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Original Article

A retrospective analysis of the characteristics of retracted articles about traditional, complementary, and integrative medicine: A protocol

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Data availability statement

All relevant materials and data generated from this study will be posted on the Open Science Framework: https://doi.org/10.17605/OSF.IO/TK9ZS

Authors' contributions

Concept – J.Y.N.; Design – J.Y.N., L.B., D.F., T.H., H.C.; Supervision – J.Y.N.; Resource – J.Y.N., H.C.; Materials – J.Y.N., H.C.; Data collection and/or processing – N/A (Protocol); Analysis and/or Interpretation – N/A (Protocol); Literature search – J.Y.N., K.S.; Writing – J.Y.N., K.S.; Critical reviews – J.Y.N., K.S., L.B., D.F., T.H., H.C.

Declaration of interests

Jeremy Y Ng serves as a voluntary member of the *European Science Editing* International Advisory Board.

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Abstract

Background: Traditional, complementary, and integrative medicine (TCIM) includes a diverse range of practices, products, and therapies outside the scope of conventional Western medicine, including acupuncture, Ayurveda, chiropractic care, and homeopathy. Globally, TCIM is widely used and recognized by most World Health Organization member states, and research in this field has grown substantially in recent decades. However, TCIM research is often criticized for methodological weaknesses and insufficient rigour, raising concerns about its evidence base and credibility. Retraction of scientific articles serves as an essential mechanism to safeguard research integrity, alerting the scientific community to serious errors or misconduct such as fabrication, falsification, or plagiarism. The increasing number of retractions across biomedical research highlights the importance of understanding their underlying causes. Studying retracted TCIM publications may provide unique insights into recurring methodological, ethical, or systemic issues specific to this field and inform strategies to strengthen research quality.

Objectives: The proposed research protocol will use a retrospective analysis to analyse retracted TCIM articles reported in the Retraction Watch database.

Methods: Articles classified under '(HSC) Medicine – Alternative' will be identified, extracted, and compared descriptively against retracted non-TCIM publications. Variables of interest include reasons for retraction, date of retraction, article type, journal, publisher, country, number of authors, paywall status, and time from publication to retraction. Data will be summarized using descriptive statistics, with exploratory comparisons made between TCIM and non-TCIM retractions.

Conclusions: The findings will provide the first comprehensive overview of TCIM retractions, offering valuable insights into patterns of flawed research in the field.

Keywords:

Complementary medicine, integrative medicine, metaresearch, retracted articles, Retraction Watch, traditional medicine

Introduction

Traditional medicine refers to 'the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement, or treatment of physical and mental illness'.[1]

Complementary medicine is defined as 'a non-mainstream approach used together with conventional medicine'.[2,3] Integrative medicine 'brings conventional and complementary approaches together in a coordinated way'.[2,3] The primary objective of integrative medicine is holistic, aiming to support health across biological, behavioural, social, and environmental domains, rather than solely focusing on treating illness. For the purpose of this study, these practices will be referred to collectively as traditional, complementary, and integrative medicine (TCIM). This term includes a wide array of health care practices, products, and therapies that fall outside the scope of conventional Western medicine. Examples include acupuncture, chiropractic care, Ayurveda, and homeopathy, each with distinct philosophical, historical, and geographical origins.[4] The use of TCIM is widespread globally. According to a 2019 report from the World Health Organization (WHO), approximately 88% of WHO member states acknowledge the use of TCIM within their health care systems.[5] Many of these countries have also developed formal policies and programmes related to TCIM, highlighting its recognized importance in global health. The actual number of countries using these practices is likely even higher, indicating the significant role TCIM plays in health care worldwide.[5] In recent years, TCIM has gained considerable popularity in the Western world, driven by increased patient interest and utilization.[5] This growing acceptance has been accompanied by a rise in research focused on TCIM.[6] However, this research often faces criticism from both biomedical researchers and conventional practitioners, who argue that TCIM studies frequently lack rigorous methodologies and adequate outcomes.[7,8] These critiques underscore the need for more stringent research practices and higher standards to enhance the credibility and methodological quality of TCIM studies.[8,9]

Retraction serves as a critical mechanism in maintaining the validity and credibility of the published record of research by alerting the scientific community to significant issues within publications, such as fundamental flaws or research misconduct, among other reasons.[10,11] Research misconduct encompasses fraud, which includes fabrication, falsification, and plagiarism.[12] When an article is retracted, often a retraction note is issued as a separate publication, explaining the reasons for the retraction. The article itself is flagged as retracted on the journal's website and in its metadata, as included in bibliographic databases such as PubMed, to alert the reader that the publication is no longer part of the scientific record, as it cannot be relied upon. Retracted articles are generally not removed from journals, allowing the examination of the errors or issues that led to their retraction along with their retraction note.[13] The annual number of retracted articles has increased over the years, with over 10,000 research publications retracted in 2023 alone.[14] This rise is partly due to growing awareness of the importance of research integrity and the mechanisms available for retraction.[15,16]

Studying retracted articles, specifically within the TCIM field, is potentially useful for several reasons. It helps identify common challenges that are specific to this field, e.g., the most frequent methodological errors, breaches of ethics, and inaccuracies in data collection, the knowledge of which can guide researchers in improving TCIM study designs, ethical standards, and data quality.[9,17]

Investigating TCIM retractions can help to improve the quality of research in that field. Retractions can signal underlying issues in the research processes. When a field of research has many retractions, it raises concerns about its evidence base, leading to more scepticism and reduced acceptance of the field from the public.[18] Furthermore, studying retractions can highlight the possible impact of lack of institutional supervision on research integrity. Retractions can occur due to poor training and supervision of researchers; perverse incentives in the research culture; and inadequate review processes, oversight, or lack of resources to maintain ethical standards in research.[17–20] These insights can inform the development of institutional policies to better prevent research misconduct, breaches of ethics, or methodological flaws in TCIM. Strengthening institutional supervision can lead to closer adherence to research standards, ultimately promoting the quality of TCIM research.[20] In this study, we will survey retracted TCIM articles using data from the Retraction Watch database (RWD) and analyse this information to better understand the common characteristics behind retracted TCIM publications. By identifying the common factors and patterns reported from the RWD, we hope to gain some insights that may help to improve the quality of TCIM research. Therefore, the objective of this study is to propose a protocol for analysing the characteristics of retracted articles within the field of TCIM.

Methods

Open science statement

The study has been registered on the Open Science Framework (OSF).[21] In addition, all associated data collection methods, the data set, and the code or scripts for data analysis will be publicly posted on OSF to ensure that our research process is fully transparent, reproducible, and accessible to the broader scientific community. Once the final data analysis is complete and the report prepared, it will be made available as a preprint prior to journal submission.

Approach

This proposed analysis focuses on retracted articles to identify patterns, trends, and specified reasons for retractions within TCIM. Specifically, we will collect data on retracted TCIM articles reported in the RWD, display the data as a contingency table alongside retracted non-TCIM articles, and compare the two categories of articles descriptively.[22] The time frame will be from the inception of the RWD to the date the data set is downloaded for analysis, which will be reported in the final manuscript. The study will follow a multi-step process that includes database selection, article selection, data extraction, and statistical analysis. The methods of this study are in alignment with earlier studies investigating retractions.[23,24]

Database selection and search strategy

The RWD will be the exclusive resource for identifying and collecting data on retracted TCIM articles. This database is a valuable

source of retracted research articles, serving both the public and research communities.[25]

Article selection and data extraction sheet

As the RWD is the exclusive data source for this study, only retracted records indexed in the RWD will be eligible for inclusion. As the RWD indexes multiple publication types (e.g., research articles, reviews, case reports, and editorials), all retracted publication types will be included in the study.[26] The article must be listed in the RWD with a 'Retraction' nature of notice, confirming its retracted status. The inclusion and exclusion criteria for TCIM and non-TCIM articles are outlined below.

Traditional, complementary, and integrative medicine

Inclusion: The article must fall under the subject category '(HSC) Medicine – Alternative', where HSC is an abbreviation for 'Health Sciences', ensuring it is within the TCIM field. This classification was selected following clarification obtained through personal communication with Ivan Oransky (co-founder of Retraction Watch, August 2024) regarding the most appropriate TCIM-related category within the database.

Exclusion: Every article that falls under the '(HSC) Medicine' subject category that is not '(HSC) Medicine – Alternative'. Examples include '(HSC) Medicine – Cardiology', '(HSC) Medicine – Endocrinology', and '(HSC) Medicine – Rehabilitation/Therapy' (this is not an exhaustive list).

Non-traditional, complementary, and integrative medicine

Inclusion: Every article that falls under the '(HSC) Medicine' subject category that is not '(HSC) Medicine – Alternative'.

Exclusion: Every article that falls under the subject category '(HSC) Medicine – Alternative'.

The RW data set will be downloaded as a .csv file through Crossref Lab's application programming interface (API)[16] and subsequently imported into an Excel sheet. Using Excel's filter function, we will isolate the retracted TCIM and non-TCIM articles on separate tabs while maintaining the original database of articles. The Excel sheet systematically shows the following information in columns, as provided and labelled in the RW article search outputs: record ID, title, subject, institution, journal, publisher, country, author, URLs, article type (also known as publication type), retraction date, retraction digital object identifier (DOI), retraction PubMed ID, original paper date, original paper DOI, original paper PubMed ID, retraction nature (nature of notice), reason, paywall status, and notes.[27] Each field, such as affiliation, reason for retraction, and article type, has its separate column, with the items within each field separated by semicolons.

Ethical aspects of the study

This study will involve a retrospective analysis only of publicly available data and therefore does not require ethics approval or consent to participate.

Statistical analysis

Descriptive statistics will be employed to analyse the information collected during the data collection phase of the study. The fields to be analysed include date of retraction, subject, journal, publisher, country, article type, reasons for retraction, nature of retraction, and paywall status. For each field, we will calculate the total number of retractions for each unique entry and identify the top three with the most retractions where

applicable. Furthermore, for fields that allow multiple entries, each entry will be treated as a separate category for analysis. For example, when there are multiple reasons for retraction listed for an article, each reason will be treated as a separate category during analysis; therefore, a single article may contribute to multiple counts for the reason for retraction. Additionally, we will calculate the average duration between publication and retraction. A contingency table will be constructed to summarize the data. The analysis will describe the frequency of retractions across the selected characteristics in TCIM and non-TCIM articles displayed in the table. Exploratory analyses will use multiple logistic regression to assess whether and how TCIM and non-TCIM retractions differ in study characteristics and reasons for retractions.

Discussion

This study aims to analyse the characteristics of retracted articles in the field of TCIM as reported in the RWD and to compare these findings with conventional Western medicine articles in the RWD in order to enhance our understanding of the characteristics of and reasons for these retractions. By focusing on retracted TCIM articles, we seek to document common patterns in the flawed research within this field. The retraction process serves as a mechanism for highlighting issues with published studies, such as serious errors and misconduct.[17] The presence of methodological flaws does not necessarily result in retraction, and many flawed studies remain in the published literature without formal correction. Overall, this study's findings will provide data on retracted TCIM articles and their characteristics, contributing to the ongoing dialogue about research quality in the field. These findings may inform future efforts to improve the quality and rigour of TCIM research.

Strengths and limitations

A key strength of this study is the use of the RWD, which provides a centralized source of retracted articles across various scientific disciplines. This database is particularly valuable for its coverage of retracted TCIM articles and its ability to filter search results based on specific categories, such as TCIM. The systematic approach to data collection, including the use of subject filters, supports the identification of relevant articles. Data will be downloaded directly from Crossref Lab's API, further reducing the risk of human error. The study's reliance on descriptive statistics to analyse and identify patterns will provide insights into the common characteristics of retracted TCIM articles, which may inform improvements in research practices.[28]

The limitations of the proposed protocol also stem from its strengths. Retractions form a small and probably quite selective sample of all articles that should have been retracted, and hence do not fully illustrate the current status of research quality in TCIM.[29] Furthermore, retractions of non-TCIM articles may occur under partly different selection pressure, which threatens the validity of comparing reasons for retraction between TCIM and non-TCIM retractions. Although the RWD allows the use of filters to collect articles in specific fields, including TCIM-related articles, the accuracy of this filtering approach has not been validated. As such, our method for identifying TCIM retractions may include non-TCIM articles and exclude others that are relevant. Although commonly used bibliographic databases such as MEDLINE do index retracted articles, to our knowledge

only the RWD systematically compiles retracted publications and provides detailed information on those retractions. Although exploring the existence of other such specialized databases, including those indexing articles in additional languages, was beyond the scope of this study, the reliance on the RWD excludes articles not indexed in this database, potentially missing relevant retracted articles. Moreover, as the RWD database may lack coverage of non-English articles, it may not reflect the entire scope of retractions in the TCIM field. Lastly, because no multivariable analyses are envisioned, associations will not be corrected for confounding.

The findings of the study will be based on descriptive statistics for data collected from the RWD, which may not fully capture the complexity of factors associated with retractions. Reasons for retraction are incompletely reported in retraction notices and, therefore, also in the RWD. Many poor-quality studies are never retracted, and retraction notices often lack complete information, focusing primarily on more obvious issues such as data fabrication or lack of ethics approval. As a result, although the study will highlight common trends and patterns, it will be unable to fully elucidate the underlying quality issues in TCIM research or provide comprehensive solutions to the identified issues.[28]

This study will analyse the characteristics of retracted articles in the field of TCIM using the RWD as the data source. By systematically examining the characteristics and reasons for retraction among TCIM publications and comparing them to retractions in non-TCIM, this work aims to generate valuable insights into patterns of flawed research, breaches of ethics, and systemic challenges unique to TCIM scholarship. Retractions, although often viewed negatively, offer an important opportunity to learn from past errors and strengthen research practices moving forward. Understanding the circumstances that lead to retraction can help identify areas where methodological rigour, compliance with ethics, and institutional support must be improved to enhance the overall quality of TCIM research.

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