



**CURBING HEALTH MISINFORMATION WITH SCIENTIFIC
JOURNALS: A STUDY OF NIGERIA'S PUNCH AND TRIBUNE
ONLINE NEWSPAPERS**

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Abstract

Keywords:

*Editorial
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This descriptive research explores the patterns of health news in Punch and Tribune online newspapers from 2018 to 2022, emphasizing the reliance on foreign research by both publications in a bid to curb health misinformation online. With a population of 765 and a sample size of 533, the study reveals Punch's consistent rise in yearly research journal-sourced health news, contrasting with Tribune's fluctuating trend. The Punch heavily favors foreign research (98.1%), while Tribune maintains a more balanced approach with 51.4% from Nigerian sources. The findings underscore disparities in editorial strategies, raising concerns about the visibility of local health research. The study recommends increased collaboration with local researchers and enhanced accessibility of local research, for a more comprehensive and contextually relevant portrayal of health topics to curb health misinformation.

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INTRODUCTION

Newspapers serve as vital repositories of information, playing a crucial role in keeping readers informed about contemporary societal developments (Chowdhury & Halder, 2016). The content within newspapers is meticulously curated, drawing from diverse sources such as in-house journalists, columnists, and citizen journalists. This content undergoes rigorous gatekeeping procedures, with the final framing influenced by the philosophical, social, religious, or political leanings of the newspaper's ownership and control (Garz & Rickardsson, 2022). Consequently, readers are presented with information to which they can react, fostering a spectrum of responses, from agreement to disagreement.

In the realm of scientific genres, health is a subcategory of science, and health sciences encompass a range of disciplines dedicated to delivering healthcare through the application of science, engineering, mathematics, and technology. Termed Biomedical and Health Sciences academically, this field focuses on studies addressing human health and disease, including diagnosis, treatment, prevention, and epidemiology (Society for Science, 2023).

Biomedical and health sciences frequently make headlines in mass media, but health misinformation, particularly online, remains prevalent. The World Health Organization (WHO) highlights the negative impact of misinterpreted health information on mental health, vaccine hesitancy, and healthcare provision, emphasizing the need for legal policies, awareness campaigns, improved health-related content, and enhanced digital and health literacy (World Health Organization, 2022)

To combat health misinformation, it is crucial to verify information sources. The American Society for Microbiology suggests checking information from reputable sources as a key strategy (Barron, 2022). Reputable sources recognize that effectively communicating science involves understanding science journalism principles, critically examining data sources, and implementing third-party fact-checking for accurate reporting (Schäfer, 2011). Science journalists play a vital role in disseminating new discoveries, and fact-checkers ensure the accuracy of reported facts before publication.

Science and health misinformation refer to information that goes against the consensus within the scientific community concerning a particular phenomenon. According to this definition, the understanding of what is deemed accurate or inaccurate is in a constant state of flux due to the emergence of new evidence and advancements in techniques and methods. The

acquisition of information from sources beyond the formal healthcare system has been a longstanding practice, and the existence of health misinformation and disinformation is not a recent development (Swire-Thompson & Lazer, 2020).

The failure to utilize scientific evidence in science reporting or misrepresenting scientific facts in the mass media has historically fueled tensions between scientists and journalists (Peters, 2013). One solution to this discord is for journalists to rely on peer-reviewed journals where scientists officially and publicly communicate their scientific findings. This has been exemplified by specialised news blogs on science i.e. Science Daily, Science News, New Scientists, and The Conversation who all rely on peer-review journals for most of their articles, especially evidence-based medicine. Health news sourced from peer-reviewed journals such as The Journal of the American Medical Association, The New England Journal of Medicine, The Lancet, Pediatrics, Diabetes Care, Circulation, and many others (WebMD, 2017) has been a staple of editorial practice in many newspapers, whether in traditional print or digital formats.

Health misinformation in Nigeria spans a wide spectrum, encompassing rumors like the belief that bathing with salt water can cure Ebola, ethnically rooted beliefs such as the idea among the Igbos that palm oil on a hot knife can disinfect and heal foot cuts, and misperceptions about disease causes, transmission modes, and treatments, including herbal concoctions (Africacheck, 2021). Investigating evidence-based medicine from peer-reviewed journals as sources of health news in the Nigerian mass media, particularly in the realm of online newspapers is the purpose of this research.

The importance of science literacy has become crucial in distinguishing authentic health news from misinformation. Science literacy empowers individuals to discern between accurate and false health information, as demonstrated by a Chinese study indicating that higher science literacy reduces the likelihood of believing in health rumors (He et al., 2021). Biomedical and health science play a significant societal role, offering valuable insights into illness trends, treatment outcomes, and public health interventions (Nass et al, 2019). Despite the vital role of health research in providing accurate data, there is a prevalence of health misinformation in mass media, including online newspapers.

Newspapers globally serve as agenda-setters and fulfill their social responsibility by disseminating medical, health-based, and scientific findings through a concept known as Research Translation. The Agency for Healthcare Research and Quality emphasizes that

research translation involves adapting scientific data for practical use and requires various techniques, including high-quality research, systematic reviews, and simplifying technical jargon for broader understanding. To enhance public health, research evidence must be effectively communicated, distributed to target audiences, and integrated into healthcare systems by providers and stakeholders (Agency for Healthcare Research and Quality, 2012)

The escalating reliance on online health information has amplified the vulnerability to misinformation, particularly among individuals with lower education levels, limited healthcare knowledge, and those distrustful of the healthcare system or favoring alternative treatments (Scherer et al., 2021). Health communication scholars are actively engaged in understanding and countering health-related misinformation, dedicating efforts to rectify misconceptions and immunize individuals against its impact (Krishna & Thompson, 2019). The surge in fake health news during the global COVID-19 pandemic, labeled an 'infodemic,' underscores the importance of relying on peer-reviewed journals for evidence-based health research to prevent the potentially fatal consequences of misinformation (Caceres et al., 2022).

In Nigeria, the widespread dissemination of health misinformation, rooted in cultural beliefs and propagated through social media, poses a substantial threat to public health awareness (Africacheck, 2021). According to *Statistica*, as of January 2023, Nigeria boasted a user base of 31.6 million active social media users, with WhatsApp emerging as the predominant platform, commanding nearly 95 percent of the user share. Facebook, YouTube, and Instagram trailed closely as the subsequent most utilized social media platforms in the country (Sasu, 2022). Mmadu-Okoli and Nsofor (2021) notes that in Nigeria, older individuals favor WhatsApp for information, while younger people rely on international sources; those more likely to believe rumors are from the Northern region, male, younger, skeptical about vaccines, or trust social media, with differences in preferred platforms based on gender and age. Also, the study by Birukila et al. (2016) note that widespread health misinformation, especially in regions with low levels of written language and digital literacy like Africa, significantly undermines public health initiatives, exemplified by instances such as the anti-polio vaccine campaign in northern Nigeria. Nevertheless, Yety and Tapia (2020) as cited in Matyey et al., (2023) highlighted that the COVID-19 pandemic emphasized the critical role of rapid and effective communication, especially for indigenous communities, who encountered challenges in accessing reliable information, avoiding misinformation, and obtaining the necessary

resources to adequately address the health crisis. Within this context, there is a critical need to scrutinize the role of Nigerian newspapers, specifically "Punch" and "Tribune" online newspapers, as sources of health news. The period from 2018 to 2022 offers a crucial timeframe for analysis, and a comparative study of these newspapers can provide insights into the prevalence, patterns, and potential mitigation strategies for health misinformation in the Nigerian media landscape. This research aims to address the overarching problem of health misinformation by evaluating the accuracy, reliability, and content of evidence-based medicine and health research from Nigerian journals as sources of health news in these two prominent Nigerian online newspapers.

METHODOLOGY

The research design was descriptive-comparative research which is a type of descriptive research. Descriptive research is a research method that aims to provide a detailed description of a population, situation, or phenomenon. It can be used to answer questions about what, where, when, and how, but not why. Descriptive research can use a variety of methods, such as surveys, interviews, observations, and archival research. Unlike experimental research, descriptive research does not involve controlling or manipulating the variables. The researcher simply observes and measures the variables as they exist naturally (Goundar, 2012). In descriptive-comparative research, the researcher examines two non-manipulated variables and devises a formal procedure to determine a conclusive judgment regarding their relative superiority (Longe, 2020). The method of data collection was the quantitative observation method. Quantitative observation entails the systematic collection of numerical data with outcomes amenable to analysis through numerical and statistical techniques (Longe, 2020). Observation of online text is a valuable method of data collection in descriptive research, particularly in the context of studying digital environments, social media, or online platforms. This method involves systematically observing and analyzing textual content available on the internet to gain insights into various phenomena (Dawson, 2020). The population of the study was 765 health news stories in two purposively selected Nigerian newspapers that both publish hardcopy and online (*Punch* and *Tribune*) from 2018 to 2022. The *Punch* and *Tribune* are two prominent Nigerian national newspapers, each with its own characteristics and focus. The *Punch* is one of Nigeria's most widely circulated newspapers, founded in 1971. It is known for

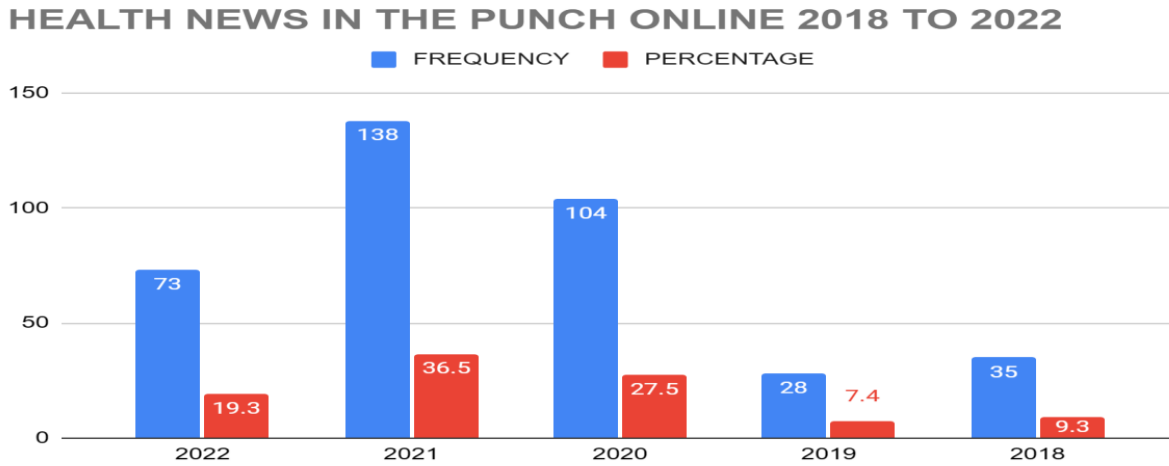
its editorial independence and investigative journalism. The *Punch* covers a wide range of topics, including politics, business, entertainment, and sports. It has a reputation for providing in-depth analysis and critical viewpoints on political and social issues. The *Tribune* is one of Nigeria's prominent newspapers, founded in 1949 by Chief Obafemi Awolowo. It has a long history of contributing to journalism and has been a significant player in Nigerian media. The newspaper covers a wide range of topics, including news, politics, business, sports, and culture, catering to a diverse readership. Over the years, the *Tribune* has maintained a reputation for providing in-depth analysis and commentary on current affairs, making it a respected source of information in Nigeria. The *Punch* and *Tribune* all have readers from all literate segments and demographics in Nigeria as they are general-interest newspapers featuring news and features regarding politics, sports, health, business, finance, agriculture, entertainment, fashion and lifestyle among other newspaper genres. While senior citizens and elites read both newspapers in hardcopy and softcopy, the youths mainly read online versions of both newspapers.

A population refers to the entire group being examined, whereas a sample is a smaller subset selected for data collection. In research, the term "population" extends beyond individuals to encompass a diverse range of subjects, such as objects, events, organizations, countries, species, organisms, and other entities (Bhandari, 2020). Using the keyword "study" in the search widget of the news blogs, the population of the *Tribune* reports was 300 reports, from <https://tribuneonlineng.com/page/8/?s=study> to <https://tribuneonlineng.com/page/39/?s=study> and after filtering only health reports sourced from journal articles, the sample size was 146. For the *Punch*, the population was 465 from <https://punchng.com/page/6/?s=study> to <https://punchng.com/page/37/?s=study> and after filtering only health reports sourced from journal articles, the sample size was 387.

The unit of analysis of the study was the news stories and news features that carried all 387 health reports in the *Punch* and *Tribune* from 2018 to 2022. Based on the method of data collection i.e. observation, each webpage of news stories and news feature were analysed for health news content that had a peer-reviewed journal as its source of health information in order to describe the frequency of the use of peer-reviewed journals as a strategy to curb health misinformation in the news media in Nigeria.

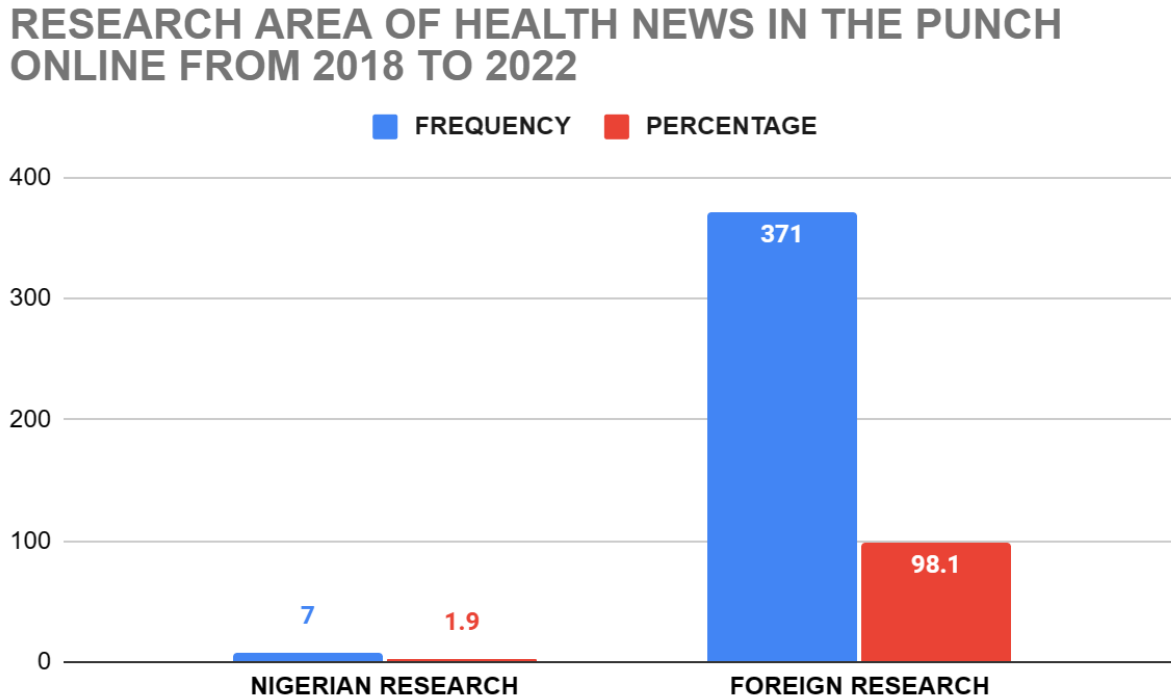
RESULTS AND DISCUSSION

Figure 1: The total number of health news by *Punch* online newspapers (2018-2022, %)



The data illustrates the yearly frequency and percentage distribution of research journal-sourced health news in the *Punch* online newspaper from 2018 to 2022. In 2018, there were 35 articles, constituting 9.3%, while 2019 experienced a slight decrease with 28 articles, representing 7.4%. Notably, 2020 witnessed a substantial increase to 104 articles, constituting 27.5%, followed by a peak in 2021 with 138 articles, accounting for 36.5%. The most recent data for 2022 indicates 73 articles, making up 19.3%. These fluctuations suggest dynamic trends in the inclusion of research-based health news, potentially influenced by editorial decisions, changes in research output, or evolving public interest in health-related topics. Further exploration into the content and contextual factors behind these variations could offer deeper insights into the patterns of health news reporting in the *Punch* online newspaper during the specified period.

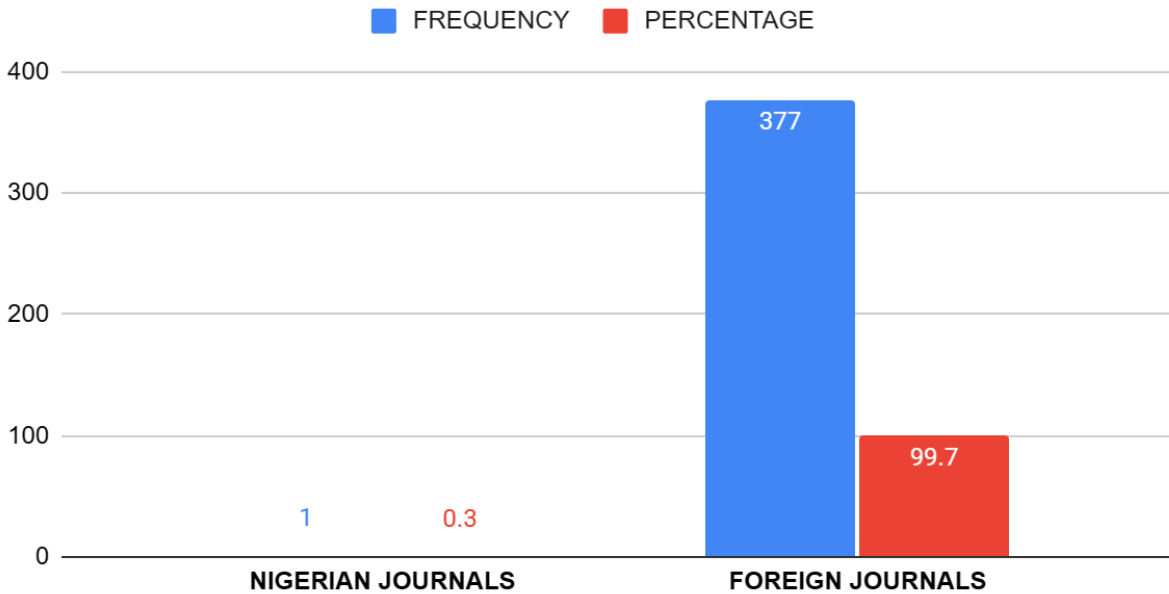
Figure 2: Research area of health news by *Punch* online newspapers (2018-2022, %)



The analysis of the data on the origin of health-scientific research published as health news by the *Punch* online newspaper reveals a substantial reliance on foreign research, constituting 98.1% of the sourced content. In contrast, Nigerian research contributions are relatively limited, representing only 1.9% of the health-scientific research used in health news articles. This data indicates a predominant preference for international research findings over domestic ones in the publication of health news. The overwhelming majority of health-scientific research originating from foreign sources highlights the newspaper's inclination toward utilizing global studies to inform its health news coverage. The relatively low inclusion of Nigerian research may suggest potential opportunities for fostering more collaboration with local researchers and promoting the incorporation of domestically generated health-scientific research within the newspaper's reporting.

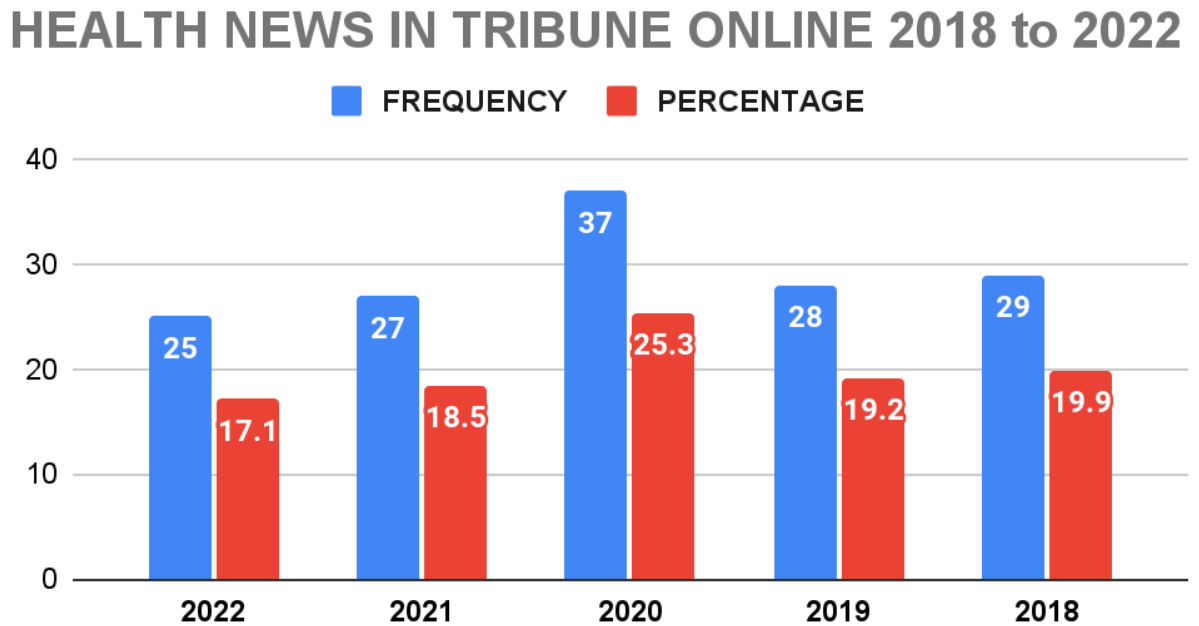
Figure 3: Research journal as source of health news by *Punch* online newspapers (2018-2022, %)

RESEARCH JOURNAL OF HEALTH NEWS IN THE PUNCH ONLINE FROM 2018 TO 2022



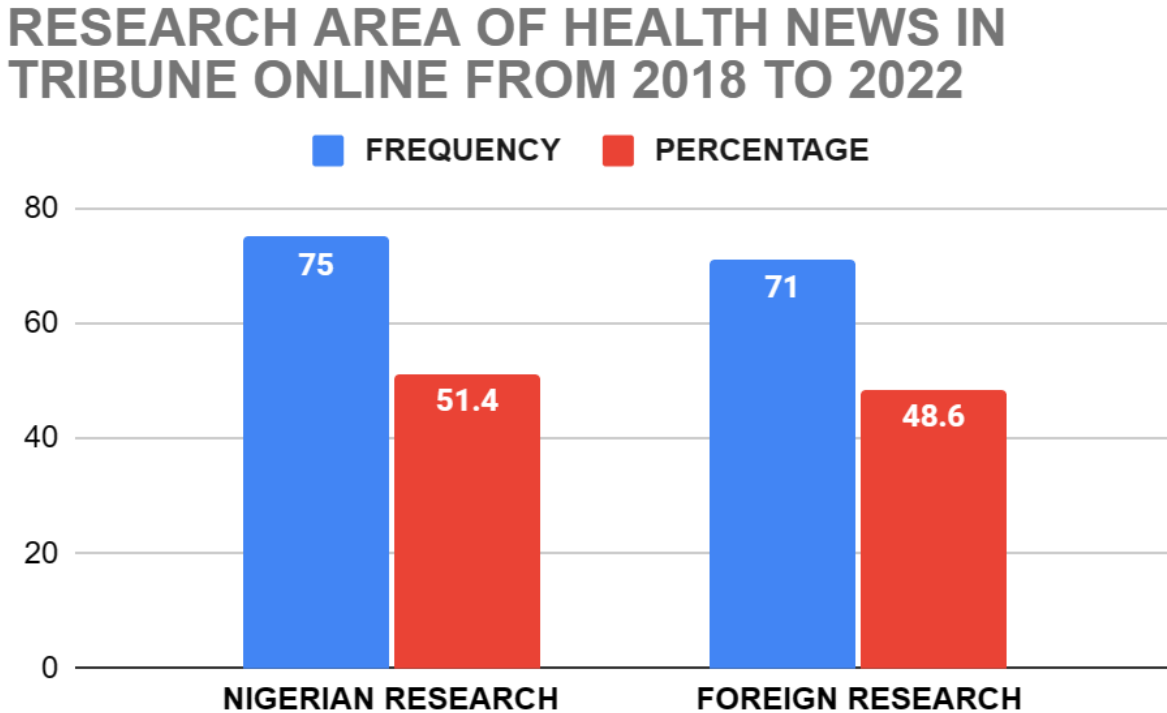
The analysis of the sources of health news in the *Punch* online newspaper from 2018 to 2022 highlights a significant reliance on foreign journals, constituting a substantial percentage of 99.7%. In contrast, Nigerian journals contribute minimally, representing only 0.3% of the sourced health news. This data indicates a predominant preference for information derived from international sources, suggesting a reliance on global perspectives and research findings in the publication of health-related content. The overwhelming majority of health news originating from foreign journals underscores the newspaper's inclination toward utilizing external research and expertise to inform its health reporting. The limited inclusion of Nigerian journals may signify potential areas for improvement in promoting and integrating local research within the newspaper's health news coverage.

Figure 4: The total number of health news by *Tribune* online newspapers (2018-2022, %)



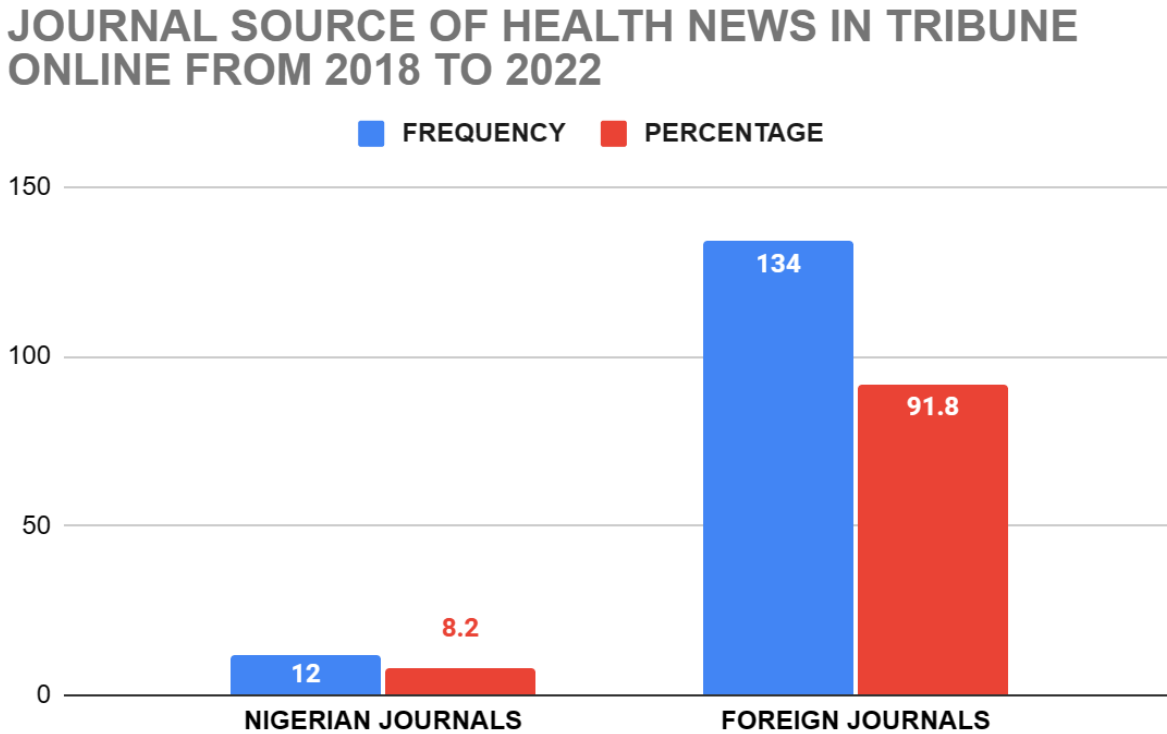
The analysis of the trend of health news from *Tribune* online newspaper over the five-year period from 2018 to 2022 reveals fluctuations in the annual publication figures. In 2018, there were 29 health news articles, constituting 19.9% of the total health news content for that year. The following year, 2019, witnessed a slight decrease to 28 health news articles, representing 19.2%. However, in 2020, there was an increase to 37 health news articles, accounting for 25.3% of the total health news content. The trend continued with a slight decrease in 2021, where 27 health news articles were published, making up 18.5%. In the most recent year, 2022, there were 25 health news articles, comprising 17.1% of the total health news content. This data indicates a variable pattern in the coverage of health-related topics by *Tribune* online newspaper, with notable shifts in the number of articles published each year. The fluctuations may be influenced by factors such as emerging health issues, public interest, or changes in editorial priorities.

Figure 5: The research area of health news by *Tribune* online newspapers (2018-2022, %)



The analysis of the research area and location of study in *Tribune* newspaper's journal-sourced health news indicates a relatively balanced coverage between Nigerian and foreign research. Nigerian research articles constitute 51.4% of the total, with a count of 75 articles, while foreign research articles make up 48.6%, totaling 71 articles. This suggests that *Tribune* newspaper maintains a fairly equitable representation of both domestic and international health research in its coverage. The attention to Nigerian research highlights a commitment to addressing local health issues and contributing to the dissemination of knowledge from within the country. Simultaneously, the inclusion of foreign research underscores the newspaper's recognition of global health perspectives and the importance of international studies in informing readers about broader health-related developments. The approach to incorporating a mix of Nigerian and foreign research articles reflects a comprehensive and inclusive stance, providing readers with a diverse range of health-related information from various geographical contexts.

Figure 6: Research journal source of health news by *Tribune* online newspapers (2018-2022, %)



The analysis of the data on the source of journals for health news in Tribune online indicates a significant reliance on foreign journals. Out of the total health news articles analyzed, only a small proportion (12 articles, 8.2%) is derived from Nigerian journals, while the vast majority (134 articles, 91.8%) originates from foreign journals. This distribution suggests a notable preference for international sources when reporting on health-related topics in Tribune online. The dominance of foreign journals in the sourcing of health news may indicate a perceived credibility, depth, or comprehensiveness in the content offered by international publications. The limited inclusion of Nigerian journals could be due to various factors, including the accessibility of relevant research, the perceived global relevance of foreign studies, or editorial considerations. Overall, the data underscores the newspaper's inclination toward incorporating a diverse range of perspectives and research findings, with a

predominant focus on global health literature to cater to the informational needs and interests of its readership.

Comparative Analysis of the *Punch* Health News and *Tribune* Health News

The comparative analysis of health news trends in the *Punch* and *Tribune* online newspapers from 2018 to 2022 highlights distinctive patterns. In the *Punch*, there is a noticeable increase in yearly research journal-sourced health news, peaking in 2021, while *Tribune* exhibits fluctuations with variable coverage each year. The *Punch's* fluctuations suggest dynamic shifts possibly influenced by editorial decisions, research output changes, or public interest evolution. In 2018, The *Punch* published 35 articles (9.3%), followed by 28 in 2019 (7.4%), a substantial increase to 104 in 2020 (27.5%), a peak of 138 in 2021 (36.5%), and 73 articles in 2022 (19.3%). Conversely, *Tribune's* variable pattern may stem from emerging health issues, editorial priorities, or shifts in public interest. In 2018, *Tribune* published 29 health news articles (19.9%), followed by 28 in 2019 (19.2%), an increase to 37 in 2020 (25.3%), a decrease to 27 in 2021 (18.5%), and 25 articles in 2022 (17.1%). Overall, the analysis underscores the diverse dynamics of health journalism in the Nigerian online media landscape, with each newspaper following a unique trajectory in presenting research-based health news over the specified period.

The comparative analysis of research areas in the *Punch* and *Tribune* online newspapers reflects stark disparities in their reliance on foreign and Nigerian health-scientific research. The *Punch* predominantly leans on foreign research, constituting a substantial 98.1% of its sourced content, with only a minimal 1.9% contribution from Nigerian research. In contrast, *Tribune* newspaper presents a more balanced approach, with Nigerian research articles accounting for 51.4% (75 articles) and foreign research articles making up 48.6% (71 articles). This discrepancy underscores the contrasting editorial strategies of the two newspapers, with The *Punch* prioritizing international health-scientific research, while *Tribune* seeks a more equitable representation of both Nigerian and foreign studies in its health news coverage. The variations in their research sources may influence the diversity and perspectives offered in their health news reporting.

The analysis of health news sources in the *Punch* online newspaper reveals a predominant reliance on foreign journals, comprising a substantial 99.7%, while Nigerian journals make a minimal contribution of only 0.3%. In a parallel examination of *Tribune* online, a notable dependence on foreign journals is evident, with 91.8% of health news articles originating from such sources. Conversely, Nigerian journals account for a modest 8.2% of the total articles analyzed. These findings underscore a consistent pattern of favoring foreign publications in both newspapers, suggesting potential factors such as accessibility, credibility, or global perspectives influencing editorial choices in health news sourcing as a strategy of curbing health misinformation. The limited reliance on Nigerian journals raises questions about the visibility and accessibility of local health research in the context of online news reporting.

CONCLUSION

The comparative analysis of health news sourcing practices between the *Punch* and *Tribune* online newspapers reveals consistent patterns of a significant reliance on foreign journals in both outlets. This indicates reliance on foreign journals to mitigate health misinformation. The dominance of foreign sources, especially in *Punch*, underscores potential challenges in access or preference for global perspectives in health reporting. The minimal contribution of Nigerian journals raises concerns about the visibility and utilization of local health research in online news content.

RECOMMENDATION

To address these issues, it is recommended that the *Punch* and *Tribune* in a bid to curb health misinformation prioritize collaboration with local researchers and institutions to promote the inclusion of Nigerian research in health reporting. Additionally, efforts should be made to enhance the accessibility and dissemination of local health research findings to journalists. News outlets should also consider adopting transparent sourcing policies and editorial guidelines that balance the inclusion of both local and foreign perspectives, ensuring a more comprehensive and contextually relevant portrayal of health-related topics. This approach would not only enrich the diversity of health news content but also contribute to the promotion of local scientific contributions within the broader media landscape in a bid to curb health misinformation both locally and globally.

REFERENCES

- Africacheck. (2021). Monitoring health misinformation in nigeria: A collection of potentially harmful claims from may to july 2020 . Retrieved September 16, 2023, from https://africacheck.org/sites/default/files/media/documents/2021-01/Africa%20Check%20Health%20Misinformation%20in%20Nigeria_Quarterly%20report%203_August%202020.pdf
- Agency for Healthcare Research and Quality. (2012). Communication and dissemination strategies to facilitate the use of health-related evidence | effective health care program. Ahrq.gov. Retrieved September 16, 2023, from Ahrq.gov. <https://effectivehealthcare.ahrq.gov/products/medical-evidence-communication/research-protocol>
- Barron, M. (2022). How to spot and combat health misinformation. *American Society For Microbiology*. Retrieved from <https://asm.org/Articles/2022/September/How-to-Spot-and-Combat-Health-Misinformation>
- Caceres, M. M. F., Sosa, J. P., Lawrence, J. A., Sestacovschi, C., Tidd-Jonshon, A., Rasool, M. H. U., ... Fernandez, J. P. (2022). The impact of misinformation on the COVID-19 pandemic. *AIMS Public Health*, 9(2), 262–277. Retrieved from <https://doi.org/10.3934/publichealth.2022018>
- Chen, H. (2022). Research on the development from print media to digital media --taking the american market as an example. *Advances in Social Science, Education and Humanities Research*, 663, 311–327.
- Chowdhury, S., & Halder, S. (2016). Educational Dissemination through Newspaper Daily. *Journal of Education and Practice*, 7(7), 1–12.
- Dawson, C. (2020). A-Z of digital research methods. *Routledge*.
- Galvez, J. A., Lledo, V. S., & Garcia, A. R. (2021). Determinants of infodemics during disease outbreaks: A systematic review. *EJIFCC*. Retrieved from <https://effectivehealthcare.ahrq.gov/products/medical-evidence-communication/research-protocol>
- Garz, M., & Rickardsson, J. (2022). Ownership and media slant: Evidence from Swedish newspapers. *Kyklos*, 76(1), 18–40.
- Goundar, S. (2012). *Research Methodology and Research Method: Methods Commonly Used By Researchers* .
- Greene, C. M., & Murphy, G. (2021). Quantifying the Effects of Fake News on Behavior: Evidence From a Study of COVID-19 Misinformation. *Journal of Experimental Psychology: Applied*, 27(4).
- He, L., Chen, Y., Xiong, X., Zoe, X., & Lai, K. (2021). Does Science Literacy Guarantee Resistance to Health Rumors? The Moderating Effect of Self-Efficacy of Science Literacy in the Relationship between Science Literacy and Rumor Belief. *International Journal of Environmental Research and Public Health*, 18(5).
- Kelly, J., Sadeghieh, T., & Adeli, K. (2014). Peer Review in Scientific Publications: Benefits, Critiques, & A Survival Guide. *EJIFCC*, 25(3), 227–243.
- Krishna, A., & Thompson, T. L. (2019). Misinformation About Health: A Review of Health Communication and Misinformation Scholarship. *Sage Journals*, 65(2).

- Longe, B. (2020). Descriptive research designs: Types, examples & methods. Retrieved January 26, 2024, from Formplus website: <https://www.formpl.us/blog/descriptive-research>
- McNutt, M. (2022). Misinformation: addressing the challenge. *Proceedings of the Indian National Science Academy*, 815–821.
- Nascimento, B. do, Junior, I., Pizzaro, Beatriz, A., M, J., Muscar, A., ... Andre, M. (2022). Infodemics and health misinformation: A systematic review of reviews. . Retrieved September 16, 2023, from World Health Organization website: <https://doi.org/10.2471/blt.21.287654>
- Nass, S. J., Levit, & Gostin, L. O. (2019). *The Value, Importance, and Oversight of Health Research*. National Academies Press (US).
- Peng, W., Lim, S., & Meng, J. (2022). Persuasive strategies in online health misinformation: A systematic review. *Information, Communication & Society*, 26(11), 1–18.
- Peters, H. P. (2013). Gap between science and media revisited: Scientists as public communicators. *Proceedings of the National Academy of Sciences*, 110.
- Schäfer, M. (2011). Science journalism and fact checking. *Journal of Science Communication*, 10(4).
- Scherer, L. D., McPhetres, J., Pennycook, G., Kempe, A., Allen, L. A., Knoepke, C. E., ... Matlock, D. D. (2021). *Who is susceptible to online health misinformation? A test of four psychosocial hypotheses*. 40(4), 1–11.
- Society for Science. (2023). Biomedical and health sciences.
- Suarez-Lledo, V., & Alvarez-Galvez, J. (2019). Prevalence of health misinformation in social media: A systematic review. *Journal of Medical Internet Research*, 23(1).
- Swire-Thompson, B., & Lazer, D. (2020). Public health and online misinformation: Challenges and recommendations. *Annual Review of Public Health*, 41(1), 433–451.
- World Health Organization. (2022). Infodemics and misinformation negatively affect people's health behaviours.