

Current issues and status of mis/disinformation in the health library context: a rapid literature review

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The publications under review have been included in Appendix 1.

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Introduction

The novel coronavirus disease (COVID-19) has caused not only a pandemic and global health crisis but also widespread misinformation in social media and published literature (Epstein, 2022). Healthcare providers have an important role in informing patients and the public with relevant knowledge and to suppress misinformation at all information access points (Epstein, 2022). Healthcare workers are themselves also vulnerable to misinformation. Health sciences librarians have a responsibility to dispel this mis/disinformation via providing accurate resources and health information literacy.

During the pandemic, lack of relevant and credible information, misinformation, disinformation, or even information overload all added to the great challenge for libraries, like other organisations, to combat the crisis. Normal operations and services in many libraries were greatly disrupted during the pandemic. Libraries were reportedly responding to challenges by pivoting to new ways to meet their users' needs (Yu & Mani, 2020). Although there is a wealth of research around public and academic libraries in dealing with mis/disinformation (Auberry, 2018; De Paor & Heravi, 2020; Makhoul et al., 2021; Revez & Corujo, 2021; Young et al., 2021), there is little to no information around the issues and status of mis/disinformation in the

health sciences library context (Akers et al., 2022; Kumar et al., 2022; Sharma et al., 2022).

Current research in the health library context is limited to how medical/health sciences libraries responded to the COVID-19 health crisis (Yu & Mani, 2020), including health care library experiences during the COVID-19 pandemic that consider changes made in response to the pandemic when health librarians were providing essential information services from home and were disconnected from the physical library (Anderson & Ivacic-Ramljak, 2021); or the impact of COVID-19 on reference services provided by academic health sciences librarians to examine the scope of reference services, changes to reference work, and the range of reference questions that academic health sciences librarians received amidst the COVID-19 pandemic (Charbonneau & Vardell, 2022).

To address this gap and advance our knowledge of mis/disinformation, we aimed to conduct a rapid literature review. This review seeks to identify the current issues and discuss the status of mis/disinformation within the context of health sciences libraries. The findings may potentially inform our future practices in addressing this issue.

Methods

Before conducting the review, we set specific inclusion and exclusion criteria. Articles were considered for inclusion if they met the following conditions: 1) written in English, 2) published at any date, 3) focused on roles, services, and resources related to mis/disinformation within health libraries (including academic health libraries), and 4) encompassed various types of publications. Publications unrelated to health libraries were excluded.

To identify relevant documents for this review we searched Ovid MEDLINE database and the Web of Science core collection (platform). We developed the initial search strategy in MEDLINE. The search was then adapted for the Web of Science platform (WoS). Due to time and resource constraints we decided to focus on MEDLINE and WoS only, so we have not included grey literature. For our eligibility criteria we only included documents that discussed practice in a hospital or academic health library setting. We excluded documents that looked at health literacy and misinformation more generally (ie from a clinician or consumer perspective). There were no limits placed on the search. See (Figure 1. MEDLINE strategy)

<h2>Search strategy</h2>	
<p>Collaborative approach used to develop the search strategy:</p> <ul style="list-style-type: none"> • Ovid Medline • Web of Science Core Collection 	<p>Ovid MEDLINE(R) ALL <1946 to June 05, 2023> Search done on 27 March 2023</p> <ol style="list-style-type: none"> 1 exp Libraries/ 2 (health or medical or hospital or clinical or special).ti.ab. 3 (librar* or "information profession*" or "information scien*" or informationist*).ti.ab. 4 2 and 3 5 1 or 4 6 exp information dissemination/ or exp propaganda/ 7 misinform*.mp. 8 disinform*.mp. 9 conspiracy theor*.mp. 10 ((fake or alternative) adj2 (news or fact or facts or information)).mp. 11 (information adj2 disseminat*).ti.ab. 12 propaganda.mp. 13 or/6-12 14 5 and 13

Figure 1: Search Strategy

Data extraction

The search results were imported into the Covidence systematic review software (Veritas Health Information). The MEDLINE and Web of Science searches yielded 796 articles, with Covidence removing 44 duplicates. The inclusion criteria were integrated into the software as a category for screening citations (titles and abstracts) during level 1 and full-text articles during level 2 screening.

Title and abstract screening were conducted for 752 articles, resulting in the exclusion of 684. For the remaining 68 articles, full-text screening was performed, leading to the exclusion of 47 studies. Reasons for exclusion included being an abstract-only publication, unavailability of the full text, non-English content, not related to health libraries, or not addressing misinformation or disinformation. This process left 21 studies that were included in the review, as depicted in Figure 2.

Two reviewers independently read the included full text articles and extracted the data (half each).

The extracted information was categorised as follows:

- The definitions of mis/disinformation
- The types of mis/disinformation that were referred to in the articles
- Actions that libraries or librarians have taken to combat mis/disinformation
- Suggestions and recommendations that the authors had to combat misinformation

Prisma flow chart

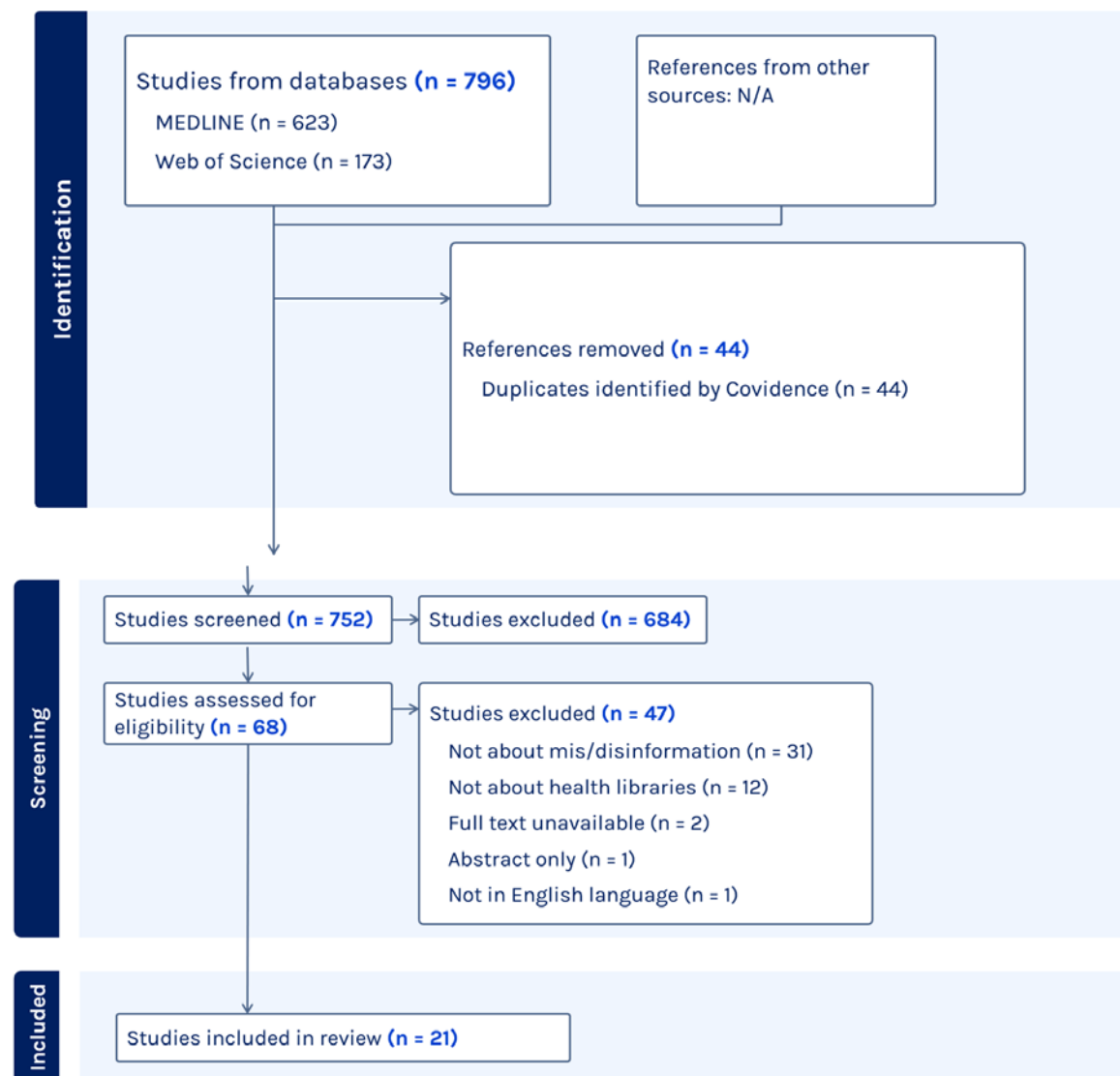


Figure 2: PRISMA flow diagram

Results

The characteristics of the studies incorporated into the review, encompassing various study types were text and opinion articles, three reviews (including a systematic review), exploratory studies, cross-sectional studies, content analyses, and one observational study involving semi-structured interviews. The publication dates spanned from 2008 to 2022, with only four studies from 2008 to 2011, followed by an increase in the number of publications from 2018, reaching seven in 2021 (see Figure 3).

The studies were conducted in different countries, with the distribution as United States (n= 11), Italy (n=3), Pakistan (n=2), and One study each for India, Spain, Malta, and Zambia, and one international study.

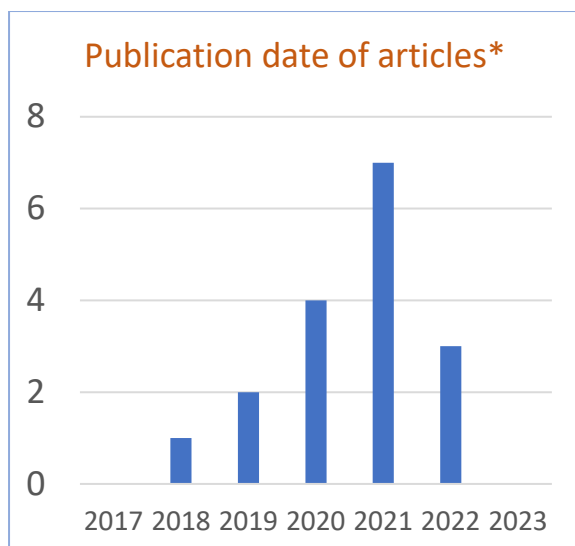


Figure 3: Publication date of articles

The definitions of mis/disinformation

Out of 21 articles misinformation was defined in two articles as “inaccurate or misleading information shared by people who do not recognize it as such” (Bianchini et al., 2019) and “unreliable information that is disseminated inadvertently”. (Ashrafi-Rizi & Kazempour, 2020, as cited in Morgan-Daniel et al. (2020).

Disinformation was defined as “inaccurate information that is intentionally produced and disseminated for political, economic, or cultural reasons” Ashrafi-Rizi and Kazempour (2020) cited in Morgan-Daniel, et al, (2020) ; “false information that is intended to mislead” (Herrero-Diz & Lopez-Rufino, 2021); and “intentionally misleading information used to obfuscate legitimate resources” (Pomputius, 2019). Looking at the definitions of mis/disinformation, most authors did not explicitly define misinformation or disinformation. This tells us that authors assume there is a general understanding of what misinformation is, and this is not different in the context of health information or health libraries.

The types of mis/disinformation that were referred to in the articles

The articles addressed various forms of misinformation, which we categorised into three groups: definitions, COVID-19-related misinformation, and broader perspectives (see Table 1).

Definitions

Firstly, authors referred to types of mis/disinformation that fell under definitions, synonyms, or categories of misinformation, encompassing terms such as falsehoods, deceptive or baseless information, misinformation circulated online or on social media, fake news, and generally any content characterised as disinformative, pseudohistorical, or pseudoscientific (Bianchini et al., 2019; Herrero-Diz & Lopez-Rufino, 2021; Jaeger & Taylor, 2021; Schneider et al., 2020).

COVID-19-related misinformation

Eight papers addressed COVID-19-related misinformation, discussing aspects such as the infodemic – characterised by an overabundance of information, including misinformation (Allen, 2021; Chan et al., 2022; Charbonneau & Vardell, 2022; Epstein, 2022; Morgan-Daniel et al., 2020; Naeem et al., 2021; Yuvaraj, 2020). These papers highlighted false claims pertaining to the virus, its transmission, treatments, and prevention. Additionally, there was exploration of conspiracy theories surrounding Dr. Anthony Fauci (spokesperson for the USA's White House Coronavirus Task Force), the virus's origin and severity, and the role of algorithms in amplifying these messages (Jaeger & Taylor, 2021).

The coverage extended to misinformation originating from governments, encompassing instances where politicians dismissed COVID as a hoax or overhyped its impact. It also delved into governments withholding COVID data and disinformation campaigns from Russia (Jaeger & Taylor, 2021). One paper pointed out that the rush to publish scientific research during the pandemic led to compromised peer review processes and the publication of substandard research (Brown, 2008).

Broader perspectives

There were additional forms of misinformation that extended the scope of the concept, considering specific instances that broadened the understanding of misinformation or disinformation. For instance, one paper discussed urban myths or medical myths, using the example of the "Freshman 15" – the belief that college freshmen gain fifteen pounds of weight in their first year away from home. Although rooted in news reports and anecdotes, this myth did not withstand scientific scrutiny (Brown, 2008).

Various authors discussed other types of health misinformation. This included the overproduction of digital content, which becomes misleading when of low quality or overwhelming in quantity. This connects with the issue of limited access to quality health information, where individuals lack reliable resources and are inundated with the overabundance of poor-quality content (Herrero-Diz & Lopez-Rufino, 2021). One paper explored complementary and alternative medicines, describing them as therapies lacking scientific support (Bianchini et al., 2019).

Another article highlighted what they called "state-mandated misinformation." This referred to certain U.S. states requiring individuals seeking abortion to be provided with information on the procedure's risks. However, the information given is often not grounded in scientific evidence and can be inaccurate (Barr-Walker et al., 2021).

Several papers raised concerns about academic publishing, including the use of artificial intelligence or bots mimicking academic writing, the inclusion of unreliable

sources in academic papers that could propagate misinformation (Herrero-Diz & Lopez-Rufino, 2021), predatory publishing producing poorly peer-reviewed work (Allen, 2021), and preprints serving as a potential source of misinformation due to the lack of vetting and peer review, which may result in findings that do not withstand rigorous scrutiny (Akers, 2018).

Table 1: Types of mis/disinformation

Category	Type of misinformation
Definitions	<ul style="list-style-type: none"> • Falsehoods • Deceptive information • Unfounded information • False information online • Fake news • Deep fake and cheap fake videos • Misinformation in social media • Any type of content that is disinformative, pseudohistorical, and pseudoscientific
COVID-19	<ul style="list-style-type: none"> • Infodemic • Harmful, false claims related to the virus • False claims about transmission, treatment & prevention • Pseudoscientific health therapies • Conspiracy theories • Algorithms reinforcing messages • State and local politicians... asserted that the virus is a hoax or overhyped • Secrecy around statistics (e.g. Brazil government) • Disinformation campaigns from Russia • Inadequate peer review
Broader perspectives	<ul style="list-style-type: none"> • Medical myths, urban myths • Overproduction of digital content • Lack of access to quality health information • Complementary and alternative medicine – not supported by scientific evidence (MeSH definition) • Difference among experts and layperson's assessments • State-mandated misinformation re abortion safety and risks

	<ul style="list-style-type: none">• Artificial intelligence and bots that mimic academic writing• Predatory publishing• Use of unreliable sources in academic papers• Preprints
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Actions that libraries or librarians have taken to combat mis/disinformation

Identifying misinformation

Of the 21 studies, 13 focused on actions taken by libraries or librarians to counter misinformation. Librarians played a role in identifying misinformation, involving the identification of predatory journals and the creation of blacklists and whitelists, such as Beall's list. They also contributed to open-access journal directories (Allen, 2021).

Librarians conducting research

Librarians engaged in research themselves, generating high-quality information or rectifying misinformation. For instance, one study conducted a content analysis of websites related to complementary and alternative medicine for cancer to pinpoint deceptive online information (Bianchini et al., 2019). Another conducted a systematic review on the "Freshman 15" concept, as mentioned earlier (Brown, 2008).

Training information literacy

Information literacy training emerged as a significant initiative, encompassing efforts to train staff in identifying predatory journals (Allen, 2021) and instructing students on using evidence-based medicine resources to address clinical questions (Akers, 2018). Some initiatives extended to training high school students and the general public (Barbaro et al., 2022).

Collaboration with other entities

Certain authors documented successful collaborations with other organisations. For instance, one group in Italy collaborated with the national health service to establish a web portal dedicated to offering accurate health information to the public and dispelling false news (Barbaro et al., 2022). Another team engaged in an international, cross-disciplinary project aimed at raising awareness about COVID-19 through the creation of videos and workshops (Chan et al., 2022).

Reference services

One paper reported a survey of academic health library reference services and found that 32% of librarians had supplied information to counteract COVID-19 misinformation. This information encompassed topics such as hydroxychloroquine, masks, and the presence of microchips in vaccines (Charbonneau & Vardell, 2022).

Formulation of search strategies

Another measure implemented was the formulation of search strategies specifically for COVID-19. Library associations were noted to be actively building repositories of expert searches focused on various COVID-19 topics (Naeem & Bhatti, 2020). These articles demonstrate that many health librarians are engaged in efforts to tackle misinformation in its various forms. However, none of the papers have reported on the results of these efforts, so it is not known how effective the programs are.

Suggestions and recommendations

Authors made various suggestions and recommendations on how libraries and librarians might combat misinformation, in addition to the real examples discussed above.

Curation & Training

Libraries commonly engage in curation and training. Four articles discussed the curation of resources, emphasising terms like trustworthy, authoritative, and best evidence, particularly in the context of COVID-19 (Akers, 2018; Chan et al., 2022; Charbonneau & Vardell, 2022; Epstein, 2022). Quality assessment, specifically highlighting the prominence of retraction notices in digital databases, was addressed in one article (Schneider et al., 2020).

Additionally, four articles highlighted training initiatives within health libraries, focusing on educating individuals to search for and identify quality information while discerning fake news (Chan et al., 2022; Herrero-Diz & Lopez-Rufino, 2021; Kim et al., 2011; Naeem & Bhatti, 2020). One article proposed leveraging reference services to assist patrons in developing skills to evaluate information resources (Charbonneau & Vardell, 2022).

Collaborations

Seven articles recommended collaborations with external parties (Akers, 2018; Barr-Walker et al., 2021; Brown, 2008; Charbonneau & Vardell, 2022; Epstein, 2022; Kim et al., 2011; Koscieljew, 2021). These included collaborations with journalists and media, health professionals, public health organisations, public libraries, researchers, and external clinics or community organisations. These partnerships would aim to improve health information literacy, provide resources, develop information materials or support the organization's efforts in combatting mis/disinformation.

Providing information externally

Six articles proposed disseminating information to external entities, which included providing information to public health contacts (Barr-Walker et al., 2021; Naeem et al., 2021), sharing accurate information on social media (Allen, 2021; Barbaro et al., 2022), conducting classes or seminars in public libraries, and collaborating to create

handouts (Charbonneau & Vardell, 2022; Epstein, 2022). The target audiences for these efforts would encompass health providers, patients, and the general public. Additionally, one paper recommended that health librarians assume a leadership role at the community level to disseminate critical information about HIV (Kanyengo, 2010).

Advocacy

Three papers identified a role for librarians in advocacy. This involvement extended to advocating for legislative changes concerning abortion (Barr-Walker et al., 2021) or transparency in artificial intelligence (Herrero-Diz & Lopez-Rufino, 2021), as well as serving as general advocates for their community (Bianchini et al., 2019).

Self-education

Self-education was another theme, with authors suggesting that "librarians should not be afraid of going beyond their comfort zone, acquiring different skills or experimenting with new collaborations" (Barbaro et al., 2022, p. 197). Another suggested that we need to be aware of trends in artificial intelligence and understand factors relating to how machine learning assesses misinformation in social media (Pomputius, 2019). It was also highlighted that being mindful of how false information is organised and recognising cues indicative of misinformation, especially in contentious topics where librarians may not be subject matter experts, is crucial (Bianchini et al., 2019).

Obligations

Finally, there were some papers that stated or suggested that librarians had an obligation or imperative to combat misinformation, whether that be a professional, moral or ethical obligation (Allen, 2021; Herrero-Diz & Lopez-Rufino, 2021). These papers used terms like "should" or "must", in contrast to some of the other papers who suggested ideas, using language like "well positioned to create solutions" or "we see an opportunity for".

There are many strategies here that health libraries could implement to address misinformation. However, authors have generally not addressed considerations of feasibility for health libraries given their limited resources, nor what is reasonable given the goals of parent organisations. For example, collaborations with external organisations or providing resources and training externally might be possible in an academic setting but outside of scope for librarians working in a hospital. Health librarians must carefully consider what is practicable in their own context.

Discussion

This study has identified the current issues and status of mis/disinformation within the context of health sciences libraries. Based on this review, health library practices

related to mis/disinformation can be categorised into the following: source evaluation, information literacy, research, and collaboration.

Source evaluation represents actions focused on assessing the reliability of information sources. Based on this review, identifying predatory journals (Herrero-Diz & Lopez-Rufino, 2021), identifying misinformation via checklists such as creating blacklists & whitelists e.g. Beall's list and contributions to DOAJ (Allen, 2021) were the primary activities undertaken by health libraries. Studies in other library sectors also indicate the utilisation of a checklist approach to evaluate information sources in library practices combating fake news (Revez & Corujo, 2021).

Information literacy represents actions/training provided to patrons and staff and focused on identifying, finding, evaluating, applying, and acknowledging sources of information. The main activities in support of information literacy were implementation of reference services and training, for example, training staff/faculty on identifying predatory journals (Herrero-Diz & Lopez-Rufino, 2021), training students to use EBM resources to answer clinical questions (Charbonneau & Vardell, 2022), teaching information literacy to high school students and the general public (Barbaro et al., 2022). In other sectors also the literature predominantly emphasises information literacy strategies, with librarians considering information literacy as a primary response to the fake news phenomenon (Agosto, 2018; Dalkir & Katz, 2020).

Research represents actions focused on involving in research, encompassing either health librarians conducting research (Bianchini et al., 2019; Brown, 2008) or the development of search strategies (Naeem & Bhatti, 2020). Research support is mentioned as a strategy of academic libraries' battle against misinformation during COVID-19 (Bangani, 2021).

Collaboration represents actions focused on collaborating with various stakeholders. For example, Italian librarians collaborated with the National Health Service to strengthen efforts against misinformation (Barbaro et al., 2022). Additionally, collaboration was observed with the Health Informatics Promotion Project to spread awareness of COVID-19 (Chan et al., 2022). In a recent report from Critica – a nonprofit research organisation committed to combating misinformation – "Coalitions/Collaborations" were identified as practices against misinformation. Thirteen initiatives labelled as coalitions have entailed collaborations that unite various stakeholders (Scales & Gorman, 2023).

Conclusion

A diverse array of ideas and activities are currently being undertaken by health librarians with regard to mis/disinformation. As yet, there is insufficient evidence to gauge the success of the suggested strategies and methods, highlighting a notable gap in assessing the impact of libraries' efforts. This study also underlines the

importance of considering the health library's role within the broader goals of the parent organisation. It provides insights for further research and issues to consider for librarians who want to combat mis/disinformation.

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Appendix 1. The list of the publications being reviewed

Akers, K. G. (2018). [Report from the Medical Library Association's InSight Initiative Summit 1: Engaging Users in a Disruptive Era](#)

Allen, R. M. (2021). [When peril responds to plague: predatory journal engagement with COVID-19](#)

Bianchini, C., et al. (2019). [Avoiding misleading information: A study of complementary medicine online information for cancer patients](#)

Barbaro, A., et al. (2022). [Embedded librarians: An innovative experience in health and wellness communication](#)

Barr-Walker, J., et al. (2021). [Countering misinformation about abortion: The role of health sciences librarians](#)

Brown, C. (2008). [The information trail of the 'Freshman 15'--a systematic review of a health myth within the research and popular literature](#)

Brown Epstein, H.-A. (2022). [Dispelling Covid-19 misinformation](#)

Chan, H., et al. (2022). [Equipping students and beyond with sound COVID-19 knowledge to survive and thrive despite the pandemic](#)

Charbonneau, D. H., et al. (2022). [The impact of COVID-19 on reference services: A national survey of academic health sciences librarians](#)

Herrero-Diz, P., et al. (2021). [Libraries fight disinformation: An analysis of online practices to help users' generations in spotting fake news](#)

Jaeger, P. T., et al. (2021). [Arsenals of lifelong information literacy: Educating users to navigate political and current events information in world of ever-evolving misinformation](#)

Kanyengo, C. W. (2010). [Information and communication: A library's local response to HIV/AIDS in Zambia](#)

Kim, H., et al. (2011). [Online health information search and evaluation: Observations and semi-structured interviews with college students and maternal health experts](#)

Kosciejew, M. (2021). [The coronavirus pandemic, libraries and information: A thematic analysis of initial international responses to COVID-19](#)

Miranda, G. F., et al. (2009). [Improving health communication: Supporting the practice of health communication](#)

Morgan-Daniel, J., et al. (2020). [COVID-19 patient education and consumer health information resources and services](#)

Naeem, S. B., et al. (2020). [The Covid-19 'infodemic': a new front for information professionals](#)

Naeem, S. B., et al. (2021). [An exploration of how fake news is taking over social media and putting public health at risk](#)

Pomputius, A. (2019). [Putting misinformation under a microscope: Exploring technologies to address predatory false information online](#)

Schneider, J., et al. (2020). [Continued post-retraction citation of a fraudulent clinical trial report, 11 years after it was retracted for falsifying data](#)

Yuvaraj, M. (2020). [Global responses of health science librarians to the COVID-19 \(Corona virus\) pandemic: a desktop analysis](#)