to issues like alcoholism, substance abuse, and tobacco use, which can impact oral health.(17) Neglecting overall health often results in neglecting oral health as well.(18) This comprehensive bibliometric

study aims to analyze and synthesize the existing body of research on transgender health. By examining the frequency and trends of key terms and topics related to transgender health, we aim to provide a clear and detailed picture of the current state of knowledge in this field. Specifically, we will explore the prevalence and impact of various health disparities experienced by transgender individuals, as well as the effectiveness of different interventions and policies aimed at improving transgender health outcomes. Through a detailed bibliometric analysis, this study will highlight the most relevant research findings, identify gaps in the current literature, and suggest directions for future studies. Our goal is to offer valuable insights that can inform healthcare policies, practices, and research to improve the health and well-being of transgender individuals. By understanding the complex factors influencing transgender health, healthcare providers and policymakers can develop more effective strategies to address the unique needs and challenges faced by this population.(19)

Material and Methods

This bibliometric analysis employed the R programming language and R Studio software to explore the research landscape concerning transgender and health.(20,21) The study focused on articles indexed in the PubMed Core Collection from the year 2010 to 2024. (22)

Search Strategy: -The search strategy utilized PubMed as the primary database, encompassing literature up to July 2024. The algorithm applied for PubMed searches was as follows:

- Transgender Health AND Gender Identity
- Mental Health AND Transgender Persons AND Public Health
- Transgender Health NOT HIV/AIDS
- Gender Identity NOT Non-binary
- Transgender Health OR Transgender Well-being
- Sexual Orientation OR Gender Diversity
- (Transgender Health OR LGBT Health) AND (Psychology OR Mental Health)
- (Sex Factors AND Transgender Persons) OR (Sexual Partners AND Gender Identity)

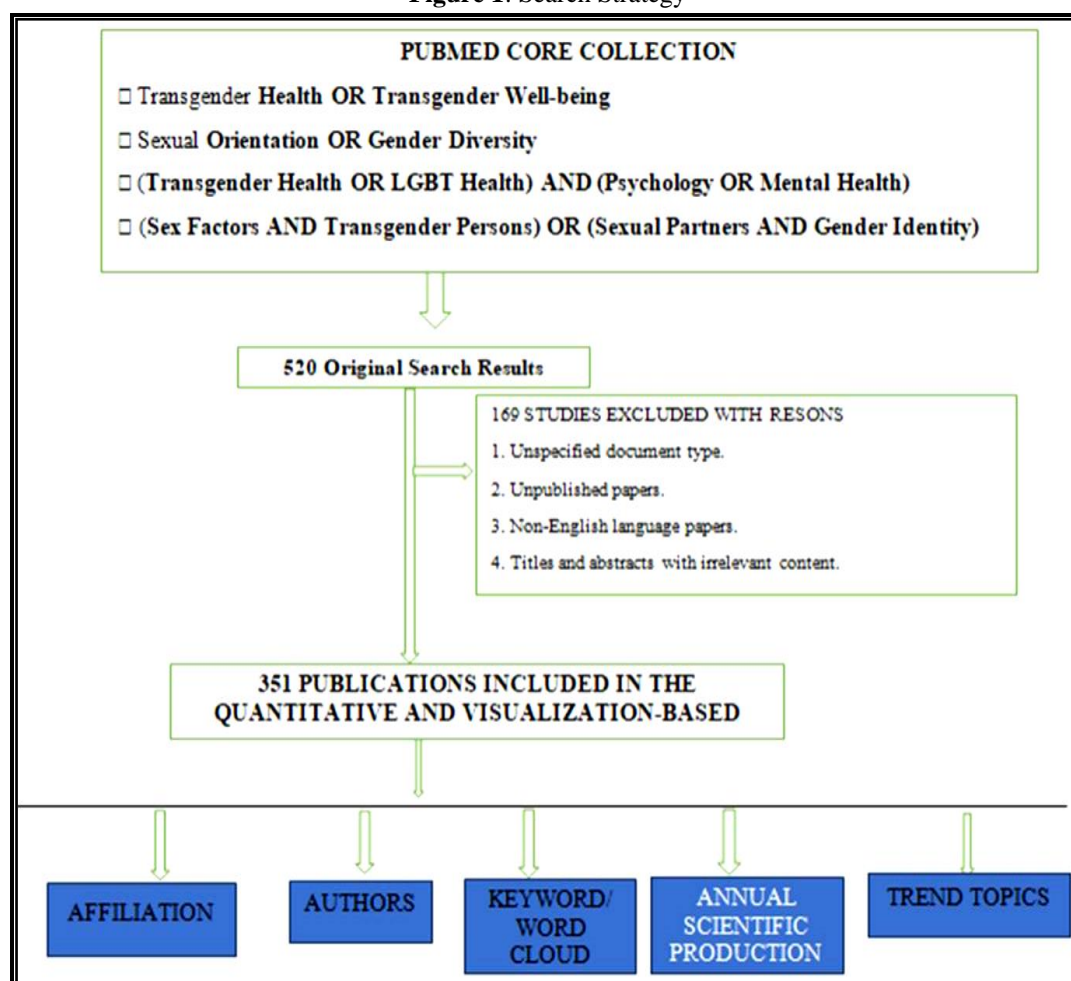


Data Extraction and Analysis

The bibliometric analysis included extracting information such as title, author, institution, country, publication year, keywords, and citations. These details were imported into Microsoft Excel 2000 (Redmond, Washington, USA). Citexs AI (Wuhan, China) was used for identifying related diseases. Visualization of

countries, institutions, authors, journals, diseases, and keywords was carried out using R programming and R Studio software.(20,21) In the visualization, the size of nodes and the thickness of lines connecting nodes in R Studio indicated the volume of publications and the strength of connections.

Figure 1: Search Strategy



Data Collection: Data extraction included information such as publication year, authors, affiliations, journals, citation counts, and keywords from retrieved articles.

Data Analysis

Publication Trends:

Identification of publication trends over time to understand the evolution of research interest.

Descriptive analysis

Examine trends in publications over time, encompassing the distribution across different years and types of documents.

Author analysis

Identify highly productive authors and collaboration networks within the field. Analyze author output and patterns of co-authorship.



Journal analysis

Assess the impact and influence of journals that publish research in transgender and health. Evaluate journal metrics such as impact factor and citation count to gauge their significance.

Keyword analysis

Identify common keywords and themes across the literature. Analyze the frequency of keywords, networks of co-occurrence, and clusters of related themes.

Statistical Analysis: Descriptive statistics, network analysis, and visualization techniques were employed to interpret and present findings.

Visualization and Interpretation:

Employ bibliometric visualization methods such as co-authorship networks, keyword co-occurrence maps, and citation networks to illustrate connections and patterns within the data.

Analysis of findings: Evaluate the outcomes of the bibliometric study in alignment with the specified research goals. Identify prominent trends, influential authors, emerging topics, and areas where research is lacking.

Ethical Considerations: The study adhered to ethical guidelines for bibliometric analysis, ensuring proper attribution of intellectual contributions and adherence to copyright policies.

Results

Figure 2: Main Information



Table 1 and Figure 2 shows -The bibliometric analysis of transgender and health research from 2010 to 2024 reveals a burgeoning field with a notable growth trajectory. Over this 14-year period, the dataset includes 221 sources and 351 documents, indicating a substantial volume of research in this area. The annual growth rate of 29.91% highlights a rapidly increasing interest and expanding body of work related to transgender health. The average age of documents, 4.23 years, suggests that most research is recent and reflects current trends and advancements. However, the average citation rate of 0

citations per document may point to either a very new field where papers are still gaining recognition or potential issues with the dataset's citation data. This could imply that while the field is growing, the impact and visibility of the research might still be developing. Additionally, the absence of references in the dataset suggests a need for further investigation into citation practices or completeness of the data. Overall, the analysis indicates a dynamic and evolving research landscape in transgender health.



Figure 3: Annual Scientific Production

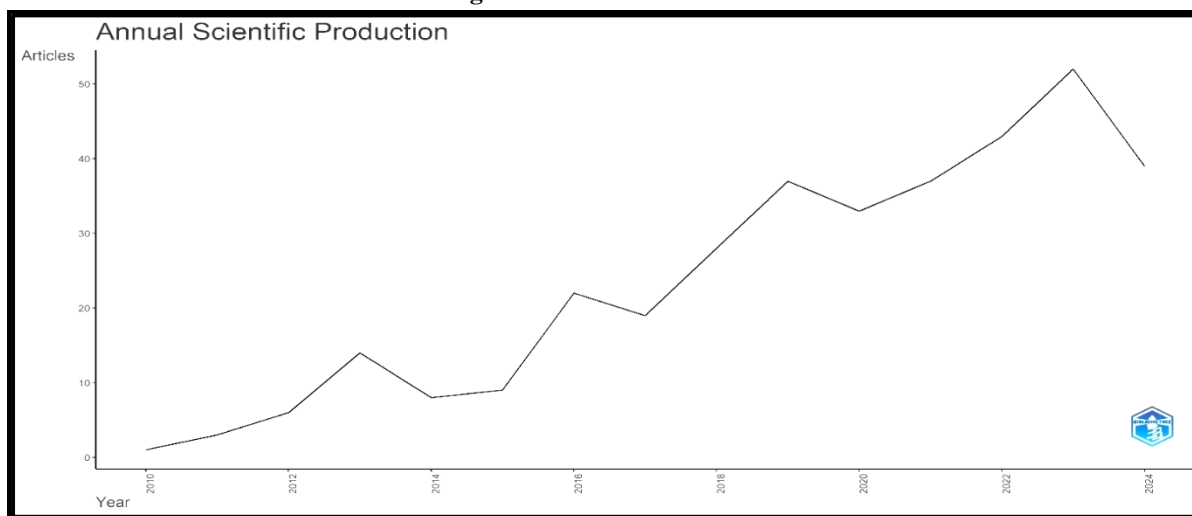


Figure 3 Shows-The annual scientific production of research on transgender and health from

2010 to 2024 shows a clear upward trend, reflecting growing interest and productivity in this field. In the early years, the number of articles was relatively modest, starting with just 1 article in 2010. This number gradually increased, with a significant jump to 6 articles in 2012 and further accelerating in the following years. The period from 2016 to 2024 demonstrates a marked increase in research output, with notable peaks in 2018, 2019, 2022, and 2023. In 2016, the number of articles rose to 22, and this upward trajectory continued,

reaching 37 articles in both 2019 and 2021. The highest production was observed in 2023, with 52 articles, indicating a peak in research activity. The most recent year, 2024, shows a slight decline to 39 articles, which could be indicative of a stabilization of research output or a lag in publication processes. Overall, the data illustrates a vibrant and expanding field of research, with a steady increase in annual production reflecting growing recognition and exploration of transgender health issues.

Figure 4: Most Relevant Sources

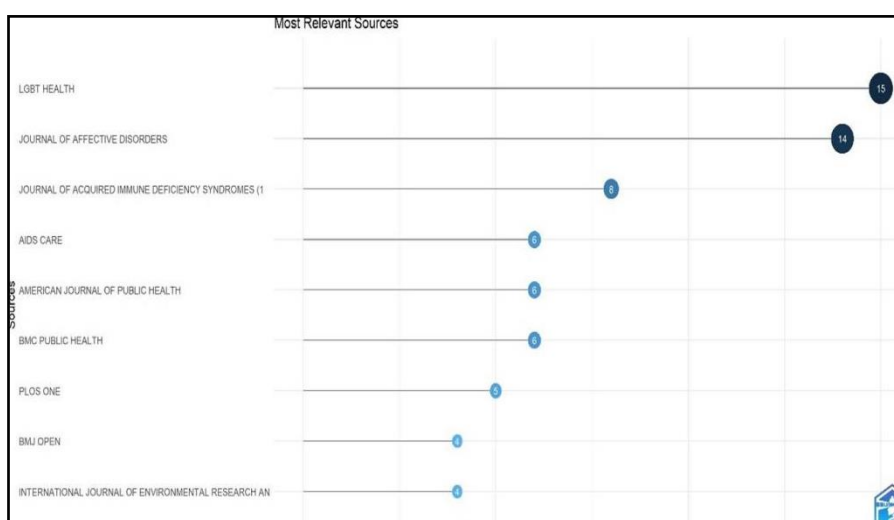




Figure 4 Shows The most relevant sources in the field of transgender and health research reveal a diverse landscape of publication venues. LGBT Health stands out as the leading journal with 15 articles, underscoring its pivotal role in disseminating research specifically focused on LGBT and transgender health issues. Following closely is the Journal of Affective Disorders with 14 articles, highlighting significant research on mental health challenges faced by transgender individuals. The Journal of Acquired Immune Deficiency Syndromes (1999) and AIDS Care, with 8 and 6 articles respectively, reflect a concentrated effort on HIV/AIDS-related health issues within the transgender community. The American Journal of

Public Health, BMC Public Health, and PLOS ONE each contribute 6 articles, demonstrating their engagement with broader public health research that includes transgender health topics. BMJ Open and the International Journal of Environmental Research and Public Health, each with 4 articles, address environmental and public health aspects affecting transgender individuals. Lastly, the International Journal of Transgender Health, also with 4 articles, serves as a specialized outlet dedicated to transgender health research. This array of journals illustrates the multidisciplinary approach to transgender health research, with contributions spanning specialized, public health, and general health domains.

Figure 5: Most Relevant Authors

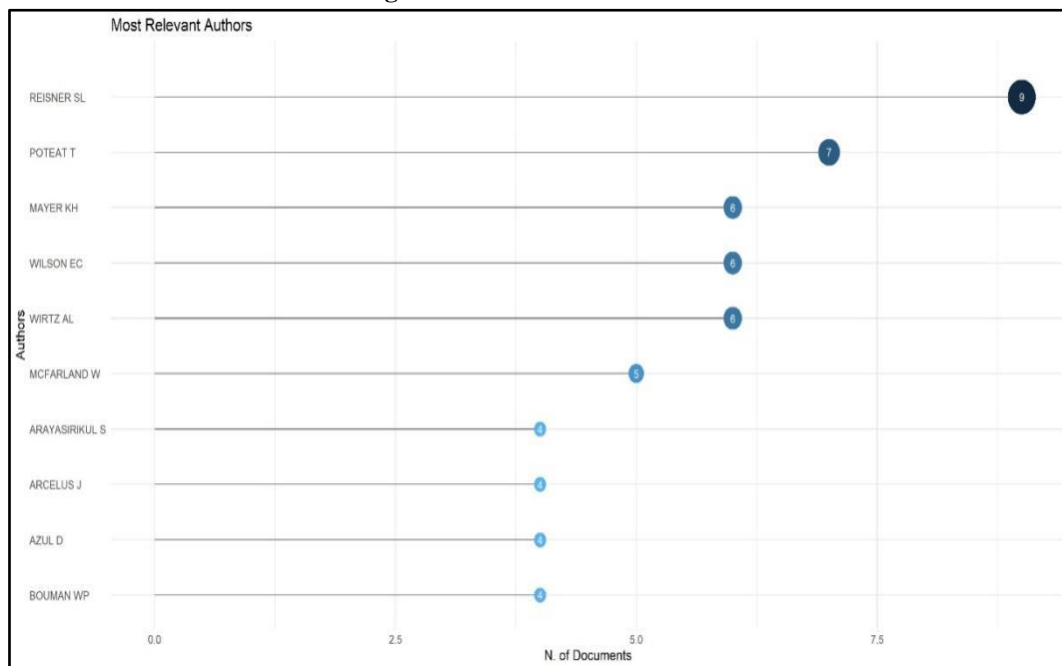


Figure 5 Shows-The most relevant authors in transgender and health research highlight key contributors to the field. S. Reisner leads with 9 articles, underscoring their prominent role and extensive contribution to research on transgender health issues. T. Poteat follows with 7 articles, reflecting significant work in this area as well. K.H. Meyer and A.L. Wirtz each have 6 articles, indicating substantial research output and influence on transgender health topics. W. McFarland contributes 5 articles, showing a notable

presence in the field. Authors such as S. Arayasirikul, J. Arcelus, D. Azul, and W.P. Bouman, each with 4 articles, also play important roles, adding valuable perspectives and research findings. Overall, these authors are key figures in transgender health research, with S. Reisner and T. Poteat being particularly prominent. Their collective work reflects a robust body of research advancing understanding and addressing the health needs of transgender individuals.



Figure 6: Most Relevant Affiliations

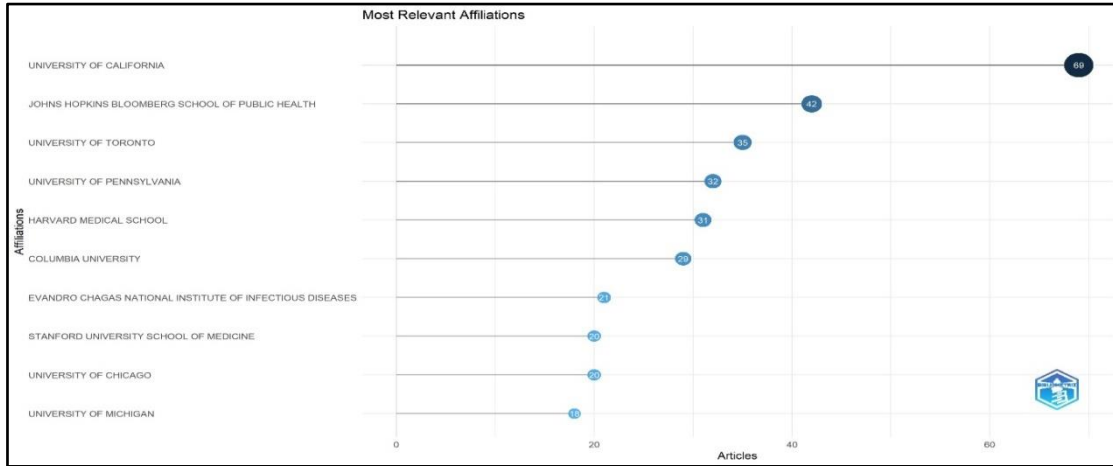


Figure 6 Shows The affiliations of authors in transgender and health research highlight the leading institutions contributing to the field. University of California is the most prominent, with 69 articles, demonstrating its substantial role in advancing research on transgender health. Johns Hopkins Bloomberg School of Public Health follows with 42 articles, reflecting its significant involvement in public health research related to transgender issues. University of Toronto contributes 35 articles, indicating a strong presence in this research area, while University of Pennsylvania and Harvard Medical School also play major roles with 32 and 31 articles, respectively. Columbia University contributes 29 articles,

showcasing its involvement in transgender health research. The Evandro Chagas National Institute of Infectious Diseases with 21 articles, and Stanford University School of Medicine and University of Chicago, each with 20 articles, also make notable contributions. Finally, University of Michigan adds 18 articles to the body of research. These affiliations represent a diverse array of leading institutions, with strong contributions from major universities and specialized research centers. Their collective output highlights the extensive academic and research focus on transgender health across various prestigious institutions.

Figure 7: Trends Topics

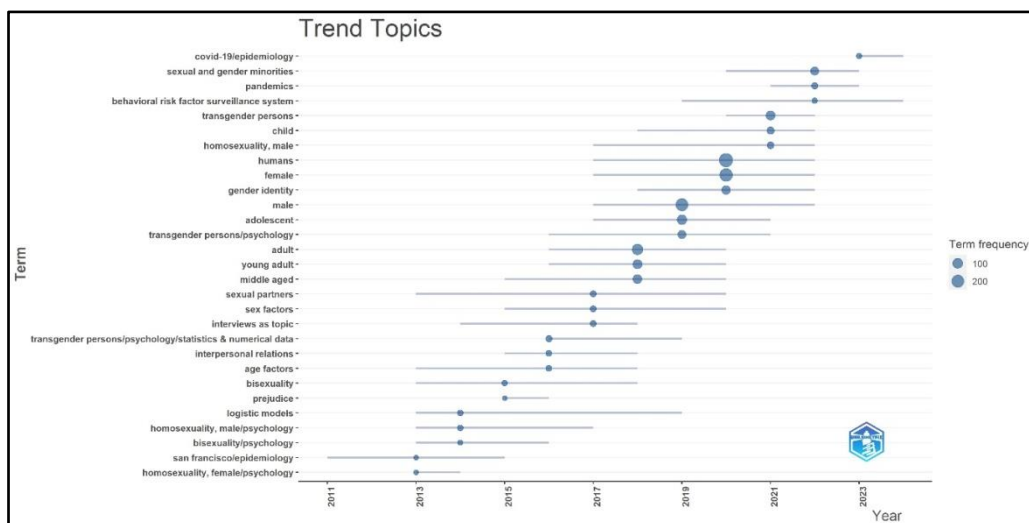




Figure 7 Shows the trending topics in transgender and health research reveal a dynamic and evolving focus. The significant attention to transgender persons/psychology, with 13 articles peaking in 2016, underscores a strong and sustained interest in the psychological aspects of transgender individuals. Alongside this, sexual and gender minorities has become increasingly relevant, with 51 articles highlighting the growing recognition of the unique challenges faced by these groups. Gender identity has also gained prominence, with 63 articles showing rising interest from 2018 onwards. Research specifically on transgender persons has surged, reaching 82 articles, particularly gaining traction from 2020, reflecting an increased focus on their needs and experiences. The

impact of the COVID-19 pandemic, with 7 articles, is emerging as a pertinent topic, illustrating the pandemic's influence on health issues specific to transgender individuals. Additionally, topics such as sex factors and sexual partners remain important, with 11 articles each, indicating continued interest in how these factors relate to health outcomes. The emergence of behavioral risk factor surveillance system with 7 articles points to a growing focus on data collection and surveillance related to behavioral risks among transgender populations. Overall, the research landscape is increasingly centering on transgender-specific issues, including psychological well-being, gender identity, and the impacts of global health crises.

Figure 8: Most Frequent Word

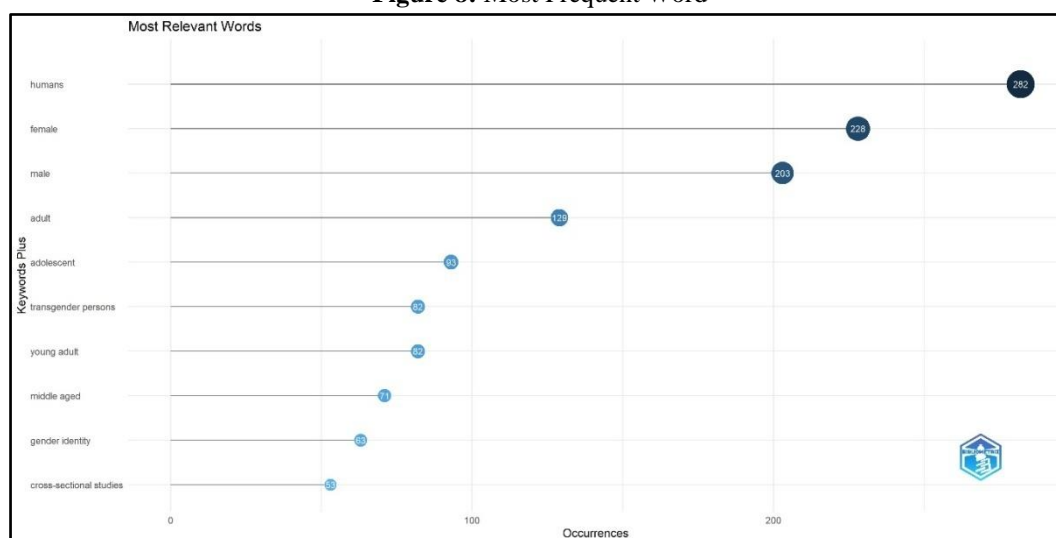


Figure 8 Shows the analysis of term frequencies in transgender and health research reveals the most frequently used concepts and categories in the literature. The term "humans" is the most common, with 282 occurrences, indicating a broad focus on human subjects across various studies. "Female" follows with 228 mentions, reflecting a substantial interest in female populations within the research. "Male" is also prominent, with 203 occurrences, highlighting significant attention to male subjects. The term "adult" appears 129 times, suggesting a considerable focus on adult populations, while "adolescent" and "young adult" both have 93 and 82 mentions respectively, indicating

that research also encompasses younger age groups. "Transgender persons"* is mentioned 82 times, emphasizing the specific focus on transgender individuals. The term "middle aged" appears 71 times, pointing to research targeting this age group. Gender identity is mentioned 63 times, reflecting an important area of study related to gender diversity. Finally, "cross-sectional studies" with 53 mentions indicates that this research design is commonly used in studies on transgender health and related topics. Overall, the most frequent terms illustrate a focus on a broad range of human subjects, with particular attention to gender, age, and the specific experiences of transgender individuals, alongside a reliance on cross-sectional study designs.



Discussion

The bibliometric analysis of transgender health research from 2010 to 2024 reveals several key trends and insights into the evolving landscape of this field. The significant increase in research output, with an annual growth rate of 29.91%, underscores the growing recognition and importance of addressing transgender health issues within the academic and medical communities. **Publication Trends** The data indicates a substantial increase in research publications, particularly from 2016 onwards, highlighting a burgeoning interest and effort in understanding and addressing the health needs of transgender individuals. The peak in publication numbers in 2023 suggests that the field has gained considerable momentum, although the slight decline in 2024 may indicate either a stabilization of output or a delay in publication processes. This trend reflects an increased societal and academic focus on the health disparities and unique challenges faced by the transgender community. **Journal and Author Contributions** The most relevant journals, such as *LGBT Health* and the *Journal of Affective Disorders*, demonstrate a multidisciplinary approach to transgender health, encompassing mental health, public health, and specific health issues like HIV/AIDS. This variety of publication venues indicates a broad interest across different domains of health research. Similarly, the prominent authors in the field, including S. Reisner and T. Poteat, have made significant contributions, reflecting their leading roles in advancing transgender health research. The diverse affiliations of these authors, from institutions like the University of California and Johns Hopkins Bloomberg School of Public Health, further highlight the extensive academic commitment to this area. **Keyword and Topic Analysis** The analysis of frequent keywords and trending topics reveals a dynamic focus within transgender health research. The prominence of terms such as "transgender persons," "gender identity," and "sexual and gender minorities" indicates a sustained and growing interest in understanding the specific health needs and experiences of transgender individuals. The emergence of COVID-19 as a pertinent topic underscores the need to consider the pandemic's unique impacts on transgender health. Additionally, the frequent mention of psychological well-being and behavioral risk factors points to an

increased recognition of the mental health challenges and risk behaviors within this population.

Methodological Insights

The reliance on cross-sectional study designs, as indicated by the frequent mention of "cross-sectional studies," suggests that while there is significant interest in exploring transgender health, there may be a need for more longitudinal research to understand long-term health outcomes and trends. The focus on different age groups, from adolescents to middle-aged individuals, illustrates the diverse demographic considerations in transgender health research.

Implications for Policy and Practice The findings of this bibliometric analysis have important implications for healthcare policy and practice. The growing body of research provides a solid foundation for developing more inclusive and sensitive healthcare policies that address the unique needs of transgender individuals. By identifying the most influential authors, journals, and institutions, policymakers and practitioners can access key sources of information and collaborate with leading experts to improve health outcomes for the transgender community. The identified gaps in the literature, such as the need for more comprehensive citation data and the underrepresentation of certain research designs, suggest areas for future research. Addressing these gaps will be crucial for developing a more complete understanding of transgender health and ensuring that research efforts are aligned with the actual needs of the community.

Conclusion

The bibliometric analysis of transgender health research from 2010 to 2024 reveals a dynamic and expanding field, marked by a significant increase in research output and growing interest in the unique health challenges faced by transgender individuals. The substantial annual growth rate of 29.91% underscores the field's rising prominence, with key journals such as *LGBT Health* and influential authors like S. Reisner and T. Poteat leading the way. Research trends highlight a focused exploration of mental health, gender identity, and the impact of recent global events like the COVID-19 pandemic. However, the low average citation rate suggests that while research volume is increasing, its impact and visibility are still emerging. The study identifies critical gaps, including the need for more longitudinal studies and comprehensive citation data.



Addressing these gaps will be crucial for developing effective healthcare policies and practices that better support the transgender community. Overall, the findings emphasize the importance of continued

research and advocacy to improve health outcomes and address the unique needs of transgender individuals.

Table 1: Main Information About Data

DESCRIPTION	RESULTS
MAIN INFORMATION ABOUT DATA	
TIME SPAN	2010-2024
SOURCES	221
DOCUMENTS	351
ANNUAL GROWTH RATE	29.91
DOCUMENT AVERAGE AGE	4.23
AVERAGE CITATION PER DOC	0
REFERENCES	0
DOCUMENT CONTENTS	
KEYWORDS PLUS	990
AUTHOR'S KEYWORD	990
AUTHORS	
AUTHORS	1860
AUTHORS OF SINGLE-AUTHORED DOCS	6
AUTHORS COLLABORATION	
SINGLE AUTHORED DOCS	6
CO-AUTHORS PER DOC	5.94
INTERNATIONAL CO-AUTHORSHIP	18.23
DOCUMENT TYPES	
autobiography;biography;historicalarticle;journalarticle;research support, n.i.h., extramural	1
case reports	2
case reports; journal article; research support, non-u.s. gov't	1
clinical trial, phase ii;journal article; randomized controlled trial; research support, n.i.h., extramural	1
comment; journal article	1
comparative study; journal article	1
comparative study; journal article; research support, non-u.s. gov't	5
comparative study; journal article; review	2
comparative study; journal article; video-audio media	1
English abstract; journal article	1
journal article	1
journal article; meta-analysis; research support, non-u.s. gov't; systematic review	169
journal article; meta-analysis; review	2
journal article; multicenter study	2
journal article; multicenter study; research support, n.i.h., extramural; research support, non-u.s. gov't	1
journal article; multicenter study; research support, non-u.s. gov't	1
journal article; observational study	1



journal article; practice guideline; research support, non-u.s. gov't	1
journal article; randomized controlled trial	1
journal article; randomized controlled trial; research support, n.i.h., extramural; research support, u.s. gov't, p.h.s.	1
journal article; research support, n.i.h., extramural	22
journal article; research support, n.i.h., extramural; research support, non-u.s. gov't	15
journal article; research support, n.i.h., extramural; research support, non-u.s.gov't; research support, u.s. gov't, non-p.h.s.	1
journal article; research support, n.i.h., extramural; research support, non-u.s. gov't; research support, u.s. gov't, p.h.s.	1
journal article; research support, n.i.h., extramural; research support, non-u.s. gov't; review	7
journal article; research support, n.i.h., extramural; research support, u.s. gov't, non-p.h.s.; review	1
journal article; research support, n.i.h., extramural; research support, u.s. gov't, p.h.s	2
journal article; research support, n.i.h., extramural; review	2
journal article; research support, non-u.s. gov'	42
journal article ;research support, non-u.s. gov't ;research support, u.s. gov't, non-p.h.s.	2
journal article; research support, non-u.s. gov't; review	2

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